SUPPLEMENT

8.A ATTACHMENT

8.A.1 Demand Estimation – Multiple Regression

The initial goal of demand function estimation was based on the functional structure with income and price as its main input variables. However, it was not possible to obtain time series data that have effective price changes. Only at two Sum centers a full set of data for the analysis was obtained. At one of the two Sums, Mandal-Ovoo, there was a 20% price reduction within a year. Such impact was observable on the Sum as a whole but was not observable among the data set obtained for the sampled households. In general, the movement of households is quite frequent in a nomadic society. That affects the power consumption to a large extent. There may be a substantial lag before the consumer becomes aware of the difference in tariffs. In addition, the power station cut electricity supply when there was some accident, leading to a reduction in demand in that month. The disturbances are numerous. The only statistically significant variables in relation to power consumption were the ownership of electric appliances. Therefore, the demand function is an equation consisting of the number of electric appliances owned.

Table I.8.A-1 shows the results of the regression analysis conducted with the typical electric appliances as the independent variables.

Table I.8.A-1 Summary of Regression Analysis with Appliance Ownership

	coeffcient	t-statistic	coeffcient	t-statistic	coeffcient	t-statistic	coeffcient	t-statistic
intercept	15.42	1.42	10.74	1.23	22.41	5.32	22.36	6.32
color	16.78	2.99	17.61	3.93	19.36	4.62	21.76	6.15
radio								
refrigerator								
log of lamp								
log of no. appliance	4.53	0.70	2.28	0.66				
electric stove	6.10	1.54	7.60	1.45	7.36	2.11	4.70	1.53
no. of samples	24		22*		24		22*	
R-squared	0.59		0.73		0.58		0.70	
Corrected R-sq	0.52		0.69		0.54		0.67	

* excluding outlier samples

8.A.2 Nightly Hours That Require Illumination During Winter and Summer

The difference in power demand between during winter and summer is quite large in Mongolia. For this reason, many Sum centers stop supplying electricity during summer. One reason is that nomadic households leave towns for better grazing ground during summer. Another large impact is due to the

high latitude of the country which makes a large difference in daylight time between summer and winter. As a result, the illumination time creates a large difference in electricity consumption[*3.]

In order to derive the difference in power consumption that is caused by the difference in daylight time, the dark hours, i.e. after the sun sets till 11 pm and after the sun rises till 7 am are calculated for every day for one year for a typical location in Mongolia (46 degree North and 105 degrees east.) Then the night hours were averaged for the summer and winter (between equinoxes.) The calculation shows that winter has 5 hours and 57 minutes of nighttime while the summer has 2 hours and 47 minutes.

Table I.8.A-2 Night Hours Winter/Summer

unit hour:minute

	night time	morning before dawn
Annual	3:53	0:28
Winter	5:00	0:57
Summer	2:47	0:00

winter and summer are defined as times between equinoxes

8.A.3 Summer to Winter Power Consumption Ratio

Since the demand function derived in A.1 is based on the data for winter power consumption, the demand for the winter per an average household is derived to be 891W per day. From the Sample Survey, the average ownership of electric appliances is surveyed. From the ownership of the lamps, the power consumed for illumination is estimated based on the assumption that the lamps are used during 85% of the nightly hours and discount ratio of 1.27. The average viewing hours for TV is assumed to be 2 hours per day. The balance of power consumption is assumed to be unchanged regardless of seasons. Following these assumptions, the ratio of summer power consumption to that during winter is estimated to be 0.65 as shown in Table I.3.A-3.

*3 The other factor that may affect the use of power is the difference in temperature. However the impact is much more negligible compared to daylight time differences.

Table I.8.A-3 Summer to Winter Power Consumption Ratio

Appliance	ownership	capacity W	Average W	winter power consumption W	summer electricity
B/W TV	70%	82	57.4	114.8	114.8
Color TV	20%	100	2.0	40.0	40.0
VCR	7%	60	4.2	8.4	8.4
Radio/Cassette	50%	10	5	0.3	0.3
Fluorescent Lamps	24%	40	9.6	38.2	17.9
Lamps	226%	60	1,35.6	540.0	252.6
Electric Stove	60%	2,000	1,200	78.7	78.7
Washing M/C	19%	200	38	2.5	2.5
Refrigerator	32%	150	48	3.1	3.1
Air Fan	2%	50	1	0.1	0.1
Air Conditioner	0%	0	0	0.0	0.0
Computer	1%	150	1.5	0.1	0.1
Iron	72%	1,000	720	47.2	47.2
Electric Oven	7%	2,000	140	9.2	9.2
Electric Rice Cooker	2%	400	8	0.5	0.5
Vacuum Cleaner	10%	760	76	5.0	5.0
Generator	4%	1,125	45	3.0	3.0
Others	1%	100	1	0.1	0.1
Total		8,287	2,510.3	891	583

Summer/Winter Ratio	0.65

8.A.4 Unit Capacity Power Demand At Public Facilities

There are variations in terms of power requirements from the public facilities in different Sum centers. Therefore it is necessary to obtain a certain size of samples to drive the average parameters. The sample data set was taken from the data collected by the Inventory Survey from the Sums where the public facilities are equipped with kWh meters. These Sums have the records of the power sales as well as power tariffs. The power consumption can be calculated from these two data sets. The power consumption data are then divided by the number of students for the school （ｋＷｈ/student/hour） and divided by the number of beds for the hospital (kWh/bed/hour.) Furthermore these unit consumptions were averaged by the class of annual operation hours to analyze the changes in unit consumption in relation to the increase in annual operation hours. The unit consumption decreases as annual operation hour sincrease. The proposing systems are going to be based on the continuous annual operation for 24 hours each day. Therefore the unit values need to be estimated in the extension of the trends as shown in Table I.8.A-2. There is no data that indicate the capacities of Sum offices and also the office capacity does not correspond to the size of Sum either. Therefore the constant value has been adopted for the Sum office.

Table I.8.A-4 Public Facility Unit Power Consumption

	Unit	Annual Operation Hours							Adopted Parameter
		below 1000 hrs	over 1000 hrs	over 2000 hrs	over 3000 hrs	over 4000 hrs	6000 hrs	8000 hrs	
Hospital	sample No.	7	17	10	7	4			
	kWh/bed/hour	0.17	0.09	0.09	0.10	0.073	0.038	0.026	**0.026**
	elasticity			0.02	0.30	−0.90	−0.95	−1.00	
School	sample No.	5	17	10	7	4			
	kWh/student/hour	0.0032	0.0040	0.0029	0.0010	0.0011	0.0007	0.0005	**0.0005**
	elasticity			−0.27	−1.30	0.34	−0.80	−1.00	
Sum Office	sample No.	7	17	10	7	4			
	kWh/year	594	578	910	1,134	1,342	1,544	1,698	**1,700**
	elasticity			0.58	0.49	0.56	0.30	0.30	

＊ estimated values
full annual operation hours is equated to 8000 hours

8.A.5 Estimation of Load Factor

There is no power station in the Sum center which has a kWh meter to monitor the output continuously. The generator has a kW meter but no Sum center power station records the output level continuously. During the Sample Survey there was no Sum center that had a power supply, as summer season is usually off-season. The load curve of the central grid system is available but does not reflect the totally different demand pattern comprising of large segments of business and manufacturing in urban areas. Hence it is not accurate to apply the central pattern to the Sum power system. The only available data at hand is the data on the current and past operation patterns. The data basically rely on the memories of the operators at the power station, but the accuracy is rather high as it is repeated every day. However, the operation pattern is not equal to demand pattern as the generator is at work during the daytime without full needs.

The actual load factor level was estimated from the Inventory Survey data. The sample Sums were drawn according to the criteria of having meters for public facilities and other users (33 samples.)

Table I.8.A-5 Sampled Sums for Load Factor Estimation

	id	Sum	Aimag	Working capacity kW	Annual operation hour	Annual kWh
Under 1500 hrs	80	BATSHIREET	KHENTII	100	900	45,234
	80	ALDARKHAAN	ZAVKHAN	160	1050	54,636
	12	KHURMEN	UMNUGOBI	151	1320	109,411
Between 1500-2500 hrs	103	BAYANZUREKH	KHUVSGUL	75	1560	41,715
	138	BULNAI	ZAVKHAN	450	1920	240,375
	94	NARIINTEEL	UVURKHANGAI	63	2160	29,032
	89	BOGD	UVURKHANGAI	90	2450	97,000
Between 2500-3500 hrs	2	BAYAN-OVOO	UMNUGOBI	120	2520	28,815
	8	NOMGON	UMNUGOBI	120	2630	123,553
	10	KHANBOGD	UMNUGOBI	90	2880	35,309
	64	TUMENTSOGT	SUKHBAATAR	300	3060	169,208
	25	DARVI	GOBI-ALTAI	60	3114	20,876
Between 3500-5000 hrs	11	TSOGT-OVOO	UMNUGOBI	60	3832	12,855
	9071	GALSHAR	KHENTII	40	4680	35,276
	1	BAYANDALAI	UMNUGOBI	60.3	4770	19,796
	13	TSOGTTSETSII	UMNUGOBI	90	4812	37,767
Over 5000 hrs	93	KHAIRKHANDULAAN	UVURKHANGAI	75	5400	26,588
	61	BAYANDELGER	SUKHBAATAR	160	6480	45,929
	3	BULGAN	UMNUGOBI	130	7380	110,644

Source: JICA Master Plan Study for Rural Power Supply, Inventory Survey

Table I.8.A-6 summarizes Table I.8.A-5 for each group.

Table I.8.A-6 Annual Operation Hour and Load Factor

	Average Load Factor
under 1500 hrs hrs	53%
between 1500-2500 hrs	32%
between 2500-3500 hrs	31%
between 3500-5000 hrs	13%
over 5000 hrs	11%

Source: JICA Master Plan Study for Rural Power Supply

As the above table suggests, the longer the annual operation hour is, the lower the load factor becomes, agreeing to general tendencies. The same data set was classified by seasonal and daily operation type.

Table I.8.A-7 Load Factor by Seasonal and Daily Operation Type

operation type				load factor	sample no.
winter		summer			
peak	off-peak	peak	off-peak		
yes	no	no	no	45%	6
yes	yes	no	no	20%	2
yes	yes	yes	no	21%	8
yes	yes	yes	yes	17%	2
yes	no	yes	yes	18%	1

Source: JICA Master Plan Study for Rural Power Supply, Inventory Survey

The load factor for the operation restricted to winter peak hours is the highest while the operation with daytime operation and summer time operation has the lowest load factor. The reason why the yearly operation type has a higher load factor for those Sums that operate over 5000 hours per year is that some of these Sum centers only supply during the daytime peak hours.

From the above observations and analysis on operation hour and seasons, it is concluded that the load factor be set at 0.2 for the winter weekdays.

Appliance	ownership	capacity W	Average W	winter power consumption W	summer electricity
B/W TV	70%	82	57.4	114.8	114.8
Color TV	20%	100	2.0	40.0	40.0
VCR	7%	60	4.2	8.4	8.4
Radio/Cassette	50%	10	5	0.3	0.3
Fluorescent Lamps	24%	40	9.6	38.2	17.9
Lamps	226%	60	1,35.6	540.0	252.6
Electric Stove	60%	2,000	1,200	78.7	78.7
Washing M/C	19%	200	38	2.5	2.5
Refrigerator	32%	150	48	3.1	3.1
Air Fan	2%	50	1	0.1	0.1
Air Conditioner	0%	0	0	0.0	0.0
Computer	1%	150	1.5	0.1	0.1
Iron	72%	1,000	720	47.2	47.2
Electric Oven	7%	2,000	140	9.2	9.2
Electric Rice Cooker	2%	400	8	0.5	0.5
Vacuum Cleaner	10%	760	76	5.0	5.0
Generator	4%	1,125	45	3.0	3.0
Others	1%	100	1	0.1	0.1
Total		8,287	2,510.3	891	583

Summer/Winter Ratio	0.65

CHAPTER 2 PILOT PLANT

SUPPLEMENT

Table II.2-1 Monthly Data of Adaatsag (1/14)

Jun (1999)	Solar Irradiation	Sunshine duration	Atmospheric Pressure	Wind direction	Wind Velocity	Maximum Ins. Velocity	Direction at max. Ins. velocity	PV power Generation	Wind power Generation	Charge / Discharge power	AC supply from Inverter	Supply to DC Refrigerator	Average Ambient Temp. 1	Average Temp. of Cubicle 2
	kWh/m2	h	hPa		m/s	m/s		kWh	kWh	kWh	kWh	Wh	℃	℃
1	8.186	13.6	775	W	6.5	18.1	NNW	7.00	5.16	1.81	1.50	279.8	15.8	21.1
2	8.075	12.1	777	SE	4.2	15.0	NNW	10.39	1.67	1.31	1.76	464.5	14.4	22.1
3	7.162	9.9	779	E	4.3	11.8	N	9.56	2.69	-1.77	4.33	690.0	12.6	20.5
4	6.679	8.6	776	ENE	5.8	17.2	NE	13.52	3.77	4.35	3.54	504.9	14.7	21.2
5	8.380	13.2	782	E	6.3	13.4	N	8.09	4.79	-0.47	3.60	666.6	14.3	21.5
6	8.056	12.9	785	S	4.0	12.2	W	11.00	1.58	0.28	2.85	534.5	18.9	24.2
7	8.156	13.8	782	SW	3.9	13.4	NW	11.93	1.07	1.49	2.37	284.5	21.4	27.4
8	7.692	13.6	781	ESE	5.2	13.2	NNW	9.22	2.54	1.03	1.54	403.7	18.8	26.4
9	7.814	11.0	780	SE	4.5	13.5	S	11.16	2.42	1.22	2.93	345.5	20.6	26.0
10	7.410	11.7	773	SW	5.0	18.4	WSW	9.93	3.07	1.99	1.91	239.5	25.4	29.0
11	7.121	11.1	772	S	4.1	10.9	NE	7.88	2.78	-0.37	1.70	517.4	25.0	29.8
12	3.484	3.6	772	SSE	6.7	16.2	WSW	4.80	6.58	0.00	1.91	533.1	22.1	26.1
13	7.265	11.3	772	SSW	7.5	18.1	NNW	5.87	6.96	0.61	2.61	514.9	16.4	22.9
14	6.843	8.5	781	N	6.3	13.9	NNE	8.69	5.54	0.68	3.92	427.7	15.1	21.7
15	2.385	2.8	782	E	8.2	15.4	ESE	4.52	9.10	-1.51	5.48	158.7	9.8	14.1
16	6.026	9.6	777	SSE	5.1	13.8	NW	11.40	2.55	1.29	3.19	316.1	12.9	17.6
17	8.088	13.9	778	E	3.1	8.7	NNE	12.18	0.06	-1.17	3.85	302.2	15.9	22.8
18	8.186	12.8	778	SE	5.4	13.7	SSE	12.09	3.50	3.02	2.99	456.6	20.7	24.7
19	8.890	13.8	778	WNW	9.1	19.6	NNW	4.78	7.48	-0.86	3.12	709.4	15.7	23.1
20	8.289	13.3	777	WSW	8.9	17.0	NNW	4.45	10.49	1.76	3.46	379.9	12.9	19.5
21	6.903	10.7	778	SSE	10.2	20.8	NNW	6.77	3.67	-3.44	4.01	426.1	11.2	15.8
22	7.624	13.6	780	S	2.9	11.5	ESE	13.56	0.48	0.02	4.36	426.1	16.0	23.2
23	8.510	14.4	778	E	2.5	9.2	NE	13.34	0.07	0.63	3.23	395.0	18.9	26.2
24	5.512	8.6	775	SW	3.6	17.9	N	10.63	0.75	-2.39	4.16	397.6	20.7	25.1
25	7.302	11.6	774	WSW	4.2	18.3	W	14.77	1.43	3.15	3.28	609.5	19.3	25.1
26	7.945	13.5	776	SSW	3.4	10.0	N	15.00	1.45	-0.49	6.68	784.9	18.8	23.9
27	6.052	9.1	771	SW	6.5	24.4	SW	11.45	3.40	-0.15	5.16	603.6	26.3	27.7
28	7.028	10.2	775	S	9.3	20.5	NNW	5.21	11.06	1.97	4.39	507.5	16.2	23.3
29	7.885	11.7	778	E	4.6	10.7	ESE	11.94	1.92	-1.28	5.02	662.4	18.1	23.1
30	5.881	9.7	776	SE	6.9	21.5	S	10.87	7.43	3.83	4.18	913.8	22.3	25.4
Average	7.160	11.1	777	SSE	5.6			9.73	3.84	0.55	3.43	481.8	17.7	23.3
Maximum	8.890	14.4	785	SSE	10.2	24.4	SW	15.00	11.06	4.35	6.68	913.8	26.3	29.8
Minimum	2.385	2.8	771	E	2.5			4.45	0.06	-3.44	1.50	158.7	9.8	14.1
Total	214.829	334.2						292.00	115.46	16.54	103.03	14456.0		

Ins. = Instantaneous
Max. = Maximum
kWh/m2 = kilowatt hour per meter square
h = Hour
hPa = Hechta-Pascal (Millbrae)
m/s = Meter per second
kWh = kilowatt hour
Wh = Watt hour
℃ = Centigrade

Table II.2-1 Monthly Data of Adaatsag (2/14)

Jul (1999)	Solar Irradiation	Sunshine duration	Atmospheric Pressure	Wind direction	Wind Velocity	Maximum Ins. Velocity	Direction at max. Ins. velocity	PV power Generation	Wind power Generation	Charge / Discharge power	AC supply from Inverter	Supply to DC Refrigerator	Average Ambient Temp. 1	Average Temp. of Cubicle 2
	kWh/m2	h	hPa		m/s	m/s		kWh	kWh	kWh	kWh	Wh	℃	℃
1	3.903	5.4	771	SSW	7.0	15.1	SW	7.20	1.01	-5.65	3.81	922.4	18.4	21.8
2	7.551	13.4	774	SW	3.7	11.0	WSW	14.50	1.75	2.64	3.84	516.5	19.5	23.3
3	5.790	9.7	776	E	5.6	17.4	NE	11.48	2.36	-0.05	3.95	662.1	21.3	25.1
4	5.705	9.2	780	ESE	5.8	12.4	N	11.45	3.70	-4.74	12.06	672.5	15.8	21.4
5	8.096	12.6	783	NE	5.1	12.1	N	15.84	3.79	2.72	6.32	905.5	16.6	23.6
6	3.529	5.3	782	E	3.3	9.4	S	6.81	0.22	-8.81	5.39	861.8	15.8	21.4
7	6.513	10.7	780	SE	2.3	12.7	N	12.90	0.57	-1.76	4.65	1049.7	17.6	24.2
8	5.916	9.5	778	S	4.6	15.7	WNW	12.07	3.25	1.40	3.39	1156.2	15.6	22.1
9	6.384	10.6	778	WNW	5.4	12.0	NNW	12.44	5.03	0.91	6.23	677.6	14.0	20.3
10	5.959	11.7	777	W	5.1	11.6	NW	11.56	3.57	2.46	2.80	703.2	14.3	20.3
11	7.224	13.6	777	ESE	4.1	9.2	NNW	13.35	1.67	-0.03	4.45	1146.0	17.3	23.7
12	6.874	11.8	777	E	1.9	8.5	SSE	13.29	0.01	-0.51	3.28	1151.4	20.7	26.6
13	7.687	12.4	778	SSE	2.7	9.2	SW	14.82	0.32	0.25	4.28	1149.1	24.2	28.3
14	6.202	11.0	779	S	2.8	14.8	WSW	11.93	1.55	-2.66	5.53	1111.3	25.2	29.5
15	8.127	12.0	779	SE	3.6	21.1	NNW	15.81	0.49	-3.50	8.37	1191.4	26.2	30.2
16	7.131	11.5	781	ENE	5.1	10.9	N	15.06	0.00	-3.09	7.27	1144.8	22.9	28.3
17	5.905	9.8	781	SSE	4.5	14.8	NW	11.80	0.00	-6.68	7.62	1099.3	22.2	27.9
18	6.308	10.5	779	ENE	3.2	10.3	E	12.92	0.63	-2.46	5.36	1143.7	22.7	28.3
19	7.022	12.3	776	S	1.9	6.8	N	13.75	0.00	-4.52	7.52	1100.6	25.4	30.2
20	7.723	13.6	777	ENE	2.9	8.4	ENE	14.94	0.31	-0.54	5.26	1117.1	27.6	32.3
21	7.749	13.3	779	ENE	4.4	9.5	E	15.10	1.36	-0.84	6.54	1131.0	29.2	33.3
22	7.547	12.6	782	SSE	3.6	10.1	SSW	14.63	0.84	-1.43	6.26	1128.0	30.5	34.3
23	7.612	10.5	782	SSW	3.0	13.1	NE	14.93	0.56	0.17	4.84	1108.8	30.9	34.8
24	6.034	10.3	780	SE	4.6	22.5	S	12.02	0.01	-4.13	5.60	1117.2	31.3	34.4
25	5.712	9.7	777	SSW	5.6	16.8	SE	11.59	0.10	-4.35	5.55	1121.3	31.8	34.3
26	5.703	7.3	777	SW	8.1	16.9	NNW	12.81	0.01	-3.80	5.93	1123.4	23.7	27.9
27	3.263	4.5	779	E	7.0	13.3	NE	6.52	1.91	-8.60	6.31	1147.4	23.4	27.3
28	7.500	12.1	777	WSW	4.8	13.1	WNW	15.76	4.11	1.67	7.43	1129.6	24.1	29.2
29	5.959	9.4	779	SSW	3.9	14.2	NW	13.30	0.01	-3.22	5.81	1135.9	21.3	27.2
30	7.410	13.5	781	SSE	5.0	10.6	NNW	15.44	0.07	-7.89	11.91	1142.8	19.9	26.3
31	7.637	12.7	782	S	5.1	18.1	N	16.57	4.08	0.03	9.44	1149.1	19.5	26.3
Average	6.505	10.7	778	SSE	4.3			12.98	1.39	-2.17	6.03	1029.5	22.2	27.2
Maximum	8.127	13.6	783	SW	8.1	22.5	S	16.57	5.03	2.72	12.06	1191.4	31.8	34.8
Minimum	3.263	4.5	771	E & S	1.9			6.52	0.00	-8.81	2.80	516.5	14.0	20.3
Total	201.675	332.5						402.59	43.29	-67.01	187.00	31916.7		

Ins. = Instantaneous
Max. = Maximum
kWh/m2 = kilowatt hour per meter square
h = Hour
hPa = Hechta-Pascal (Millbrae)
m/s = Meter per second
kWh = kilowatt hour
Wh = Watt hour
℃ = Centigrade

Table II.2-1 Monthly Data of Adaatsag (3/14)

Aug (1999)	Solar Irradiation	Sunshine duration	Atmospheric Pressure	Wind direction	Wind Velocity	Maximum Ins. Velocity	Direction at max. Ins. velocity	PV power Generation	Wind power Generation	Charge / Discharge power	AC supply from Inverter	Supply to DC Refrigerator	Average Ambient Temp. 1	Average Temp. of Cubicle 2
	kWh/m2	h	hPa		m/s	m/s		kWh	kWh	kWh	kWh	Wh	℃	℃
1	8.095	13.4	783	SSW	5.8	13.3	NNW	16.85	6.02	6.30	5.81	1153.2	17.6	24.1
2	3.779	5.7	781	SSE	2.2	8.3	WSW	7.84	0.34	-10.77	7.60	1205.5	20.3	25.1
3	3.027	4.0	777	SSE	5.2	18.0	NW	6.02	5.65	-4.33	5.49	1112.7	21.9	25.6
4	4.557	5.8	777	E	5.0	10.3	N	9.89	2.76	-2.78	5.00	1051.1	19.2	24.9
5	1.694	0.9	771	SE	4.4	9.9	S	3.01	1.93	-8.72	3.69	759.4	17.6	21.4
6	6.891	11.4	766	W	4.7	23.6	NNW	15.83	3.58	2.90	6.24	739.1	19.1	23.5
7	6.761	10.7	769	SW	6.8	16.3	NW	15.62	0.04	-0.22	5.47	945.8	16.4	21.3
8	4.647	6.9	768	SW	8.6	22.9	WSW	10.30	0.28	-7.09	6.87	1160.1	13.0	15.7
9	6.688	12.1	776	W	6.2	16.4	NW	14.81	0.17	0.78	5.45	375.3	11.8	16.0
10	7.582	13.4	780	SSW	2.9	11.0	WSW	16.81	1.46	-0.90	8.25	1184.7	17.7	22.4
11	6.610	11.1	776	SSW	3.8	16.6	SW	14.99	3.38	0.87	7.24	932.2	23.7	26.5
12	7.368	12.7	774	SSW	6.3	14.8	NW	17.07	7.54	6.71	7.39	959.8	20.6	26.0
13	6.909	12.6	779	E	7.4	13.8	SE	16.07	9.00	6.34	7.89	1168.1	19.5	24.3
14	4.229	7.7	779	ESE	8.6	19.6	SSE	8.92	4.73	-5.42	8.22	1161.5	22.3	24.7
15	2.330	3.0	778	SSE	6.7	14.6	SE	4.15	0.01	-14.30	7.81	1142.1	23.9	26.6
16	2.853	4.5	785	ENE	5.9	13.9	N	5.73	3.44	-4.90	4.53	1040.7	16.1	21.0
17	3.065	4.7	785	SSE	3.6	13.4	NW	7.08	1.87	-0.36	1.82	804.7	13.7	18.0
18	4.241	9.1	785	SSW	3.6	18.8	NNW	9.97	2.24	1.56	2.74	866.5	12.9	18.2
19	6.812	12.2	787	SW	5.8	15.1	NNW	16.83	2.32	2.34	6.96	927.5	12.8	18.6
20	6.761	11.8	785	SE	2.4	7.0	E	16.95	0.00	5.44	3.01	842.1	17.0	22.8
21	6.290	10.8	767	SSE	1.7	11.1	SSE	13.18	0.00		4.56	707.1	18.3	24.1
22	5.906	10.2	733	S	2.5	12.2	WSW	6.53				364.8	19.4	24.0
23	6.702	12.0	782	E	3.6	9.4	E	17.13	0.00	-0.32	7.08	909.0	20.2	25.6
24	4.138	7.0	785	E	4.3	11.5	N	9.68	0.00	-6.88	6.81	790.8	18.1	23.5
25	5.801	10.6	781	S	3.5	15.1	NW	14.88	0.00	2.76	3.86	820.7	19.6	24.2
26	6.064	10.3	779	WSW	7.9	20.5	NNW	15.69	0.00	1.93	3.95	1020.7	13.6	18.6
27	6.260	10.7	779	SSW	3.5	11.8	WSW	17.23	0.00	3.62	3.28	1100.0	13.8	19.4
28	6.673	12.2	778	SSW	3.5	8.6	NW	17.91	0.00	2.00	5.33	1136.2	16.4	22.5
29	6.195	10.9	780	ESE	3.1	9.7	SSE	17.01	0.00	2.08	4.44	1104.5	20.1	24.7
30	6.350	10.9	777	SSE	4.9	13.0	W	17.21	0.00	0.79	5.92	978.3	23.1	26.6
31	5.780	10.8	777	S	4.8	19.9	WSW	15.74	0.00	-2.00	7.01	1073.7	25.1	28.3
Average	5.518	9.3	776	S	4.8			12.80	1.89	-0.78	5.65	952.8	18.2	22.8
Maximum	8.095	13.4	787	ESE/SW	8.6	23.6	NNW	17.91	9.00	6.71	8.25	1205.5	25.1	28.3
Minimum	1.694	0.9	733	SSE	1.7			3.01	0.00	-14.30	1.82	364.8	11.8	15.7
Total	171.058	290.1						396.93	56.76	-22.57	169.72	29537.9		

Ins. = Instantaneous
Max. = Maximum
kWh/m2 = kilowatt hour per meter square
h = Hour
hPa = Hechta-Pascal (Millbrae)
m/s = Meter per second
kWh = kilowatt hour
Wh = Watt hour
℃ = Centigrade

Table II.2-1 Monthly Data of Adaatsag (4/14)

Sep (1999)	Solar Irradiation	Sunshine duration	Atmospheric Pressure	Wind direction	Wind Velocity	Maximum Ins. Velocity	Direction at max. Ins. velocity	PV power Generation	Wind power Generation	Charge / Discharge power	AC supply from Inverter	Supply to DC Refrigerator	Average Ambient Temp. 1	Average Temp. of Cubicle 2
	kWh/m2	h	hPa		m/s	m/s		kWh	kWh	kWh	kWh	Wh	℃	℃
1	4.335	8.9	781	SE	7.8	16.7	N	10.84	0.00	-5.91	6.62	538.3	18.3	23.5
2	5.952	10.9	782	E	4.6	14.3	SE	17.08	0.00	2.18	5.47	112.9	18.6	23.8
3	5.317	8.8	780	SE	3.0	13.3	NW	15.12	0.00	-0.06	5.12	666.0	23.3	26.9
4	4.828	8.5	779	SE	2.7	8.3	NE	14.06	0.00	1.39	2.55	955.2	22.8	27.1
5	1.754	1.2	776	WSW	4.3	13.7	WNW	3.34	0.00	-8.41	2.82	810.3	17.0	21.0
6	6.048	11.1	774	W	5.0	15.0	NNW	17.56	0.00	7.02	3.40	695.3	18.1	22.0
7	4.349	9.2	776	SE	3.8	11.6	N	12.30	0.00	-1.39	3.25	1171.5	16.8	22.7
8	6.010	11.5	774	SW	3.0	10.4	SW	17.93	0.00	4.01	3.45	1160.5	19.5	24.8
9	5.317	9.5	775	WNW	5.9	17.6	W	16.01	0.00	0.09	4.96	1103.2	17.9	21.9
10	5.289	11.3	777	SW	7.2	17.2	NW	15.77	0.00	0.38	4.71	1147.7	10.0	16.0
11	5.938	11.4	778	SSE	4.7	15.6	WNW	18.82	0.00	2.17	6.08	977.1	9.9	15.5
12	5.779	10.6	781	ESE	5.0	16.3	NNE	18.59	0.00	1.18	6.72	949.1	8.8	17.0
13	4.264	8.1	785	NE	5.5	13.2	NNE	12.32	0.00	-4.90	6.47	1023.7	4.6	11.6
14	4.331	8.1	785	E	2.6	8.1	SSW	13.23	0.00	-2.73	5.87	769.8	6.7	13.4
15	2.287	3.9	783	SE	3.3	8.5	SSE	5.13	0.00	-5.46	3.06	526.5	4.9	10.0
16	2.981	6.0	782	E	6.6	13.3	SE	8.16	6.44	3.61	4.07	236.8	6.2	9.0
17	2.705	4.6	784	E	5.3	13.9	SE	5.85	4.61	-2.33	3.81	290.9	7.8	10.9
18	2.490	3.5	787	E	5.2	11.8	ENE	5.21	3.64	-2.75	3.38	160.8	5.6	9.6
19	3.659	7.4	789	ENE	4.9	10.1	ENE	10.90	2.10	6.02	0.65	38.4	6.1	9.9
20	5.029	8.7	789	ESE	4.8	11.8	E	17.94	3.11	8.64	3.02	197.0	5.6	10.6
21	5.559	11.3	786	SW	2.4	10.4	SW	19.98	1.26	10.06	1.95	244.2	5.0	11.4
22	5.251	10.9	780	S	3.1	12.4	SSW	19.44	1.98	7.94	3.70	456.7	7.5	12.9
23	4.907	9.7	778	WSW	7.5	19.1	NW	18.41	13.96	19.57	2.88	518.2	7.3	12.5
24	4.802	10.2	778	SW	3.1	12.7	WSW	17.72	2.24	4.64	5.41	462.4	6.8	12.0
25	4.124	7.5	773	WSW	6.4	20.5	NW	14.32	13.47	14.45	3.65	240.7	9.6	13.4
26	4.904	10.9	781	S	3.1	11.8	NNW	13.04	2.54	3.28	2.90	66.0	6.1	14.0
27	0.549	0.0	781	ESE	4.6	12.2	SE	0.82	3.22	-13.38	7.55	176.0	4.3	8.2
28	4.635	10.8	783	NW	8.7	17.4	NW	14.87	14.27	15.02	4.38	127.5	3.2	8.2
29	4.958	10.6	785	SW	2.1	8.7	WSW	15.05	0.08	1.80	3.86	72.6	3.2	9.1
30	4.824	10.8	782	S	5.7	14.8	NNW	13.06	3.02	3.59	2.72	395.9	2.8	8.8
Average	4.439	8.5	780	SSE	4.7			13.42	2.53	2.32	4.14	543.0	10.1	15.2
Maximum	6.048	11.5	789	NW	8.7	20.5	NW	19.98	14.27	19.57	7.55	1171.5	23.3	27.1
Minimum	0.549	0.0	773	SW	2.1			0.82	0.00	-13.38	0.65	38.4	2.8	8.2
Total	133.175	255.9						402.87	75.94	69.72	124.48	16291.2		

Ins. = Instantaneous
Max. = Maximum
kWh/m2 = kilowatt hour per meter square
h = Hour
hPa = Hechta-Pascal (Millbrae)
m/s = Meter per second
kWh = kilowatt hour
Wh = Watt hour
℃ = Centigrade

Table II.2-1 Monthly Data of Adaatsag (5/14)

Oct (1999)	Solar Irradiation	Sunshine duration	Atmospheric Pressure	Wind direction	Wind Velocity	Maximum Ins. Velocity	Direction at max. Ins. velocity	PV power Generation	Wind power Generation	Charge / Discharge power	AC supply from Inverter	Supply to DC Refrigerator	Average Ambient Temp. 1	Average Temp. of Cubicle 2
	kWh/m2	h	hPa		m/s	m/s		kWh	kWh	kWh	kWh	Wh	℃	℃
1	4.992	11.1	791	SSW	4.7	13.0	NNW	11.71	2.19	0.80	3.55	127.0	-1.7	5.6
2	4.764	10.7	790	SSW	2.4	11.0	SW	12.65	0.33	1.44	2.14	94.8	3.3	8.1
3	4.181	8.1	784	SSW	2.0	10.3	WNW	12.86	0.12	-0.01	3.59	78.2	7.4	11.9
4	4.058	8.9	781	WSW	2.2	10.5	WSW	13.87	0.42	1.43	3.44	84.6	9.2	14.6
5	4.327	9.5	780	W	3.6	10.4	NW	13.94	0.96	2.49	2.90	269.3	8.8	14.0
6	3.962	9.8	781	SW	3.0	9.9	W	13.25	0.00	-0.02	3.48	391.9	9.2	14.6
7	4.362	10.6	782	S	2.4	8.7	WSW	15.81	0.08	2.07	3.64	410.8	10.0	15.9
8	3.575	8.3	776	SW	4.9	15.8	SW	12.67	5.30	4.41	3.61	507.1	10.6	14.4
9	4.370	10.7	774	WSW	5.3	15.2	NW	8.14	3.88	-0.79	2.92	500.7	6.8	11.6
10	3.761	8.7	773	WNW	9.7	20.6	NNW	7.33	6.99	0.25	4.33	242.5	-0.4	3.5
11	3.476	7.3	773	WSW	6.0	18.8	NNW	12.18	4.40	2.41	4.42	280.7	3.4	7.5
12	2.480	5.9	784	S	4.7	11.5	N	5.67	1.97	-1.83	0.25	165.5	-4.1	2.1
13	4.152	9.6	784	SW	5.4	17.3	SW	8.12	4.21	-4.31	6.82	168.6	-2.5	4.6
14	4.192	10.5	785	SW	8.7	22.0	NW	10.01	7.26	6.61	1.44	65.3	-2.6	6.9
15	3.822	10.1	792	W	3.7	11.6	NW	8.87	0.58	-1.34	1.69	0.0	-6.2	1.2
16	3.910	10.0	793	WNW	3.6	11.6	NW	19.61	2.03	-5.29	16.29	0.0	-0.6	4.9
17	3.860	10.2	787	WSW	2.8	9.8	WSW	15.23	0.35	5.93	0.70	0.0	3.1	8.8
18	3.947	10.2	780	WSW	3.6	11.7	WNW	10.80	1.20	1.73	1.22	0.0	3.0	9.4
19	3.839	10.1	783	WNW	5.0	12.5	NW	8.16	2.92	-0.10	2.02	0.0	4.0	10.3
20	4.182	11.0	781	W	2.8	10.0	NW	17.13	0.19	-3.02	6.78	89.0	5.0	9.8
21	3.692	10.1	781	SSW	1.4	6.1	WNW	11.71	0.00	0.60	1.92	134.0	5.7	12.0
22	3.692	10.1	780	SSE	1.7	8.3	SW	11.90	0.00	-1.99	4.28	229.2	6.4	11.7
23	3.505	9.6	779	WSW	5.5	14.4	NNW	16.56	5.09	2.91	8.78	85.3	3.6	10.4
24	1.878	3.5	778	SSE	5.5	16.7	NNW	6.86	5.19	-3.92	6.56	0.0	2.0	6.5
25	3.580	10.0	781	WSW	4.0	11.2	WNW	16.77	3.51	2.49	7.80	143.7	-0.8	6.2
26	3.554	9.8	775	SSW	2.7	11.8	WSW	13.40	0.42	1.27	3.20	92.8	0.0	6.2
27	3.135	9.7	777	NW	8.4	19.9	NW	8.29	7.87	0.54	5.86	0.4	-7.0	3.1
28	3.531	9.8	782	WNW	6.1	18.3	NW	12.80	2.45	-1.76	7.33	0.0	-10.1	-1.3
29	2.706	7.9	781	SSW	1.6	6.4	N	13.27	0.00	-1.99	5.50	134.3	-4.6	0.7
30	2.797	9.6	786	S	5.0	12.2	NNW	14.89	3.60	3.59	5.45	76.6	-2.9	3.0
31	2.453	8.8	787	W	2.2	8.5	WNW	10.97	0.00	-1.43	2.73	332.9	-4.3	1.7
Average	3.701	9.3	781	SW	4.2			12.11	2.37	0.42	4.34	151.7	1.7	7.7
Maximum	4.992	11.1	793	WNW	9.7	22.0	NW	19.61	7.87	6.61	16.29	507.1	10.6	15.9
Minimum	1.878	3.5	773	SSW	1.4			5.67	0.00	-5.29	0.25	0.0	-10.1	-1.3
Total	114.735	290.2						375.43	73.51	13.17	134.64	4705.2		

Ins. = Instantaneous
Max. = Maximum
kWh/m2 = kilowatt hour per meter square
h = Hour
hPa = Hechta-Pascal (Millbrae)
m/s = Meter per second
kWh = kilowatt hour
Wh = Watt hour
℃ = Centigrade

Table II.2-1 Monthly Data of Adaatsag (6/14)

Nov (1999)	Solar Irradiation	Sunshine duration	Atmospheric Pressure	Wind direction	Wind Velocity	Maximum Ins. Velocity	Direction at max. Ins. velocity	PV power Generation	Wind power Generation	Charge / Discharge power	AC supply from Inverter	Supply to DC Refrigerator	Average Ambient Temp. 1	Average Temp. of Cubicle 2
	kWh/m2	h	hPa		m/s	m/s		kWh	kWh	kWh	kWh	Wh	℃	℃
1	3.087	9.5	786	WSW	2.1	7.4	WNW	14.87	0.00	0.70	4.71	0.0	-1.7	4.2
2	3.050	9.5	784	SW	1.3	5.5	SSW	14.62	0.00	-2.23	7.61	0.0	-1.1	4.8
3	2.874	9.2	779	WSW	1.6	7.1	SW	16.42	0.00	-0.42	7.10	126.8	1.3	5.9
4	3.041	9.2	778	S	2.4	7.8	SW	15.27	0.05	2.65	3.54	0.0	2.5	7.2
5	2.247	6.2	779	NE	5.6	11.0	NNE	11.01	2.97	-4.54	8.42	381.6	2.1	6.4
6	2.298	6.6	783	WSW	6.8	15.4	NW	12.04	9.94	0.35	10.44	1139.3	-1.3	4.0
7	2.736	9.2	787	SSW	1.0	4.9	SSW	17.03	0.00	-0.62	6.75	1140.5	-1.5	5.0
8	2.573	7.2	784	S	0.9	6.2	SW	15.48	0.00	0.46	4.46	1002.2	-1.0	4.4
9	2.762	8.6	777	SW	3.1	9.5	NW	18.19	0.63	0.01	8.18	817.9	-0.6	5.1
10	2.709	9.0	772	WSW	2.4	9.2	SW	16.33	0.28	2.56	4.59	113.0	-2.1	4.7
11	2.377	6.9	774	WNW	6.6	18.5	NW	10.55	7.20	0.45	7.32	259.4	-4.4	3.2
12	1.048	0.7	773	S	4.7	16.4	NNW	2.55	5.58	-5.11	3.76	292.5	-5.3	-1.4
13	2.453	8.9	781	NW	8.2	17.2	NNW	13.66	8.35	5.92	5.98	300.1	-10.7	-1.8
14	2.772	8.7	787	SSW	1.6	9.4	WNW	14.82	0.00	-3.19	7.48	286.2	-12.1	-4.2
15	2.616	8.4	785	SSE	1.9	9.7	SSW	17.41	0.32	-1.92	9.47	219.2	-9.8	-3.2
16	2.102	6.3	784	W	6.6	21.2	NW	12.58	6.84	1.41	7.92	317.2	-7.4	-1.3
17	2.484	8.8	782	W	3.1	11.1	NW	16.60	1.46	-1.75	9.78	112.9	-4.4	1.5
18	2.446	8.6	777	SW	4.7	14.9	NW	17.98	2.04	1.13	9.03	0.0	-3.7	2.5
19	2.426	8.6	776	SW	2.2	9.5	WSW	18.09	0.90	-1.09	9.88	242.2	-3.9	1.6
20	2.347	8.2	772	SSW	1.6	7.3	SW	16.73	0.00	-0.91	7.13	681.0	-4.3	1.8
21	2.182	7.6	769	S	1.6	7.7	SW	15.16	0.21	-4.36	9.22	630.9	-2.6	2.7
22	1.333	3.3	770	WSW	1.9	7.3	NW	4.95	0.00	-11.35	6.15	533.7	-2.4	1.5
23	1.066	0.3	780	WSW	8.7	18.3	NNW	2.38	17.50	4.37	5.51	456.5	-8.5	-2.6
24	1.256	0.1	785	SE	8.1	16.3	NW	2.28	14.75	-0.76	7.75	362.6	-17.2	-10.8
25	2.331	8.3	785	WNW	4.2	16.3	NW	17.52	3.24	-0.90	11.32	264.0	-21.2	-13.3
26	1.993	6.3	782	NW	7.6	15.4	NW	10.16	10.29	5.27	5.67	84.4	-15.1	-9.2
27	1.865	6.4	784	NW	6.9	16.6	NW	11.23	8.67	1.66	8.29	186.1	-11.9	-7.0
28	2.093	7.5	786	NW	6.4	15.0	NW	13.35	6.54	1.19	8.68	335.6	-12.2	-6.7
29	2.160	8.3	782	W	2.1	9.2	WSW	16.20	0.03	-0.29	6.79	306.2	-12.0	-6.2
30	2.335	8.1	778	W	2.8	11.9	NNW	18.41	0.96	1.25	8.21	303.2	-12.7	-6.4
Average	2.302	7.1	780	SW	3.9			13.46	3.62	-0.34	7.37	363.1	-6.2	-0.3
Maximum	3.087	9.5	787	WSW	8.7	21.2	NW	18.41	17.50	5.92	11.32	1140.5	2.5	7.2
Minimum	1.048	0.1	769	S	0.9			2.28	0.00	-11.35	3.54	0.0	-21.2	-13.3
Total	69.062	214.5						403.87	108.75	-10.06	221.14	10895.2		

Ins. = Instantaneous
Max. = Maximum
kWh/m2 = kilowatt hour per meter square
h = Hour
hPa = Hechta-Pascal (Millbrae)
m/s = Meter per second
kWh = kilowatt hour
Wh = Watt hour
℃ = Centigrade

Table II.2-1 Monthly Data of Adaatsag (7/14)

December (1999)	Solar Irradiation	Sunshine duration	Atmospheric Pressure	Wind direction	Wind Velocity	Maximum Ins. Velocity	Direction at max. Ins. velocity	PV power Generation	Wind power Generation	Charge / Discharge power	AC supply from Inverter	Supply to DC Refrigerator	Average Ambient Temp. 1	Average Temp. of Cubicle 2
	kWh/m2	h	hPa		m/s	m/s		kWh	kWh	kWh	kWh	Wh	℃	℃
1	2.042	8.0	783	WSW	1.4	12.8	NNW	15.81	0.93	2.46	4.70	289.0	-12.1	-5.1
2	1.236	2.8	786	WSW	1.8	10.5	NW	3.88	0.32	-10.88	5.67	300.6	-11.7	-6.7
3	2.058	7.2	788	NW	8.5	15.6	NNW	14.03	13.58	13.36	4.55	295.1	-12.0	-4.9
4	2.239	7.9	787	W	2.1	11.2	NW	15.32	0.25	-0.65	6.47	211.8	-14.4	-6.9
5	2.047	8.1	786	WNW	3.1	10.5	NW	12.50	1.21	0.81	3.77	7.6	-12.6	-6.9
6	2.007	7.8	781	SW	1.7	8.6	SSW	15.12	-0.19	-1.90	6.91	351.1	-13.2	-7.1
7	1.927	7.6	778	WSW	3.1	18.0	NW	16.51	1.06	0.36	6.53	1170.0	-10.4	-5.1
8	1.909	7.9	779	W	5.6	15.5	NW	13.75	6.07	1.81	7.53	871.3	-8.1	-2.5
9	1.905	7.7	774	WSW	5.8	22.1	NW	11.88	4.56	0.90	6.13	38.0	-9.4	-2.5
10	1.938	7.7	782	SW	1.6	7.6	SSW	14.58	-0.22	-2.06	6.34	668.9	-14.8	-7.7
11	1.875	7.8	777	SW	2.5	16.0	NNW	16.16	0.92	-2.33	9.24	493.1	-12.6	-6.5
12	1.890	7.2	781	WSW	3.4	15.8	NW	15.05	-0.23	-3.18	7.93	504.7	-13.5	-7.4
13	1.951	6.5	780	WNW	5.2	15.3	NW	14.55	5.09	3.65	5.76	379.6	-12.6	-7.1
14	1.575	5.9	773	W	2.2	7.3	SW	10.55	-0.24	-7.58	7.74	734.5	-13.5	-7.4
15	1.438	6.2	776	WNW	5.8	14.6	N	6.65	7.64	-2.45	6.58	752.6	-15.0	-9.5
16	2.096	7.1	782	WNW	3.6	9.4	NNW	15.26	1.23	-0.27	6.64	643.6	-18.9	-12.7
17	1.696	6.0	786	NW	6.4	12.8	NW	12.15	7.72	7.77	2.70	348.3	-19.7	-14.5
18	1.859	5.9	790	NNW	8.5	17.2	NNW	7.19	6.35	2.15	2.16	286.2	-22.0	-15.9
19	1.461	5.0	788	W	4.9	14.8	NW	8.30	2.79	-0.59	2.45	340.8	-18.8	-14.9
20	1.536	5.8	790	S	2.7	10.9	NNW	10.57	1.22	-4.90	6.98	345.3	-16.2	-10.5
21	1.201	4.2	789	WSW	1.5	6.4	SW	9.78	-0.24	-3.53	3.70	351.3	-19.6	-13.7
22	2.123	7.6	783	WNW	4.9	16.6	NW	18.01	5.19	7.29	6.12	353.5	-16.3	-10.4
23	1.800	7.7	783	NW	4.3	12.6	NW	16.48	2.73	3.77	5.73	375.3	-9.2	-5.0
24	1.800	7.1	776	SW	0.9	5.5	NW	15.62	-0.18	-1.20	6.75	454.6	-10.1	-4.2
25	1.740	5.0	771	WSW	1.2	4.7	WSW	11.08	-0.19	-3.84	5.08	528.6	-10.6	-5.2
26	1.414	5.1	771	WNW	8.9	21.4	NW	8.69	10.36	2.48	6.49	656.4	-13.0	-9.0
27	1.794	6.9	778	WSW	2.5	13.0	NW	14.65	2.48	-1.66	8.96	254.2	-16.8	-11.1
28	1.444	5.6	769	SSW	1.2	7.5	W	10.10	-0.24	-7.04	7.23	351.7	-15.5	-9.7
29	1.940	7.9	771	WNW	3.3	9.9	NW	17.60	1.71	4.06	5.66	334.3	-17.2	-11.2
30	1.531	6.1	771	SSW	0.8	7.5	NW	10.33	-0.19	-6.48	7.12	300.7	-18.1	-12.4
31	1.855	7.3	768	ENE	1.7	5.2	E	15.85	-0.24	-0.45	6.51	333.7	-16.8	-11.4
Average	1.784	6.6	779	WSW	3.5			12.83	2.62	-0.33	6.00	429.8	-14.4	-8.6
Maximum	2.239	8.1	790	WNW	8.9	22.1	NW	18.01	13.58	13.36	9.24	1170.0	-8.1	-2.5
Minimum	1.201	2.8	768	SSW	0.8			3.88	-0.24	-10.88	2.16	7.6	-22.0	-15.9
Total	55.327	206.6						398.00	81.25	-10.12	186.13	13326.4		

Ins. = Instantaneous
Max. = Maximum
kWh/m2 = kilowatt hour per meter square
h = Hour
hPa = Hechta-Pascal (Millbrae)
m/s = Meter per second
kWh = kilowatt hour
Wh = Watt hour
℃ = Centigrade

Table II.2-1 Monthly Data of Adaatsag (8/14)

January (2000)	Solar Irradiation	Sunshine duration	Atmospheric Pressure	Wind direction	Wind Velocity	Maximum Ins. Velocity	Direction at max. Ins. velocity	PV power Generation	Wind power Generation	Charge / Discharge power	AC supply from Inverter	Supply to DC Refrigerator	Average Ambient Temp. 1	Average Temp. of Cubicle 2
	kWh/m2	h	hPa		m/s	m/s		kWh	kWh	kWh	kWh	Wh	℃	℃
1	1.250	---	772	SW	8.0	22.6	NW	6.44	17.57	6.17	7.87	331.3	-21.0	-15.9
2	1.775	---	771	SE	1.8	7.4	S	13.55	-0.24	-3.06	6.84	306.4	-21.8	-15.4
3	1.005	---	766	NE	2.2	6.6	NE	3.21	-0.24	-15.62	8.95	300.4	-21.5	-16.6
4	2.060	---	769	SSE	3.5	17.5	NW	10.84	5.78	-0.61	7.17	288.5	-23.4	-16.0
5	1.869	---	771	NW	11.5	19.8	NW	8.57	29.90	14.79	8.05	246.9	-29.8	-23.8
6	---	---	---	---	---	---	---	---	---	---	---	---	---	---
7	---	---	---	---	---	---	---	---	---	---	---	---	---	---
8	---	---	---	---	---	---	---	---	---	---	---	---	---	---
9	---	---	---	---	---	---	---	---	---	---	---	---	---	---
10	---	---	---	---	---	---	---	---	---	---	---	---	---	---
11	---	---	---	---	---	---	---	---	---	---	---	---	---	---
12	---	---	---	---	---	---	---	---	---	---	---	---	---	---
13	---	---	---	---	---	---	---	---	---	---	---	---	---	---
14	---	---	---	---	---	---	---	---	---	---	---	---	---	---
15	---	---	---	---	---	---	---	---	---	---	---	---	---	---
16	---	---	---	---	---	---	---	---	---	---	---	---	---	---
17	---	---	---	---	---	---	---	---	---	---	---	---	---	---
18	---	---	---	---	---	---	---	---	---	---	---	---	---	---
19	---	---	---	---	---	---	---	---	---	---	---	---	---	---
20	---	---	---	---	---	---	---	---	---	---	---	---	---	---
21	---	---	---	---	---	---	---	---	---	---	---	---	---	---
22	---	---	---	---	---	---	---	---	---	---	---	---	---	---
23	---	---	---	---	---	---	---	---	---	---	---	---	---	---
24	---	---	---	---	---	---	---	---	---	---	---	---	---	---
25	---	---	---	---	---	---	---	---	---	---	---	---	---	---
26	---	---	---	---	---	---	---	---	---	---	---	---	---	---
27	---	---	---	---	---	---	---	---	---	---	---	---	---	---
28	---	---	---	---	---	---	---	---	---	---	---	---	---	---
29	---	---	---	---	---	---	---	---	---	---	---	---	---	---
30	---	---	---	---	---	---	---	---	---	---	---	---	---	---
31	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Average	1.591	#DIV/0!	769	SSW	5.4			8.52	10.55	0.33	7.77	294.7	-23.5	-17.6
Maximum	2.060	0.0	772	NW	11.5	22.6	NW	13.55	29.90	14.79	8.95	331.3	-21.0	-15.4
Minimum	1.005	0.0	766	SE	1.8			3.21	-0.24	-15.62	6.84	246.9	-29.8	-23.8
Total	7.959	0.0						42.61	52.77	1.67	38.88	1473.5		

Ins. = Instantaneous
Max. = Maximum
kWh/m2 = kilowatt hour per meter square
h = Hour
hPa = Hechta-Pascal (Millbrae)
m/s = Meter per second
kWh = kilowatt hour
Wh = Watt hour
℃ = Centigrade

Table II.2-1 Monthly Data of Adaatsag (9/14)

February (2000)	Solar Irradiation	Sunshine duration	Atmospheric Pressure	Wind direction	Wind Velocity	Maximum Ins. Velocity	Direction at max. Ins. velocity	PV power Generation	Wind power Generation	Charge / Discharge power	AC supply from Inverter	Supply to DC Refrigerator	Average Ambient Temp. 1	Average Temp. of Cubicle 2
	kWh/m2	h	hPa		m/s	m/s		kWh	kWh	kWh	kWh	Wh	℃	℃
1	---	---	---	---	---	---	---	---	---	---	---	---	---	---
2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3	---	---	---	---	---	---	---	---	---	---	---	---	---	---
4	---	---	---	---	---	---	---	---	---	---	---	---	---	---
5	---	---	---	---	---	---	---	---	---	---	---	---	---	---
6	---	---	---	---	---	---	---	---	---	---	---	---	---	---
7	---	---	---	---	---	---	---	---	---	---	---	---	---	---
8	---	---	---	---	---	---	---	---	---	---	---	---	---	---
9	---	---	---	---	---	---	---	---	---	---	---	---	---	---
10	---	---	---	---	---	---	---	---	---	---	---	---	---	---
11	---	---	---	---	---	---	---	---	---	---	---	---	---	---
12	---	---	---	---	---	---	---	---	---	---	---	---	---	---
13	---	---	---	---	---	---	---	---	---	---	---	---	---	---
14	---	---	---	---	---	---	---	---	---	---	---	---	---	---
15	3.247	254.3	774	WSW	1.2	4.6	NW	18.02	-0.57	-5.99	8.61	215.1	-17.5	-9.1
16	3.317	234.3	772	SW	1.1	6.4	SSW	14.79	-0.64	-5.40	5.30	-28.3	-13.9	-6.9
17	2.980	223.2	772	WSW	1.6	11.3	NW	13.82	-0.40	-7.41	6.27	152.8	-11.0	-4.2
18	3.584	253.7	777	NW	6.7	17.0	NNW	8.34	9.69	-1.96	5.09	426.3	-13.8	-4.7
19	3.576	256.1	775	SW	2.1	7.5	NW	15.73	-0.65	-6.05	6.29	362.3	-15.2	-7.2
20	3.503	255.4	772	SSE	2.1	8.8	S	15.14	-0.57	-6.37	6.22	349.0	-13.2	-5.4
21	3.592	251.3	772	S	3.8	12.1	NNW	18.45	1.07	-3.71	8.25	352.1	-13.0	-5.2
22	3.322	208.5	778	NW	5.1	10.6	NNW	11.39	4.28	-7.33	8.11	225.1	-14.6	-7.3
23	3.856	258.0	780	W	3.7	8.8	N	17.79	1.44	-7.33	10.96	638.9	-14.3	-6.9
24	3.508	219.7	778	WNW	2.9	11.5	NW	16.62	1.98	-5.18	8.79	322.5	-12.8	-6.2
25	3.987	263.2	776	WNW	5.3	12.7	WNW	15.49	4.64	-2.39	7.72	196.7	-11.0	-4.3
26	4.107	272.3	775	NW	5.4	11.2	NW	15.70	3.10	-6.74	10.19	464.4	-9.7	-2.7
27	4.147	272.0	777	SW	1.8	8.3	SSW	19.74	0.03	-8.74	13.06	312.1	-8.8	-0.9
28	4.204	274.4	779	SW	2.0	10.9	SSW	20.58	0.80	0.17	6.52	178.3	-6.8	0.2
29	4.301	274.3	774	S	2.2	8.1	N	20.54	-0.01	-5.82	11.11	270.6	-7.2	0.7
Average	3.682	251.3	775	WSW	3.1			16.14	1.61	-5.35	8.16	295.8	-12.2	-4.7
Maximum	4.301	274.4	780	NW	6.7	17.0	NNW	20.58	9.69	0.17	13.06	638.9	-6.8	0.7
Minimum	2.980	208.5	772	SW	1.1			8.34	-0.65	-8.74	5.09	-28.3	-17.5	-9.1
Total	55.231	3770.7						242.14	24.19	-80.25	122.49	4437.9		

Ins. = Instantaneous
Max. = Maximum
kWh/m2 = kilowatt hour per meter square
h = Hour
hPa = Hechta-Pascal (Millbrae)
m/s = Meter per second
kWh = kilowatt hour
Wh = Watt hour
℃ = Centigrade

Table II.2-1 Monthly Data of Adaatsag (10/14)

March (2000)	Solar Irradiation	Sunshine duration	Atmospheric Pressure	Wind direction	Wind Velocity	Maximum Ins. Velocity	Direction at max. Ins. velocity	PV power Generation	Wind power Generation	Charge / Discharge power	AC supply from Inverter	Supply to DC Refrigerator	Average Ambient Temp. 1	Average Temp. of Cubicle 2
	kWh/m2	h	hPa		m/s	m/s		kWh	kWh	kWh	kWh	Wh	℃	℃
1	4.760	10.6	772	SSW	1.8	9.3	SW	21.76	0.15	-9.29	13.12	1006.8	-6.8	0.0
2	4.390	8.3	768	WNW	8.3	16.6	WNW	18.56	14.03	2.10	13.53	933.7	-7.0	-0.1
3	4.320	10.6	776	NW	8.9	19.8	NW	11.08	6.93	-5.86	8.07	324.5	-9.1	0.6
4	4.649	10.8	775	W	6.0	15.1	WNW	19.70	2.03	-2.97	8.90	352.5	-7.4	-1.6
5	4.459	9.9	775	WSW	4.9	14.3	NNW	13.67	4.65	-9.47	11.56	470.0	-10.7	-2.2
6	3.812	10.0	777	SSW	6.0	19.6	NNW	13.00	5.52	-1.42	5.62	612.5	-11.3	-1.4
7	4.700	10.7	782	WNW	5.4	14.7	NW	13.51	2.74	-7.71	8.43	155.4	-10.1	-1.2
8	4.645	10.9	779	S	2.0	7.3	N	14.94	0.00	-6.24	5.28	183.7	-6.7	2.4
9	4.697	10.9	779	SE	3.0	9.2	NNW	13.58	0.00	-2.81	3.96	164.6	-5.6	2.1
10	4.627	10.6	778	SSW	2.5	6.0	NNW	9.41	0.00	-10.30	6.18	149.8	-4.8	2.2
11	4.693	10.6	775	SSE	1.1	5.9	SSW	19.17	0.00	-7.18	7.44	604.5	-2.4	6.1
12	4.615	9.6	774	ESE	2.6	7.4	NE	16.92	0.00	-8.16	6.21	613.1	-1.6	6.3
13	2.122	3.4	772	SSE	6.1	15.1	SSE	4.78	4.98	-15.57	7.35	507.2	-1.6	3.2
14	4.449	10.1	773	WSW	7.5	14.8	NNW	16.16	12.26	3.05	7.43	189.8	-4.7	2.4
15	5.147	11.0	774	WNW	4.6	12.5	WNW	19.49	3.94	-4.39	9.47	423.5	-5.1	3.3
16	5.245	11.1	770	W	3.6	11.3	WNW	19.83	2.13	-5.99	9.32	733.7	-4.3	4.1
17	3.111	6.7	767	W	6.1	18.5	NNW	7.62	10.36	-11.22	10.57	671.1	-3.9	1.9
18	4.840	9.9	776	SW	3.1	11.9	SSW	17.03	0.00	-16.14	14.12	348.5	-4.2	3.6
19	4.338	9.7	772	SE	2.9	12.9	NNE	15.08	0.79	-12.81	10.57	346.6	0.3	8.1
20	4.637	9.4	774	ESE	5.0	14.9	SE	16.94	2.09	-6.92	7.73	599.0	-0.1	6.7
21	3.209	6.9	769	WSW	6.4	15.9	SE	8.30	7.37	-10.87	8.49	551.9	-0.2	5.2
22	4.556	8.9	774	NW	10.3	18.4	NW	14.99	14.46	6.97	4.24	550.5	-8.7	-2.0
23	5.598	11.1	778	WNW	6.6	15.5	WNW	19.86	1.97	-1.13	5.06	305.5	-7.8	-1.4
24	5.573	11.1	779	NW	5.8	15.8	NW	20.03	7.42	4.88	4.49	401.9	-3.9	2.9
25	5.546	11.0	777	W	5.9	14.4	WNW	12.98	6.16	-3.80	4.80	396.6	1.4	8.2
26	4.663	8.9	769	W	6.9	17.5	NNW	12.78	8.02	-5.20	7.73	408.6	1.2	8.4
27	5.066	10.5	777	WSW	6.2	13.6	WNW	13.50	6.64	-4.30	6.03	528.1	-2.6	5.3
28	4.899	9.9	776	SSE	3.2	12.7	S	14.71	2.02	-10.95	9.36	499.2	3.7	9.7
29	3.350	5.7	775	S	3.6	11.5	N	8.32	1.18	-15.43	6.89	432.5	4.3	11.0
30	6.050	11.3	774	W	6.5	16.3	NW	19.71	10.07	3.28	8.09	584.2	0.6	7.9
31	5.837	11.3	773	SSE	3.4	10.4	N	18.73	1.70	-7.54	9.39	721.4	1.5	9.8
Average	4.600	9.7	774	SW	5.0			15.03	4.50	-5.92	8.04	476.4	-3.8	3.5
Maximum	6.050	11.3	782	NW	10.3	19.8	NW	21.76	14.46	6.97	14.12	1006.8	4.3	11.0
Minimum	2.122	3.4	767	SSE	1.1			4.78	0.00	-16.14	3.96	149.8	-11.3	-2.2
Total	142.603	301.4						466.14	139.61	-183.39	249.43	14770.9		

Ins. = Instantaneous
Max. = Maximum
kWh/m2 = kilowatt hour per meter square
h = Hour
hPa = Hechta-Pascal (Millbrae)
m/s = Meter per second
kWh = kilowatt hour
Wh = Watt hour
℃ = Centigrade

Table II.2-1 Monthly Data of Adaatsag (11/14)

April (2000)	Solar Irradiation	Sunshine duration	Atmospheric Pressure	Wind direction	Wind Velocity	Maximum Ins. Velocity	Direction at max. Ins. velocity	PV power Generation	Wind power Generation	Charge / Discharge power	AC supply from Inverter	Supply to DC Refrigerator	Average Ambient Temp. 1	Average Temp. of Cubicle 2
	kWh/m2	h	hPa		m/s	m/s		kWh	kWh	kWh	kWh	Wh	℃	℃
1	5.373	10.4	774	S	4.4	12.8	NW	16.32	3.19	-4.91	6.19	582.4	1.6	8.8
2	5.865	11.0	772	WSW	4.1	14.8	W	18.09	4.30	-3.36	7.19	812.0	4.7	11.4
3	4.276	9.7	774	NW	8.7	19.1	NW	12.66	5.67	-6.76	6.25	944.8	-3.0	3.6
4	6.353	11.5	780	WNW	4.3	12.6	WNW	19.35	-0.66	-6.75	7.23	476.9	-3.0	4.8
5	4.614	7.1	772	SW	7.4	23.2	WNW	12.12	8.70	-2.98	5.71	350.0	1.3	7.1
6	6.317	11.6	777	SW	6.8	19.0	NNW	19.33	-0.57	-4.53	4.83	784.1	-3.2	4.4
7	6.453	10.9	770	S	6.3	15.8	SW	18.37	-0.49	-7.92	6.06	916.5	4.8	10.0
8	5.006	7.5	770	SSE	10.5	24.0	NNW	13.38	5.77	-3.90	4.39	514.8	-5.4	3.1
9	6.437	11.5	781	WNW	6.4	19.1	NW	15.36	6.57	-3.49	6.10	714.8	-5.3	4.1
10	6.579	11.7	774	SW	3.8	12.9	W	17.23	3.13	-4.58	5.82	766.2	4.5	11.6
11	5.520	11.5	768	SSW	6.3	13.3	NNW	13.47	7.62	-1.51	3.59	927.2	7.5	14.8
12	5.579	9.3	777	NNE	8.9	15.1	N	7.25	12.68	-2.98	3.95	723.0	1.4	11.1
13	6.751	12.0	784	S	6.2	13.7	NNW	7.25	7.09	-8.11	3.33	500.1	0.9	10.4
14	6.273	10.2	780	WSW	4.0	13.0	WSW	15.84	3.16	-4.60	4.29	1006.8	4.9	12.1
15	6.219	11.5	776	SW	4.1	9.8	NNW	13.99	0.86	-7.45	2.90	1014.6	8.4	15.7
16	5.138	9.6	774	ENE	3.1	7.6	NW	13.65	0.00	-11.38	5.52	0.0	10.8	18.2
17	4.390	8.7	771	ENE	5.7	10.7	SE	10.61	4.14	-6.65	2.57	991.2	10.5	16.4
18	4.046	5.7	769	ESE	3.9	17.3	W	10.19	1.30	-12.31	4.57	1061.8	10.7	16.8
19	1.692	0.9	767	S	5.8	18.5	NNW	2.96	10.89	-13.50	8.33	684.2	3.6	10.1
20	6.524	10.7	772	WNW	10.4	22.9	NW	16.86	10.03	0.79	7.51	192.2	-0.6	5.0
21	5.783	9.3	774	W	5.7	16.9	NNW	14.75	9.76	-0.89	6.15	732.2	0.0	7.0
22	7.088	12.3	777	SW	2.6	8.8	WNW	18.16	0.17	-9.21	7.94	871.8	3.1	12.4
23	6.072	10.2	768	S	4.5	14.8	WSW	15.18	3.74	-6.14	5.79	470.8	9.1	15.1
24	3.644	7.1	762	NW	17.7	31.9	NW	6.81	9.46	-6.76	4.37	753.6	-1.8	1.5
25	7.105	11.2	775	W	9.6	24.3	NNW	17.66	0.16	-5.42	3.84	1043.8	0.2	4.4
26	7.067	12.5	775	SSW	2.0	9.1	SW	17.10	0.00	-6.13	3.90	844.4	9.1	15.9
27	6.974	11.5	766	SSW	6.0	20.2	SW	16.86	0.00	-9.29	6.51	0.0	12.4	16.8
28	4.350	6.3	764	W	9.4	23.9	NW	9.85	0.05	-14.59	5.35	806.0	3.3	8.1
29	7.267	12.9	773	WNW	6.8	15.4	NW	17.22	3.39	-3.00	4.45	893.6	8.7	13.5
30	7.298	12.7	775	SSW	1.9	9.2	SW	16.79	0.00	-6.83	4.54	630.2	13.7	21.7
Average	5.735	9.9	773	SSW	6.2			14.15	4.00	-6.18	5.30	700.3	3.7	10.5
Maximum	7.298	12.9	784	NW	17.7	31.9	NW	19.35	12.68	0.79	8.33	1061.8	13.7	21.7
Minimum	1.692	0.9	762	SSW	1.9			2.96	-0.66	-14.59	2.57	0.0	-5.4	1.5
Total	172.053	299.0						424.66	120.11	-185.14	159.17	21010.0		

Ins. = Instantaneous
Max. = Maximum
kWh/m2 = kilowatt hour per meter square
h = Hour
hPa = Hechta-Pascal (Millbrae)
m/s = Meter per second
kWh = kilowatt hour
Wh = Watt hour
℃ = Centigrade

Table II.2-1 Monthly Data of Adaatsag (12/14)

May (2000)	Solar Irradiation	Sunshine duration	Atmospheric Pressure	Wind direction	Wind Velocity	Maximum Ins. Velocity	Direction at max. Ins. velocity	PV power Generation	Wind power Generation	Charge / Discharge power	AC supply from Inverter	Supply to DC Refrigerator	Average Ambient Temp. 1	Average Temp. of Cubicle 2
	kWh/m2	h	hPa		m/s	m/s		kWh	kWh	kWh	kWh	Wh	℃	℃
1	6.232	11.0	772	SSW	5.9	21.5	NW	14.41	0.29	-8.28	4.31	342.0	15.8	20.6
2	7.557	10.1	775	W	9.7	23.9	NW	17.25	2.22	-4.38	4.55	628.6	6.3	11.8
3	5.039	8.2	771	WSW	4.5	16.3	N	11.37	0.27	-8.85	1.95	1003.7	13.4	18.4
4	7.505	12.4	780	W	5.9	17.2	NNW	17.00	-0.59	-4.97	3.10	613.1	9.9	18.2
5	7.734	13.1	782	SSW	4.1	16.2	SSW	16.92	5.02	0.19	4.13	555.7	14.3	20.3
6	6.422	11.3	775	WSW	8.1	24.1	NNW	14.37	9.94	5.04	1.51	201.5	17.0	22.5
7	3.721	7.8	782	SSE	6.3	19.6	NNW	7.10	-0.65	-17.88	6.32	380.0	3.9	12.2
8	7.662	13.0	780	SSW	2.3	11.8	S	16.69	-0.64	-6.19	3.83	782.9	6.9	16.7
9	7.771	13.2	776	SW	3.7	13.1	SW	16.46	-0.15	-5.40	3.66	437.7	10.7	17.9
10	6.028	9.5	767	WSW	5.8	17.9	W	13.00	6.77	-1.89	3.63	392.5	12.6	18.6
11	7.398	12.5	771	W	9.1	18.5	NNW	13.34	17.70	6.15	6.22	373.5	9.5	18.5
12	4.042	6.2	771	ESE	3.3	11.2	S	7.73	1.66	-12.71	3.88	570.2	11.0	17.4
13	7.655	13.2	769	SSW	3.6	16.1	NW	15.41	2.28	-6.45	5.28	1102.3	15.0	23.4
14	4.215	7.6	772	WNW	11.2	23.6	NNW	5.73	25.66	7.07	5.30	679.8	6.9	16.3
15	7.823	13.1	774	SW	4.4	15.5	WNW	11.99	5.81	-4.80	4.14	504.9	10.6	19.7
16	7.308	11.4	772	WNW	8.8	19.8	NW	7.21	8.97	-5.75	3.20	706.9	7.1	16.5
17	5.298	10.1	774	WNW	12.6	27.1	NNW	10.21	7.29	-5.46	4.63	472.9	6.3	11.5
18	7.738	12.9	776	WSW	4.7	12.1	WNW	10.57	3.01	-6.73	2.26	273.3	11.0	17.8
19	7.451	11.4	771	SSW	4.3	16.0	NW	13.14	3.75	-5.24	4.00	334.6	17.0	23.3
20	6.904	9.7	774	SE	6.3	15.3	N	10.06	5.77	-6.21	3.54	616.8	16.1	24.3
21	8.005	13.8	776	SSE	2.9	7.6	ESE	15.52	-0.44	-8.05	4.16	1072.1	17.3	26.9
22	6.949	10.6	773	SSW	3.1	13.1	SSE	14.38	1.24	-5.67	2.51	1021.7	20.8	27.7
23	5.128	8.2	771	WSW	4.7	15.6	NW	9.47	2.38	-11.01	4.02	1092.8	20.1	26.4
24	3.549	5.2	775	WSW	5.9	20.3	NNW	6.68	-0.64	-17.27	4.49	1106.0	14.0	20.2
25	5.080	9.4	778	SE	2.4	8.0	WSW	9.73	-0.62	-13.36	3.73	1093.9	13.2	21.8
26	6.862	12.8	778	SSW	3.7	13.6	ENE	12.21	-0.61	-11.71	4.54	1071.7	14.0	22.4
27	8.211	13.4	777	SE	3.0	10.3	ENE	15.28	-0.59	-8.24	4.39	813.3	17.4	26.5
28	7.760	12.3	772	SW	6.4	18.5	SW	14.86	-0.32	-9.15	4.85	1101.8	20.7	25.5
29	7.073	9.4	766	W	7.1	17.3	NNW	14.03	-0.34	-12.03	6.89	1093.3	17.6	23.5
30	8.290	13.7	770	SW	7.4	17.6	N	15.48	-0.42	-9.36	5.60	1077.3	13.9	21.0
31	7.190	12.0	775	ESE	2.6	11.3	ESE	13.09	-0.16	-12.37	6.49	938.6	16.3	25.6
Average	6.632	10.9	774	SW	5.6			12.60	3.35	-6.81	4.22	724.3	13.1	20.4
Maximum	8.290	13.8	782	WNW	12.6	27.1	NNW	17.25	25.66	7.07	6.89	1106.0	20.8	27.7
Minimum	3.549	5.2	766	SSW	2.3			5.73	-0.65	-17.88	1.51	201.5	3.9	11.5
Total	205.600	338.5						390.69	103.86	-210.96	131.11	22455.4		

Ins. = Instantaneous
Max. = Maximum
kWh/m2 = kilowatt hour per meter square
h = Hour
hPa = Hechta-Pascal (Millbrae)
m/s = Meter per second
kWh = kilowatt hour
Wh = Watt hour
℃ = Centigrade

Table II.2-1 Monthly Data of Adaatsag (13/14)

June (2000)	Solar Irradiation	Sunshine duration	Atmospheric Pressure	Wind direction	Wind Velocity	Maximum Ins. Velocity	Direction at max. Ins. velocity	PV power Generation	Wind power Generation	Charge / Discharge power	AC supply from Inverter	Supply to DC Refrigerator	Average Ambient Temp. 1	Average Temp. of Cubicle 2
	kWh/m2	h	hPa		m/s	m/s		kWh	kWh	kWh	kWh	Wh	℃	℃
1	7.751	13.7	777	S	2.4	8.3	SSW	13.45	-0.47	-8.45	2.85	1047.8	20.1	28.7
2	8.110	13.0	778	SSE	4.3	18.1	SSE	14.80	2.99	-5.42	4.35	1029.7	21.6	28.4
3	7.238	12.0	778	ESE	3.5	9.8	SE	13.84	0.36	-13.15	5.18	1043.6	22.9	31.5
4	6.901	11.7	778	S	1.7	7.3	NE	13.20	-0.48	-12.71	3.42	1001.1	22.8	32.6
5	7.047	11.2	775	SW	6.9	19.7	NW	13.35	-0.21	-14.54	5.99	754.2	21.7	27.4
6	7.151	11.2	775	W	6.8	18.6	NW	12.76	-0.58	-11.75	3.16	686.7	15.9	22.6
7	8.578	14.4	775	SSE	4.1	13.6	NW	14.46	-0.58	-7.11	2.66	654.9	18.8	25.4
8	7.043	10.1	776	ESE	4.6	18.2	NNW	12.87	-0.54	-8.85	1.61	924.2	19.2	25.3
9	8.251	13.9	776	SSE	4.0	10.0	S	14.08	-0.58	-3.93	0.38	738.8	21.6	27.5
10	8.094	12.6	776	SSW	3.3	19.5	W	13.92	-0.52	-7.75	1.94	853.9	24.9	30.7
11	8.646	13.8	778	SSW	3.6	15.1	SE	14.75	1.72	-2.15	1.20	677.4	27.0	32.4
12	7.156	11.2	780	SSE	2.8	9.8	S	13.30	-0.06	-10.50	2.66	810.1	26.5	33.0
13	7.806	11.1	775	SSE	4.1	15.2	SSW	14.15	4.37	-1.09	0.86	746.6	25.4	30.7
14	6.276	11.5	771	SW	4.9	11.8	SSW	10.70	3.66	-7.99	0.66	1058.0	20.7	27.8
15	5.108	9.3	775	S	3.9	12.1	NE	9.05	1.40	-10.23	0.68	935.6	19.7	26.3
16	4.247	8.0	779	E	7.1	15.1	ENE	6.43	8.91	-2.05	0.33	712.6	19.2	23.4
17	6.478	11.6	782	SE	3.9	14.2	ESE	11.30	0.92	-8.38	0.99	877.5	22.7	28.8
18	7.411	13.1	779	SE	3.1	9.5	S	12.94	-0.29	-5.70	0.14	816.4	25.2	31.7
19	5.456	7.0	777	E	4.0	16.9	S	9.97	2.02	-6.96	0.58	838.2	24.8	30.3
20	4.461	6.2	776	ENE	4.7	12.2	N	7.75	2.52	-8.18	2.29	669.8	21.4	26.6
21	6.162	7.4	774	ESE	3.1	15.2	NW	12.06	0.20	-4.60	1.44	569.1	21.6	26.9
22	3.151	3.9	771	SW	7.3	24.1	NNW	4.99	12.61	-2.14	2.76	715.9	15.7	20.5
23	8.651	13.4	777	W	10.0	22.4	N	15.08	13.13	0.07	5.75	1082.8	11.1	18.1
24	8.717	14.5	776	WNW	4.4	11.5	NW	14.78	1.96	-5.23	2.18	934.5	18.0	24.6
25	7.890	14.2	773	SSW	3.3	12.4	SW	14.21	1.83	-9.42	3.58	1005.2	22.1	28.3
26	6.545	9.5	770	SW	5.2	16.0	SSW	11.69	6.38	-5.66	2.66	1019.3	21.5	27.1
27	7.916	13.7	771	NW	7.2	14.4	NW	14.08	9.76	-2.39	4.33	1064.5	14.7	22.0
28	4.685	7.9	772	WNW	6.3	16.2	NW	7.74	9.41	-9.57	6.51	954.4	10.5	16.3
29	8.476	14.5	773	WSW	3.4	12.1	WNW	14.47	0.69	-8.04	3.40	914.2	18.4	25.4
30	7.044	11.3	772	SSW	4.4	16.1	WNW	12.63	4.19	-3.90	2.88	753.3	24.9	28.9
Average	6.948	11.2	775	S	4.6			12.29	2.82	-6.93	2.58	863.0	20.6	26.9
Maximum	8.717	14.5	782	W	10.0	24.1	NNW	15.08	13.13	0.07	6.51	1082.8	27.0	33.0
Minimum	3.151	3.9	770	S	1.7			4.99	-0.58	-14.54	0.14	569.1	10.5	16.3
Total	208.446	336.9						368.80	84.72	-207.77	77.42	25890.3		

Ins. = Instantaneous
Max. = Maximum
kWh/m2 = kilowatt hour per meter square
h = Hour
hPa = Hechta-Pascal (Millbrae)
m/s = Meter per second
kWh = kilowatt hour
Wh = Watt hour
℃ = Centigrade

Table II.2-1 Monthly Data of Adaatsag (14/14)

July (2000)	Solar Irradiation	Sunshine duration	Atmospheric Pressure	Wind direction	Wind Velocity	Maximum Ins. Velocity	Direction at max. Ins. velocity	PV power Generation	Wind power Generation	Charge / Discharge power	AC supply from Inverter	Supply to DC Refrigerator	Average Ambient Temp. 1	Average Temp. of Cubicle 2
	kWh/m2	h	hPa		m/s	m/s		kWh	kWh	kWh	kWh	Wh	℃	℃
1	5.072	9.8	771	SSW	4.3	16.0	NW	8.75	2.07	-11.16	2.67	786.2	23.4	28.7
2	4.500	6.6	771	SE	4.9	13.3	NNW	8.01	1.99	-8.75	2.05	712.2	21.4	26.3
3	8.479	12.7	776	S	7.7	17.5	N	14.75	3.67	-0.45	1.60	743.5	17.8	23.4
4	8.035	13.7	780	ESE	6.1	16.1	WNW	13.85	4.74	-4.91	2.63	898.4	22.7	28.3
5	7.049	10.0	780	SE	5.2	13.6	SE	13.12	3.70	-5.65	1.92	959.3	24.4	28.7
6	3.533	4.5	776	SSW	5.8	16.1	NNW	6.09	6.27	-10.88	3.29	938.4	19.3	24.0
7	7.089	11.6	774	W	2.8	9.1	W	12.82	-0.04	-6.67	2.27	733.1	18.7	23.7
8	6.799	11.6	773	SSW	4.1	13.4	WNW	11.49	1.98	-6.19	1.67	789.8	20.3	26.8
9	7.163	10.6	775	W	3.2	13.3	NNW	13.54	-0.02	-4.30	1.14	704.4	20.8	27.0
10	7.898	13.6	776	SW	4.1	10.2	NE	14.02	1.14	-6.93	2.92	887.2	22.8	30.2
11	7.976	13.3	776	SE	5.9	12.3	ESE	14.13	5.05	0.18	1.32	789.1	25.5	30.9
12	7.798	11.8	773	E	5.2	14.2	ENE	14.11	3.32	-7.43	2.89	1062.9	26.9	34.0
13	7.597	12.0	771	SSE	5.4	26.7	N	13.92	2.41	-7.78	3.16	968.2	26.2	33.7
14	4.674	7.4	771	S	3.9	15.3	WNW	8.64	0.67	-10.09	2.03	628.5	25.3	30.9
15	6.422	10.0	769	E	6.7	15.7	NNW	12.66	7.75	1.46	2.68	455.8	25.3	30.1
16	7.295	10.5	772	ENE	6.6	22.9	NNW	14.39	5.62	-5.61	3.64	933.1	26.1	32.6
17	4.656	6.3	771	E	5.5	16.9	N	9.32	0.94	-9.73	2.01	783.8	25.2	29.8
18	4.515	7.0	771	E	7.6	20.5	N	8.20	10.83	-4.74	3.16	955.6	22.7	28.0
19	4.599	9.7	772	SE	4.0	9.6	NW	8.04	1.69	-9.42	1.73	752.3	20.3	26.7
20	6.240	9.9	776	SSW	6.6	16.1	NW	12.52	9.61	2.72	3.34	640.3	19.5	24.9
21	7.970	12.8	779	S	5.2	12.7	NNW	15.00	3.74	-6.07	2.85	1082.8	19.3	27.2
22	6.497	9.8	779	ESE	4.1	13.9	NNW	12.74	1.09	-8.46	1.91	962.4	20.6	27.8
23	6.354	11.1	776	E	3.6	8.9	NNE	12.81	0.29	-7.99	2.29	835.3	21.1	28.4
24	1.929	1.4	773	SSE	3.8	11.2	WSW	2.97	1.07	-10.54	0.88	511.2	21.1	24.7
25	6.146	8.8	772	E	4.6	16.4	N	12.03	3.64	-2.95	2.21	677.7	21.5	27.2
26	2.825	2.9	771	ESE	2.6	9.1	NNE	4.45	-0.34	-9.84	0.96	461.5	20.3	25.3
27	7.690	14.0	773	W	8.6	18.6	NW	14.90	18.16	14.08	2.12	686.1	15.8	21.1
28	7.901	13.3	776	WNW	7.7	18.8	NW	15.82	17.39	6.52	4.34	1060.7	14.4	21.3
29	5.898	10.6	778	W	9.3	19.3	NNW	12.10	23.79	8.65	4.47	1079.8	15.0	21.7
30	6.324	11.3	775	SSW	3.7	20.5	W	12.54	1.03	-11.00	2.34	1051.1	17.8	25.5
31	7.207	13.1	774	ENE	3.6	9.8	NE	14.89	0.19	-11.08	3.98	1044.9	19.0	27.6
Average	6.262	10.0	774	SSE	5.2			11.69	4.62	-5.01	2.46	825.0	21.3	27.3
Maximum	8.479	14.0	780	W	9.3	26.7	N	15.82	23.79	14.08	4.47	1082.8	26.9	34.0
Minimum	1.929	1.4	769	ESE	2.6			2.97	-0.34	-11.16	0.88	455.8	14.4	21.1
Total	194.130	311.7						362.62	143.44	-155.01	76.47	25575.6		

Ins. = Instantaneous
Max. = Maximum
kWh/m2 = kilowatt hour per meter square
h = Hour
hPa = Hechta-Pascal (Millbrae)
m/s = Meter per second
kWh = kilowatt hour
Wh = Watt hour
℃ = Centigrade

Table II.2-2 Monthly Data of Bayan-Undur (1/14)

Jun (1999)	Solar Irradiation	Sunshine duration	Atmospheric Pressure	Wind direction	Wind Velocity	Maximum Ins. Velocity	Direction at max. Ins. velocity	PV power Generation	Wind power Generation	Charge / Discharge power	AC supply from Inverter	Supply to DC Refrigerator	Average Ambient Temp. 1	Average Temp. of Cubicle 2
	kWh/m2	h	hPa		m/s	m/s		kWh	kWh	kWh	kWh	Wh	℃	℃
1	---	---	---	---	---	---	---	---	---	---	---	---	---	---
2	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3	---	---	---	---	---	---	---	---	---	---	---	---	---	---
4	---	---	---	---	---	---	---	---	---	---	---	---	---	---
5	---	---	---	---	---	---	---	---	---	---	---	---	---	---
6	---	---	---	---	---	---	---	---	---	---	---	---	---	---
7	8.395	12.9	767	S	3.8	11.3	N	12.13	1.01	1.64	2.13	234.4	20.2	25.0
8	8.154	14.3	767	E	5.2	15.6	NE	11.05	3.88	1.71	3.25	512.9	16.9	23.4
9	7.869	11.6	764	SSW	4.3	16.4	SSW	12.17	1.86	0.78	3.39	552.2	19.6	25.4
10	7.504	11.9	759	WSW	5.7	17.8	W	11.91	3.13	1.92	3.33	428.9	24.5	28.8
11	8.095	11.1	758	SE	4.3	13.3	NNE	10.78	3.02	0.88	2.95	645.1	24.1	28.8
12	3.626	4.8	758	ESE	4.3	16.0	SW	7.52	3.59	-8.12	8.37	951.0	20.5	25.9
13	7.961	10.5	758	E	6.3	16.9	N	15.88	9.80	4.28	10.58	695.9	16.0	22.4
14	6.687	9.3	766	NE	6.8	14.1	NNE	14.17	9.42	4.60	8.49	734.4	13.9	19.9
15	3.091	4.2	766	ESE	8.4	15.3	SE	6.09	10.29	-0.31	6.36	533.5	10.4	15.0
16	7.541	11.5	762	SSW	4.3	12.7	NW	13.31	2.24	0.30	5.08	604.2	13.5	19.2
17	7.883	12.9	763	SE	2.8	10.4	ENE	13.50	0.92	-0.03	4.57	507.5	16.6	22.9
18	7.515	11.3	763	SSW	5.5	17.9	NNW	12.47	4.77	3.32	3.95	543.3	19.7	25.4
19	8.981	13.8	764	ESE	6.8	19.2	NNW	8.64	7.61	1.75	4.31	501.3	13.5	21.5
20	6.139	8.0	763	NNE	8.1	15.6	N	7.08	7.04	0.35	3.74	437.8	9.6	16.3
21	7.510	13.0	764	E	8.3	18.2	N	7.22	6.58	-0.65	4.34	496.7	9.7	15.7
22	8.755	14.3	766	SSW	2.4	8.3	WSW	12.86	0.03	-0.04	3.20	356.0	14.3	21.5
23	8.486	14.3	763	SSE	3.0	9.8	NNE	13.30	0.22	0.55	3.17	528.6	18.0	24.2
24	5.183	8.4	761	SSE	3.2	19.7	NNE	10.04	1.97	-1.13	3.29	543.6	19.2	24.1
25	6.628	11.3	759	E	3.6	17.6	SSW	11.94	3.57	1.35	4.00	688.7	17.7	24.1
26	7.103	11.6	761	S	3.9	14.5	SSE	12.10	0.95	-0.11	3.27	531.1	17.8	23.9
27	6.199	10.1	757	SW	6.8	25.1	SW	11.05	6.11	2.83	3.98	757.6	24.6	28.3
28	5.558	7.5	761	NNE	8.2	17.4	N	6.42	7.32	-1.19	4.60	615.9	13.6	19.8
29	7.997	13.5	763	S	3.4	11.4	SSE	13.72	0.86	1.24	3.33	566.1	16.4	22.8
30	5.331	8.8	761	S	5.2	16.6	WSW	9.99	3.89	0.66	3.05	735.0	21.1	25.7
Average	7.007	10.8	762	SE	5.1			11.05	4.17	0.69	4.44	570.9	17.1	22.9
Maximum	8.981	14.3	767	ESE	8.4	25.1	SW	15.88	10.29	4.60	10.58	951.0	24.6	28.8
Minimum	3.091	4.2	757	SSW	2.4			6.09	0.03	-8.12	2.13	234.4	9.6	15.0
Total	168.191	260.9						265.34	100.08	16.58	106.73	13701.7		

Ins. = Instantaneous
Max. = Maximum
kWh/m2 = kilowatt hour per meter square
--- Due to late recording data is omitted for calculation

h = Hour
hPa = Hechta-Pascal (Millbrae)
m/s = Meter per second

kWh = kilowatt hour
Wh = Watt hour
℃ = Centigrade

Table II.2-2 Monthly Data of Bayan-Undur (2/14)

Jul (1999)	Solar Irradiation	Sunshine duration	Atmospheric Pressure	Wind direction	Wind Velocity	Maximum Ins. Velocity	Direction at max. Ins. velocity	PV power Generation	Wind power Generation	Charge / Discharge power	AC supply from Inverter	Supply to DC Refrigerator	Average Ambient Temp. 1	Average Temp. of Cubicle 2
	kWh/m2	h	hPa		m/s	m/s		kWh	kWh	kWh	kWh	Wh	℃	℃
1	5.055	6.8	755	SW	6.6	19.6	SW	9.15	4.91	1.14	3.02	513.6	16.5	23.3
2	8.109	13.8	759	SW	3.9	13.0	SSW	12.24	1.02	0.07	3.16	606.3	18.3	25.0
3	2.693	4.0	762	SSW	3.2	13.2	N	5.33	1.78	-5.67	3.01	477.5	16.6	21.5
4	7.823	11.3	765	ENE	4.7	12.8	NW	16.02	5.63	7.78	3.20	734.4	14.7	20.0
5	7.724	11.6	768	E	3.0	9.7	NE	12.96	0.16	-0.11	3.12	552.4	15.7	22.4
6	2.794	2.5	767	S	3.2	10.0	WSW	5.48	1.29	-7.24	3.82	556.3	14.9	20.3
7	5.092	8.0	765	SE	2.9	12.7	N	9.20	0.81	-4.58	4.57	362.3	14.1	20.1
8	5.567	7.8	764	ENE	3.7	17.4	NNE	10.14	2.15	-3.13	5.26	354.6	13.2	19.4
9	7.234	10.6	764	ENE	5.3	12.0	N	14.73	5.59	6.91	3.56	333.1	12.3	18.1
10	5.394	9.1	763	ENE	5.0	11.3	NNW	10.63	4.91	-0.23	5.02	909.7	12.7	18.3
11	6.957	13.0	762	NE	4.4	10.6	N	13.03	3.28	1.93	3.64	1054.2	16.1	21.2
12	7.063	12.2	762	ESE	2.4	9.4	SSW	12.49	0.06	-0.21	2.55	710.7	18.2	24.6
13	7.119	10.0	763	SSW	3.2	16.1	NNW	13.26	1.12	0.19	3.82	674.6	20.1	24.9
14	6.373	8.2	764	S	3.0	17.5	NW	12.31	1.01	-1.37	4.00	925.9	23.0	26.6
15	4.972	6.7	765	ESE	3.5	19.0	WNW	9.12	1.76	-4.23	4.26	1024.4	20.6	25.0
16	6.179	8.2	766	E	4.1	14.2	NNE	12.37	2.49	-0.24	4.16	840.5	19.6	24.1
17	4.646	6.3	767	ESE	3.0	14.4	N	9.58	2.54	-3.82	5.09	1009.6	18.2	23.5
18	8.034	13.0	764	ESE	2.9	8.3	N	15.49	0.34	0.45	4.51	1090.5	20.0	25.7
19	7.961	13.4	762	ESE	1.9	6.3	ENE	15.30	0.00	-0.06	4.53	1011.9	22.4	27.5
20	7.988	13.1	763	NNE	2.6	8.0	N	15.40	0.03	-1.28	5.69	1093.9	24.6	29.1
21	7.211	12.1	765	ESE	2.3	7.6	ESE	13.58	0.35	-4.18	6.87	1081.3	26.6	30.7
22	7.836	11.4	767	SSE	2.8	10.3	S	14.76	0.90	-3.17	7.78	868.0	28.1	32.1
23	7.754	12.2	767	SE	2.6	10.7	S	14.87	0.90	-1.02	6.01	843.7	28.2	32.5
24	7.688	12.8	765	S	4.8	15.9	SSW	14.96	6.03	3.87	6.09	977.4	29.3	33.0
25	7.636	10.3	762	SW	6.5	21.4	SSW	15.64	14.43	12.69	6.21	1029.9	28.2	32.7
26	6.618	10.0	765	NNE	7.9	14.6	N	12.37	9.59	4.06	6.67	894.9	22.0	27.9
27	3.674	5.7	764	ESE	5.5	14.2	NNE	7.89	5.27	-5.17	7.09	1013.5	21.4	26.1
28	7.724	12.0	763	SSE	4.6	14.0	W	16.30	4.29	2.74	6.76	916.4	21.5	27.3
29	5.022	8.4	764	ESE	3.0	11.2	WNW	11.03	0.81	-4.94	5.89	859.8	18.9	24.8
30	7.213	11.2	766	SE	4.1	11.6	W	15.55	2.94	0.92	6.48	999.4	17.9	24.3
31	6.892	11.9	768	SE	3.9	12.9	W	14.53	2.17	1.00	4.70	1078.2	17.9	24.6
Average	6.453	9.9	764	SE	3.8			12.44	2.85	-0.23	4.85	819.3	19.7	25.0
Maximum	8.109	13.8	768	NNE	7.9	21.4	SSW	16.30	14.43	12.69	7.78	1093.9	29.3	33.0
Minimum	2.693	2.5	755	ESE	1.9			5.33	0.00	-7.24	2.55	333.1	12.3	18.1
Total	200.045	307.6						385.71	88.56	-6.90	150.54	25398.9		

Ins. = Instantaneous
Max. = Maximum
kWh/m2 = kilowatt hour per meter square
h = Hour
hPa = Hechta-Pascal (Millbrae)
m/s = Meter per second
kWh = kilowatt hour
Wh = Watt hour
℃ = Centigrade

Table II.2-2 Monthly Data of Bayan-Undur (3/14)

Aug (1999)	Solar Irradiation	Sunshine duration	Atmospheric Pressure	Wind direction	Wind Velocity	Maximum Ins. Velocity	Direction at max. Ins. velocity	PV power Generation	Wind power Generation	Charge / Discharge power	AC supply from Inverter	Supply to DC Refrigerator	Average Ambient Temp. 1	Average Temp. of Cubicle 2
	kWh/m2	h	hPa		m/s	m/s		kWh	kWh	kWh	kWh	Wh	℃	℃
1	7.488	11.8	769	E	2.8	9.4	NNE	16.48	0.39	1.63	4.25	1083.4	18.1	24.3
2	2.892	3.8	766	SSW	2.7	10.9	SW	5.93	0.96	-9.10	4.93	1077.8	18.3	23.5
3	2.903	3.2	763	SE	4.0	9.8	N	5.92	1.87	-10.77	7.23	777.8	19.3	23.9
4	2.917	3.6	763	NNE	4.8	10.6	N	6.18	3.55	-8.29	7.11	759.9	16.7	21.6
5	1.931	1.3	757	S	3.5	11.0	SSW	3.67	1.74	-12.69	7.18	816.3	15.3	19.8
6	6.612	11.2	753	SSW	3.9	14.8	NW	14.16	2.85	0.24	6.02	833.6	16.7	22.1
7	5.455	9.5	755	SW	4.6	13.9	NW	11.69	4.38	-0.17	5.54	802.4	15.8	21.4
8	5.107	7.1	753	W	8.5	19.8	SW	11.93	13.91	11.54	4.03	445.1	11.8	17.7
9	6.723	12.4	762	WNW	4.6	13.9	NNW	15.02	4.59	4.23	4.85	718.5	11.2	17.6
10	7.553	12.7	764	SSE	3.0	10.7	SW	17.05	1.09	0.17	6.82	1092.9	14.7	21.5
11	6.954	10.9	761	SSE	5.1	15.5	WSW	16.36	4.83	4.45	5.69	1050.6	20.7	24.9
12	7.416	12.2	760	NE	6.0	15.3	N	17.56	6.09	7.47	5.52	697.0	17.8	24.2
13	7.058	11.5	763	SSE	4.9	11.7	SE	16.58	4.43	4.65	5.63	792.1	18.5	23.7
14	5.606	8.9	763	SSE	6.9	15.8	SE	13.52	6.83	4.64	4.73	998.2	22.1	25.9
15	4.772	6.5	763	ENE	5.9	13.8	N	11.61	7.49	3.01	5.14	913.5	22.2	27.2
16	3.661	6.1	771	ENE	5.7	15.1	N	7.21	6.85	-5.11	7.98	825.6	15.1	21.1
17	3.111	5.6	770	S	3.6	15.4	WSW	6.79	2.33	-9.81	8.22	521.5	13.8	19.4
18	5.549	10.5	770	SSE	5.2	14.6	N	13.57	5.12	-2.93	10.58	619.8	13.4	19.0
19	7.064	11.8	773	E	4.0	11.0	N	17.89	2.58	-0.11	9.70	604.8	13.0	19.6
20	6.700	12.2	770	ESE	2.4	8.0	W	16.63	0.26	0.25	5.42	923.3	15.2	22.1
21	5.442	9.5	766	S	2.5	11.3	SSE	13.01	0.58	-3.39	5.95	1042.2	16.7	22.9
22	5.488	9.7	765	SSE	2.6	11.6	WSW	13.37	0.98	-0.28	4.01	836.9	16.9	23.0
23	5.946	9.3	767	SSE	3.1	10.1	WNW	14.90	1.00	0.87	4.34	941.5	18.6	23.7
24	3.368	4.2	771	ENE	3.4	11.0	NNE	8.42	1.76	-2.13	2.13	599.0	15.6	20.8
25	5.824	8.8	766	SSW	4.5	14.0	WSW	15.40	4.26	3.89	5.37	504.5	16.3	21.8
26	5.773	8.7	764	ESE	8.0	20.1	N	16.22	8.44	9.11	4.97	623.1	12.8	18.3
27	6.259	11.3	764	S	3.9	12.4	SW	15.74	2.36	0.20	6.86	959.6	12.0	19.1
28	6.616	11.7	763	SE	2.5	8.9	N	17.51	0.11	1.41	5.71	545.8	15.2	21.6
29	6.041	9.5	764	SE	2.8	9.0	S	15.04	0.25	-1.95	6.26	880.0	17.7	23.3
30	5.879	10.1	762	S	2.8	11.8	W	15.99	0.59	-1.06	6.67	813.0	20.5	25.1
31	5.335	9.5	762	ESE	4.7	27.6	SW	14.25	4.27	2.98	4.67	934.3	20.3	25.2
Average	5.465	8.8	763	SSE	4.2			13.08	3.44	-0.23	5.91	807.5	16.5	22.1
Maximum	7.553	12.7	773	W	8.5	27.6	SW	17.89	13.91	11.54	10.58	1092.9	22.2	27.2
Minimum	1.931	1.3	753	ESE	2.4			3.67	0.11	-12.69	2.13	445.1	11.2	17.6
Total	169.443	275.1						405.60	106.74	-7.05	183.51	25034.0		

Ins. = Instantaneous
Max. = Maximum
kWh/m2 = kilowatt hour per meter square
h = Hour
hPa = Hechta-Pascal (Millbrae)
m/s = Meter per second
kWh = kilowatt hour
Wh = Watt hour
℃ = Centigrade

Table II.2-2 Monthly Data of Bayan-Undur (4/14)

Sep (1999)	Solar Irradiation	Sunshine duration	Atmospheric Pressure	Wind direction	Wind Velocity	Maximum Ins. Velocity	Direction at max. Ins. velocity	PV power Generation	Wind power Generation	Charge / Discharge power	AC supply from Inverter	Supply to DC Refrigerator	Average Ambient Temp. 1	Average Temp. of Cubicle 2
	kWh/m2	h	hPa		m/s	m/s		kWh	kWh	kWh	kWh	Wh	℃	℃
1	2.559	4.9	766	NE	6.3	12.3	N	6.08	7.71	-0.66	3.84	786.7	14.3	19.4
2	5.926	11.4	767	S	3.9	10.3	S	14.62	1.34	-0.34	5.55	813.3	16.4	22.4
3	4.618	9.8	765	SSE	3.2	13.8	WSW	12.40	1.47	-3.33	6.41	717.5	19.3	23.8
4	5.127	10.5	765	SE	2.6	11.6	N	15.17	0.88	-1.43	6.94	474.4	19.7	25.0
5	2.914	5.8	762	SE	4.4	13.0	N	7.78	4.88	-3.04	5.14	646.0	14.9	20.1
6	5.452	10.2	759	S	4.9	16.5	WSW	15.86	4.40	1.72	7.46	922.9	15.7	21.6
7	3.720	8.4	761	SSE	5.3	13.5	SSW	9.62	5.16	-5.62	9.08	921.4	15.0	20.4
8	6.080	11.2	759	S	4.3	14.0	WSW	18.38	2.99	2.62	7.80	797.7	17.2	23.0
9	4.527	8.5	761	SSW	5.2	23.4	WSW	13.58	4.41	3.04	4.83	253.7	16.9	22.2
10	4.992	10.1	762	S	5.2	16.2	NNW	15.39	4.22	0.26	8.06	953.9	8.0	15.3
11	6.372	12.2	763	S	3.2	13.2	NW	18.06	0.63	2.10	5.52	670.4	7.7	14.8
12	5.224	9.7	765	ENE	4.7	17.9	NE	15.42	4.81	4.31	5.66	312.8	7.0	14.6
13	2.845	5.7	769	ENE	5.4	16.4	NNE	6.11	5.86	-3.34	5.00	311.8	3.1	8.7
14	3.571	7.1	770	SSE	3.6	13.6	S	10.05	1.56	-5.22	6.22	557.1	5.4	11.3
15	1.864	2.2	767	SE	2.5	11.5	NE	4.48	1.57	-10.64	6.02	617.5	3.6	8.7
16	1.992	2.3	767	E	4.5	12.2	SE	5.19	4.19	-8.10	6.98	471.5	3.7	7.4
17	1.214	0.0	769	NE	6.3	12.4	E	2.36	6.44	-10.21	7.94	898.9	2.5	5.9
18	1.654	1.1	771	NE	7.0	13.7	NE	3.43	7.46	-3.80	6.10	370.5	2.2	5.6
19	2.544	4.0	774	NNE	4.3	8.6	NNE	6.72	1.92	-0.31	2.62	262.5	3.8	6.3
20	4.745	7.4	774	SSE	3.4	11.2	SSE	16.20	1.87	3.41	5.48	511.9	4.6	10.0
21	5.428	11.2	770	SSW	5.4	13.1	SW	20.06	5.62	6.47	8.77	286.2	4.4	10.6
22	5.003	10.9	764	S	4.5	14.0	SSW	18.18	4.43	-4.33	15.66	344.9	6.5	12.6
23	5.155	10.0	763	WNW	7.6	21.4	NNW	19.37	15.28	12.29	11.62	199.3	6.9	13.0
24	4.732	10.3	762	SSE	4.1	13.2	SW	17.04	4.40	1.21	9.50	259.3	5.5	12.0
25	2.432	6.9	759	E	6.0	16.9	NNE	7.07	7.83	-1.30	5.85	352.7	6.8	12.0
26	4.260	8.8	766	S	2.6	14.3	N	16.07	1.49	-0.66	7.53	472.5	4.9	12.8
27	0.557	0.0	766	S	3.7	11.2	N	1.20	3.28	-12.89	7.01	319.9	4.1	8.3
28	4.676	10.8	769	WSW	5.6	15.4	NNW	18.93	10.68	10.60	8.15	580.2	2.6	8.7
29	4.918	10.8	770	S	2.7	9.1	WSW	20.08	0.62	1.23	8.59	589.1	2.3	10.0
30	4.610	9.7	768	ENE	6.1	13.4	N	19.10	6.60	7.74	7.21	575.0	2.0	9.1
Average	3.990	7.7	765	SE	4.6			12.46	4.46	-0.61	7.08	541.7	8.2	13.8
Maximum	6.372	12.2	774	WNW	7.6	23.4	WSW	20.08	15.28	12.29	15.66	953.9	19.7	25.0
Minimum	0.557	0.0	759	SE	2.5			1.20	0.62	-12.89	2.62	199.3	2.0	5.6
Total	119.711	231.9						374.00	134.00	-18.22	212.54	16251.5		

Ins. = Instantaneous
Max. = Maximum
kWh/m2 = kilowatt hour per meter square
h = Hour
hPa = Hechta-Pascal (Millbrae)
m/s = Meter per second
kWh = kilowatt hour
Wh = Watt hour
℃ = Centigrade

Table II.2-2 Monthly Data of Bayan-Undur (5/14)

Oct (1999)	Solar Irradiation	Sunshine duration	Atmospheric Pressure	Wind direction	Wind Velocity	Maximum Ins. Velocity	Direction at max. Ins. velocity	PV power Generation	Wind power Generation	Charge / Discharge power	AC supply from Inverter	Supply to DC Refrigerator	Average Ambient Temp. 1	Average Temp. of Cubicle 2
	kWh/m2	h	hPa		m/s	m/s		kWh	kWh	kWh	kWh	Wh	℃	℃
1	4.310	9.0	776	ESE	3.3	12.9	NE	14.28	2.02	-1.56	6.90	694.9	-0.7	8.5
2	4.391	10.4	774	SSW	3.9	13.4	SW	17.66	1.90	3.07	6.19	174.0	2.7	10.6
3	3.604	7.4	769	ESE	2.7	9.7	WSW	12.23	0.31	-4.61	6.79	213.0	5.9	12.5
4	2.835	6.4	766	SSE	3.2	11.4	NW	10.53	0.77	-4.05	5.16	334.3	6.4	13.0
5	4.062	9.9	765	S	3.4	11.5	NNW	17.27	1.89	0.89	7.61	499.9	6.0	13.3
6	3.673	9.1	767	ESE	2.4	9.2	N	15.85	0.58	-4.43	10.17	260.7	5.8	13.8
7	4.238	10.8	766	SSE	3.8	10.6	SW	19.16	2.25	-0.56	10.99	408.3	7.2	14.7
8	2.926	7.5	760	SW	5.6	17.6	SW	10.11	6.30	-2.86	8.51	437.7	8.1	13.9
9	4.128	10.7	759	WSW	4.6	15.2	NW	19.29	1.88	3.64	7.29	163.4	5.9	14.0
10	4.023	9.4	760	WSW	8.3	20.8	NNW	16.18	13.82	8.98	9.87	441.0	-0.9	9.6
11	3.790	8.6	759	SSE	7.0	16.2	N	15.11	7.07	3.83	7.77	309.6	3.6	11.8
12	1.696	2.8	768	ENE	4.6	13.3	N	4.11	2.93	-9.28	6.07	293.8	-5.3	2.6
13	3.928	9.7	769	WSW	6.4	16.7	SW	18.59	3.91	5.32	6.65	339.3	-1.5	6.8
14	3.939	10.5	771	SW	7.7	18.5	NE	14.80	6.95	6.51	4.81	372.5	-2.1	8.7
15	3.517	10.0	777	S	3.3	12.2	W	13.37	0.99	-3.14	7.10	214.5	-5.7	3.7
16	3.693	10.2	777	SW	2.3	9.7	NW	16.48	0.84	1.57	5.28	493.1	-1.8	6.2
17	3.706	10.3	772	ESE	2.8	9.2	WSW	16.67	0.08	-1.40	7.66	294.6	0.7	9.2
18	3.787	10.3	766	S	4.7	14.1	N	17.29	2.38	4.21	5.24	257.1	3.5	9.9
19	3.629	10.2	769	SW	6.2	16.9	NNW	11.76	5.10	0.08	6.56	47.7	4.8	12.2
20	3.534	10.0	768	S	2.4	8.5	NNW	14.74	0.07	-0.67	5.49	0.0	2.1	11.0
21	4.035	11.1	766	E	2.7	8.5	SSW	18.19	0.15	3.13	4.75	146.2	2.6	11.1
22	3.467	10.0	765	ESE	2.4	7.4	SW	16.58	0.00	0.76	5.45	316.1	2.1	11.0
23	3.268	9.0	764	ENE	4.7	11.7	NNE	13.58	3.33	-0.54	6.96	280.4	3.2	11.0
24	2.439	6.0	762	SE	3.5	13.7	NNW	12.41	1.86	-3.18	7.15	114.2	0.0	7.6
25	3.387	9.9	766	SSE	3.3	11.9	N	19.09	1.18	1.94	7.85	300.2	-1.3	8.2
26	3.304	9.6	759	S	3.5	11.1	NW	19.41	0.89	0.71	8.72	525.6	-2.7	6.3
27	2.915	8.8	763	WSW	8.1	19.9	N	12.78	9.63	2.02	9.35	526.1	-6.8	3.8
28	3.199	9.7	767	SW	3.8	13.0	NNW	14.67	1.36	0.84	4.96	242.9	-8.8	0.3
29	2.628	7.5	765	ESE	2.1	7.9	S	13.87	0.00	-2.35	6.08	153.3	-4.7	2.9
30	2.233	8.0	770	ESE	2.7	9.2	N	12.18	0.00	-2.17	4.47	74.2	-4.8	2.3
31	2.840	9.5	771	SSE	2.3	8.8	WNW	16.26	0.00	2.21	4.09	98.4	-6.0	2.2
Average	3.455	9.1	766	SSE	4.1			14.98	2.59	0.28	6.83	291.1	0.5	8.7
Maximum	4.391	11.1	777	WSW	8.3	20.8	NNW	19.41	13.82	8.98	10.99	694.9	8.1	14.7
Minimum	1.696	2.8	759	ESE	2.1			4.11	0.00	-9.28	4.09	0.0	-8.8	0.3
Total	107.124	282.3						464.50	80.44	8.91	211.94	9027.0		

Ins. = Instantaneous
Max. = Maximum
kWh/m2 = kilowatt hour per meter square
h = Hour
hPa = Hechta-Pascal (Millbrae)
m/s = Meter per second
kWh = kilowatt hour
Wh = Watt hour
℃ = Centigrade

Table II.2-2 Monthly Data of Bayan-Undur (6/14)

Nov (1999)	Solar Irradiation	Sunshine duration	Atmospheric Pressure	Wind direction	Wind Velocity	Maximum Ins. Velocity	Direction at max. Ins. velocity	PV power Generation	Wind power Generation	Charge / Discharge power	AC supply from Inverter	Supply to DC Refrigerator	Average Ambient Temp. 1	Average Temp. of Cubicle 2
	kWh/m2	h	hPa		m/s	m/s		kWh	kWh	kWh	kWh	Wh	℃	℃
1	2.870	9.6	770	SSE	2.0	7.6	WSW	14.45	0.00	-0.11	4.47	215.6	-3.9	4.3
2	2.843	9.4	769	ESE	2.8	9.0	SW	16.78	0.00	0.72	5.83	200.5	-3.0	4.7
3	2.675	9.3	764	ESE	2.4	8.6	SSE	16.13	0.00	-1.39	7.26	84.6	-1.1	6.6
4	2.609	9.1	762	E	2.9	9.8	N	16.40	0.00	-3.36	9.51	19.0	-1.3	6.7
5	2.150	5.9	764	SE	6.5	16.2	N	11.45	0.00	-4.32	5.76	75.3	-1.7	4.0
6	2.603	7.7	769	S	6.5	17.6	N	16.80	0.00	1.25	5.71	0.0	-1.6	4.0
7	2.389	8.9	771	SE	2.4	6.2	S	15.53	0.00	2.94	2.94	0.0	-4.2	3.9
8	2.046	6.7	768	ESE	2.9	8.3	SSW	11.15	0.00	-2.13	3.63	0.0	-4.4	2.4
9	2.600	9.0	761	SW	3.2	11.2	NW	17.18	0.00	1.55	5.65	0.0	-1.9	4.8
10	2.533	9.1	756	S	2.5	10.1	W	13.83	0.00	1.22	3.03	0.0	-3.5	3.5
11	2.149	6.5	758	SSE	4.9	14.5	N	10.71	0.00	-0.85	2.11	0.0	-5.8	0.1
12	1.067	2.7	757	S	3.8	13.6	NNW	4.29	0.00	-7.18	2.07	0.0	-8.0	-2.9
13	2.323	8.9	766	SSE	6.3	18.2	N	16.22	0.00	4.98	1.85	0.0	-11.8	-5.6
14	2.882	9.8	771	S	3.0	11.4	SW	14.92	0.00	1.58	3.34	0.0	-13.9	-6.5
15	2.276	8.5	768	SSE	2.8	8.8	SSW	12.10	0.00	0.26	2.42	0.0	-12.1	-5.1
16	2.165	6.8	769	S	7.2	21.2	NNW	12.60	0.00	-2.53	5.31	0.0	-6.4	-2.9
17	2.193	8.9	767	W	4.6	11.1	NNW	16.22	0.00	2.55	4.01	0.0	-1.8	2.0
18	2.210	8.7	762	WSW	4.8	15.4	NNW	15.01	0.00	-3.21	8.12	0.0	-3.0	1.9
19	2.162	8.6	761	SSE	2.3	8.6	WNW	17.13	0.00	1.61	5.57	0.0	-5.7	1.4
20	2.114	7.4	756	SE	3.0	9.1	SW	15.66	0.00	-1.05	6.67	0.0	-3.2	2.3
21	1.902	7.6	754	SSE	1.8	8.2	WSW	14.09	0.00	-1.04	5.25	0.0	-2.8	3.4
22	0.876	0.4	754	S	3.1	13.7	NNW	2.39	0.00	-13.30	5.85	0.0	-3.0	0.7
23	1.180	2.7	765	NNE	7.3	13.8	NNE	4.08	0.00	-10.11	4.45	0.0	-9.4	-3.1
24	1.337	2.3	770	NNE	8.6	15.1	N	5.11	0.00	-3.72	3.28	0.0	-20.4	-13.5
25	2.140	8.4	770	S	4.3	14.9	NW	17.21	0.00	9.02	1.64	0.0	-18.6	-13.0
26	1.751	5.9	768	W	8.0	21.4	NNW	12.37	0.00	-1.25	4.00	0.0	-14.6	-11.0
27	1.355	4.7	770	WSW	6.2	14.2	N	10.07	0.00	-3.71	4.22	0.0	-11.4	-8.0
28	1.877	7.6	772	SW	4.4	11.3	N	15.84	0.00	2.87	3.82	190.7	-11.4	-6.7
29	1.886	8.4	767	ENE	2.5	8.7	NNE	16.57	0.00	2.66	4.23	32.1	-13.9	-6.1
30	1.976	8.3	762	SSE	3.0	11.3	NNW	16.82	0.00	1.83	5.22	0.0	-14.6	-7.4
Average	2.104	7.2	764	SSE	4.2			13.30	0.00	-0.81	4.57	27.2	-7.3	-1.2
Maximum	2.882	9.8	772	NNE	8.6	21.4	NNW	17.21	0.00	9.02	9.51	215.6	-1.1	6.7
Minimum	0.876	0.4	754	SSE	1.8			2.39	0.00	-13.30	1.64	0.0	-20.4	-13.5
Total	63.139	217.8						399.11	0.00	-24.22	137.22	817.8		

Ins. = Instantaneous
Max. = Maximum
kWh/m2 = kilowatt hour per meter square
h = Hour
hPa = Hechta-Pascal (Millbrae)
m/s = Meter per second
kWh = kilowatt hour
Wh = Watt hour
℃ = Centigrade

Table II.2-2 Monthly Data of Bayan-Undur (7/14)

December (1999)	Solar Irradiation	Sunshine duration	Atmospheric Pressure	Wind direction	Wind Velocity	Maximum Ins. Velocity	Direction at max. Ins. velocity	PV power Generation	Wind power Generation	Charge / Discharge power	AC supply from Inverter	Supply to DC Refrigerator	Average Ambient Temp. 1	Average Temp. of Cubicle 2
	kWh/m2	h	hPa		m/s	m/s		kWh	kWh	kWh	kWh	Wh	℃	℃
1	1.756	7.7	767	S	2.4	7.3	S	15.10	0.00	-2.45	7.50	-2.9	-13.2	-6.3
2	0.699	0.2	770	ENE	3.3	11.9	N	1.84	0.00	-12.74	4.87	-3.5	-11.8	-7.4
3	1.898	7.8	773	SE	5.8	14.8	NNW	15.76	0.00	-0.15	6.80	-3.1	-12.5	-6.9
4	1.809	8.2	765	SW	3.5	11.9	NW	13.29	-0.84	-9.37	1.95	-46.7	-12.1	-8.0
5	1.765	8.2	772	SSW	3.0	14.6	NNW	16.68	1.49	1.81	6.31	-0.3	-10.6	-4.8
6	1.622	7.7	766	SSE	1.9	6.7	SSE	14.92	0.00	-2.03	6.82	35.1	-12.1	-4.8
7	1.713	7.8	764	SW	3.7	13.4	NW	15.87	2.47	-0.58	8.50	126.8	-8.8	-3.8
8	1.634	7.9	764	WSW	5.9	20.1	NNW	15.29	9.07	7.78	6.41	106.4	-6.3	-0.4
9	1.492	6.8	759	S	4.1	14.8	NNW	13.47	2.77	-0.29	6.51	-0.4	-9.6	-2.6
10	1.650	6.8	766	SSW	3.9	14.0	WSW	13.49	1.46	-2.61	7.40	-1.4	-13.5	-6.0
11	1.637	7.6	762	SSW	4.4	17.0	NNW	15.36	5.98	5.56	5.79	-1.4	-11.9	-4.4
12	1.578	6.1	765	SSE	4.7	16.4	N	10.78	4.85	-1.03	6.57	-1.1	-12.3	-5.5
13	1.484	6.3	765	SW	5.4	19.7	N	10.45	8.09	1.86	6.54	-0.7	-11.7	-4.1
14	1.261	6.2	757	SW	4.5	13.1	N	7.92	3.18	-5.80	6.87	-1.3	-11.4	-6.1
15	1.239	3.4	762	S	6.4	15.5	N	5.86	14.13	3.71	6.16	-2.1	-14.7	-7.6
16	1.557	6.3	767	SSW	4.6	12.9	NNW	12.72	3.50	-1.53	7.68	-3.2	-17.2	-9.9
17	1.524	6.5	771	E	4.7	12.1	NW	13.13	3.41	-0.60	7.10	-4.2	-19.5	-11.9
18	1.813	7.5	775	E	6.3	13.7	NNW	12.75	6.82	1.68	7.78	-4.8	-22.7	-13.9
19	1.570	7.6	774	SE	5.0	13.9	N	11.00	4.57	0.30	5.44	-3.7	-16.7	-11.0
20	1.468	6.1	775	SE	2.1	9.5	ENE	12.99	0.28	-2.68	5.97	-2.2	-13.4	-7.1
21	1.642	7.3	773	SE	1.8	7.9	S	15.58	-0.03	-0.54	6.08	-4.0	-19.1	-10.7
22	1.666	7.5	769	S	6.5	17.6	NNW	14.24	5.73	4.33	5.72	-1.7	-9.9	-3.8
23	1.464	6.4	769	W	5.3	15.7	NW	12.56	3.44	-1.66	7.56	-0.4	-6.3	-1.4
24	1.582	6.8	762	ESE	1.8	9.5	N	15.34	0.12	-0.70	6.19	-1.0	-9.6	-2.8
25	1.161	3.5	756	ESE	1.6	5.6	NW	6.86	0.00	-10.33	7.13	-1.2	-9.9	-4.0
26	1.517	6.3	758	SW	8.2	22.9	NW	12.27	14.79	11.69	5.29	-0.8	-12.7	-6.0
27	1.523	6.2	763	W	4.2	16.2	NNW	13.10	1.86	-0.71	5.67	-2.2	-14.7	-7.4
28	1.253	5.1	754	SSE	3.5	12.4	N	9.23	2.48	-6.39	7.98	-2.3	-14.2	-7.9
29	1.638	7.4	756	SW	4.4	12.2	NW	16.42	2.44	4.07	5.06	-2.9	-16.0	-8.7
30	1.386	5.0	756	S	3.1	8.5	W	11.25	0.67	-6.33	8.12	-3.7	-16.0	-10.1
31	1.568	7.2	752	E	1.7	5.5	SSW	14.87	0.00	-7.39	11.73	-3.3	-18.9	-10.2
Average	1.534	6.4	764	S	4.1			12.59	3.31	-1.07	6.62	5.2	-13.3	-6.7
Maximum	1.898	8.2	775	SW	8.2	22.9	NW	16.68	14.79	11.69	11.73	126.8	-6.3	-0.4
Minimum	0.699	0.2	752	ESE	1.6			1.84	-0.84	-12.74	1.95	-46.7	-22.7	-13.9
Total	47.569	201.4						390.39	102.73	-33.12	205.50	161.8		

Ins. = Instantaneous
Max. = Maximum
kWh/m2 = kilowatt hour per meter square
h = Hour
hPa = Hechta-Pascal (Millbrae)
m/s = Meter per second
kWh = kilowatt hour
Wh = Watt hour
℃ = Centigrade

Table II.2-2 Monthly Data of Bayan-Undur (8/14)

Jan (2000)	Solar Irradiation	Sunshine duration	Atmospheric Pressure	Wind direction	Wind Velocity	Maximum Ins. Velocity	Direction at max. Ins. velocity	PV power Generation	Wind power Generation	Charge / Discharge power	AC supply from Inverter	Supply to DC Refrigerator	Average Ambient Temp. 1	Average Temp. of Cubicle 2
	kWh/m2	h	hPa		m/s	m/s		kWh	kWh	kWh	kWh	Wh	℃	℃
1	1.460	5.3	759	NE	7.7	18.6	N	12.32	12.06	5.33	8.75	0.0	-20.0	-11.3
2	1.502	6.3	755	S	2.3	8.8	S	11.76	0.36	-3.91	6.24	0.0	-21.8	-13.7
3	0.894	1.7	751	SE	1.6	8.3	N	3.95	0.28	-14.94	9.13	0.0	-22.3	-15.4
4	1.799	5.8	754	NE	4.7	13.3	N	10.70	7.16	-2.28	9.67	0.0	-24.4	-16.1
5	1.226	4.8	761	NNE	7.6	15.5	NNE	5.80	10.43	-3.46	9.73	0.0	-29.8	-22.7
6	1.722	8.0	762	SSE	3.7	13.0	NNW	16.55	1.73	0.81	7.72	0.0	-29.7	-21.2
7	1.575	7.8	753	ESE	1.6	5.3	S	14.76	-0.24	-2.11	7.02	0.0	-27.7	-19.2
8	1.705	7.4	752	E	3.2	12.8	NNW	15.33	2.25	0.64	7.22	0.0	-22.3	-15.9
9	1.166	3.7	756	E	2.8	9.8	SSE	7.28	0.52	-11.73	11.11	0.0	-22.2	-17.0
10	1.006	2.1	761	E	3.5	8.8	N	3.49	1.20	-6.76	5.28	0.0	-14.8	-11.9
11	1.730	7.1	764	ENE	4.4	8.9	N	13.55	2.65	7.10	2.92	0.0	-20.9	-14.6
12	1.444	7.1	760	SE	2.7	9.5	SW	8.96	0.87	-7.08	7.17	0.0	-25.2	-17.1
13	2.036	8.2	755	SE	2.2	10.6	N	17.63	0.75	4.92	4.73	0.0	-20.5	-13.1
14	1.725	6.6	757	E	4.2	17.1	NNE	14.33	6.39	6.56	4.62	0.0	-20.1	-13.2
15	2.327	8.4	762	SSE	2.0	6.3	S	17.64	-0.16	3.40	4.50	0.0	-23.5	-14.6
16	2.182	8.1	760	SE	1.7	6.5	S	17.57	-0.13	2.39	5.31	0.0	-22.8	-13.8
17	2.041	8.5	762	SSE	5.7	18.4	NNW	17.83	4.82	7.03	5.81	0.0	-18.7	-11.2
18	2.007	8.6	767	W	4.7	17.7	NW	18.20	4.64	7.93	5.12	0.0	-19.3	-12.1
19	2.023	8.7	761	SE	2.3	5.7	N	17.23	-0.12	3.36	4.17	0.0	-21.0	-12.0
20	1.303	4.4	761	E	2.1	7.1	N	6.07	-0.11	-7.77	4.18	0.0	-21.6	-14.5
21	2.181	8.5	761	ENE	6.2	14.0	N	18.04	4.39	9.37	3.56	0.0	-19.9	-11.4
22	1.893	7.0	764	NNE	8.3	14.2	N	10.18	13.48	9.40	4.46	0.0	-19.8	-9.8
23	2.197	8.4	774	E	6.3	12.2	N	6.80	6.97	0.48	3.60	0.0	-24.1	-14.0
24	2.126	7.9	777	E	5.7	11.6	N	7.72	4.80	-2.01	4.80	0.0	-25.1	-16.2
25	2.246	8.7	778	ENE	5.7	12.2	N	8.36	4.77	-1.08	4.59	0.0	-22.3	-14.0
26	2.239	8.8	776	SE	2.8	8.2	SSW	13.69	-0.06	-0.68	4.65	0.0	-21.4	-13.2
27	2.175	7.9	768	E	7.3	17.6	N	10.95	5.73	5.07	2.24	0.0	-20.6	-10.0
28	1.346	2.5	771	E	7.5	14.8	N	3.79	9.60	0.89	2.95	0.0	-22.0	-11.5
29	2.339	8.8	776	E	6.0	14.0	NNW	7.69	3.52	-2.50	4.01	0.0	-22.4	-13.4
30	2.380	9.0	778	ENE	3.1	9.7	NNE	11.63	0.84	-1.85	4.59	0.0	-21.0	-13.1
31	2.530	9.1	773	ESE	2.8	9.7	SSW	12.40	0.30	-0.70	3.83	0.0	-24.5	-14.7
Average	1.823	6.9	763	ESE	4.2			11.68	3.53	0.18	5.60	0.0	-22.4	-14.3
Maximum	2.530	9.1	778	NNE	8.3	18.6	N	18.20	13.48	9.40	11.11	0.0	-14.8	-9.8
Minimum	0.894	1.7	751	ESE/SE	1.6			3.49	-0.24	-14.94	2.24	0.0	-29.8	-22.7
Total	56.525	215.2						362.20	109.69	5.82	173.68	0.0		

Ins. = Instantaneous
Max. = Maximum
kWh/m2 = kilowatt hour per meter square
h = Hour
hPa = Hechta-Pascal (Millbrae)
m/s = Meter per second
kWh = kilowatt hour
Wh = Watt hour
℃ = Centigrade

Table II.2-2 Monthly Data of Bayan-Undur (9/14)

Feb (2000)	Solar Irradiation	Sunshine duration	Atmospheric Pressure	Wind direction	Wind Velocity	Maximum Ins. Velocity	Direction at max. Ins. velocity	PV power Generation	Wind power Generation	Charge / Discharge power	AC supply from Inverter	Supply to DC Refrigerator	Average Ambient Temp. 1	Average Temp. of Cubicle 2
	kWh/m2	h	hPa		m/s	m/s		kWh	kWh	kWh	kWh	Wh	℃	℃
1	2.442	9.1	767	S	3.4	10.1	SW	13.96	0.07	-0.37	4.66	-4.5	-22.9	-14.0
2	2.656	9.1	763	ENE	4.1	13.0	NNW	13.42	0.33	-0.64	4.67	-4.3	-22.0	-12.8
3	2.766	9.8	761	ENE	2.0	6.9	S	17.12	-0.14	1.67	5.14	-4.8	-21.1	-12.6
4	2.315	7.1	759	ENE	2.8	8.3	N	14.92	0.09	-1.34	6.50	-3.6	-18.6	-10.8
5	2.378	7.2	761	E	3.3	8.9	NNW	13.23	1.26	0.01	4.70	-3.5	-16.3	-9.1
6	2.735	9.3	766	S	5.3	14.3	NNW	13.74	2.16	3.08	3.26	-3.2	-15.1	-6.7
7	2.775	9.3	763	SSE	2.6	8.6	NNE	12.77	0.71	1.09	2.81	-2.5	-12.6	-4.3
8	2.765	9.3	762	SE	1.7	4.7	S	13.74	-0.01	-0.22	4.16	-2.8	-16.3	-5.8
9	2.676	9.1	758	NE	3.0	9.1	N	12.85	-0.04	0.67	2.62	-3.0	-15.6	-6.9
10	2.830	9.4	759	SE	2.7	8.7	NNW	14.48	0.12	-0.06	4.84	-2.5	-11.9	-4.1
11	2.708	7.5	757	NNE	5.4	13.3	N	13.45	4.37	3.65	4.38	-2.2	-11.8	-4.1
12	2.420	7.1	761	E	8.9	16.0	N	6.73	11.90	4.91	3.83	-2.2	-15.3	-1.1
13	3.029	9.6	765	S	5.5	12.8	NNW	5.57	3.13	-3.02	2.19	-3.7	-18.8	-8.0
14	3.111	9.7	765	S	2.4	10.5	NW	12.05	-0.07	-1.71	4.05	-3.9	-20.4	-10.6
15	2.896	9.6	761	ESE	2.4	7.5	NNW	12.70	-0.03	-0.72	3.72	-3.0	-18.1	-8.8
16	3.082	9.7	759	SE	2.8	8.9	WSW	13.57	0.17	-0.30	4.31	-2.5	-14.0	-5.8
17	2.251	6.5	760	S	4.6	18.2	NNW	9.97	6.48	1.92	4.68	-1.9	-9.8	-3.8
18	3.277	9.8	765	E	5.9	18.7	NNW	7.82	6.33	-1.91	5.91	-2.1	-14.8	-3.0
19	3.256	10.0	762	SSE	2.8	10.4	S	15.12	0.40	-0.29	5.80	-2.9	-15.3	-5.8
20	3.328	9.9	759	ESE	2.7	9.1	S	17.68	-0.02	-0.85	8.19	-2.9	-16.3	-6.5
21	3.417	9.7	760	NNE	4.8	13.1	NNW	15.85	1.46	1.03	6.27	-3.0	-16.0	-6.1
22	2.447	7.3	766	SSE	4.2	11.4	NW	9.54	2.80	-1.67	4.28	-3.5	-14.5	-7.2
23	2.997	9.9	768	SE	4.8	12.8	N	11.40	2.03	-0.05	3.79	-3.0	-13.5	-5.9
24	3.253	8.2	766	SW	5.1	15.6	NNW	12.71	2.45	1.24	4.19	-2.6	-12.5	-3.0
25	3.644	10.1	765	WSW	6.4	18.0	NW	7.62	5.23	-0.69	3.69	-1.3	-9.6	0.7
26	3.742	10.3	763	SSE	3.9	15.5	N	13.49	1.10	0.10	4.63	-1.2	-9.4	-1.0
27	3.808	10.4	764	SE	3.3	9.2	SW	13.44	0.25	0.70	3.30	-2.0	-10.4	-1.2
28	3.979	10.4	765	SSW	3.9	13.7	SSW	15.16	0.33	-0.68	5.98	124.8	-10.0	0.2
29	4.063	10.6	762	ESE	3.9	11.2	N	14.42	0.32	-0.10	4.88	-2.0	-10.2	-0.2
Average	3.001	9.1	762	SE	3.9			12.70	1.83	0.18	4.53	1.5	-15.0	-5.9
Maximum	4.063	10.6	768	NNE	8.9	18.7	NNW	17.68	11.90	4.91	8.19	124.8	-9.4	0.7
Minimum	2.251	6.5	757	SSE	1.7			5.57	-0.14	-3.02	2.19	-4.8	-22.9	-14.0
Total	87.046	265.0						368.52	53.18	5.45	131.43	44.2		

Ins. = Instantaneous
Max. = Maximum
kWh/m2 = kilowatt hour per meter square
h = Hour
hPa = Hechta-Pascal (Millbrae)
m/s = Meter per second
kWh = kilowatt hour
Wh = Watt hour
℃ = Centigrade

Table II.2-2 Monthly Data of Bayan-Undur (10/14)

March (2000)	Solar Irradiation	Sunshine duration	Atmospheric Pressure	Wind direction	Wind Velocity	Maximum Ins. Velocity	Direction at max. Ins. velocity	PV power Generation	Wind power Generation	Charge / Discharge power	AC supply from Inverter	Supply to DC Refrigerator	Average Ambient Temp. 1	Average Temp. of Cubicle 2
	kWh/m2	h	hPa		m/s	m/s		kWh	kWh	kWh	kWh	Wh	℃	℃
1	3.971	10.1	758	SSE	3.3	10.9	SW	17.42	0.21	-0.72	8.11	-2.0	-9.7	-0.5
2	4.427	10.2	757	W	6.6	16.9	NW	13.07	7.33	5.22	4.36	42.8	-6.8	0.4
3	4.169	10.6	765	W	7.4	18.7	NNW	12.46	4.83	2.40	4.81	-1.3	-9.4	2.8
4	4.352	10.7	763	W	4.7	13.3	NNW	13.67	3.07	2.69	4.11	-1.6	-8.0	0.7
5	4.011	10.5	763	S	6.9	20.3	NNW	11.22	7.10	1.77	6.25	-1.1	-9.0	4.1
6	3.259	9.1	765	E	5.9	16.7	N	10.43	4.67	0.57	4.60	-2.6	-12.7	-2.7
7	4.399	10.8	770	S	2.4	9.3	ESE	14.37	0.26	-1.91	6.36	-2.6	-11.7	-2.1
8	4.424	10.9	766	E	3.1	7.7	N	14.74	0.24	0.82	4.24	-2.3	-11.2	-0.9
9	4.401	10.9	767	ENE	2.7	7.0	N	15.33	0.00	-0.39	5.61	-2.2	-9.7	0.2
10	4.338	10.7	765	SE	2.6	8.9	SSW	14.16	0.00	0.36	3.95	-2.1	-9.1	0.5
11	4.410	10.7	762	SE	2.5	11.0	SW	16.65	0.01	-0.78	7.17	-1.6	-6.9	2.4
12	3.883	9.0	761	NE	2.4	8.8	ENE	15.40	0.16	-0.44	5.91	-1.0	-4.5	3.7
13	3.516	8.4	759	WSW	3.9	12.7	NW	14.12	3.38	1.63	5.80	9.9	-5.5	2.8
14	4.483	10.6	763	NW	8.0	16.9	N	10.33	7.72	3.71	4.27	-1.2	-7.2	6.8
15	4.948	10.9	762	SSW	2.8	10.2	NNW	15.02	0.26	0.44	4.90	-2.1	-8.5	1.5
16	4.955	11.2	758	SSW	3.9	11.2	NW	15.30	1.35	0.03	6.49	-1.3	-4.7	3.4
17	3.420	6.8	756	ESE	6.7	22.9	NNW	12.13	2.18	-1.94	6.20	-1.3	-7.1	0.6
18	4.089	9.2	763	SSE	4.9	16.8	SW	13.08	2.56	1.51	4.30	-1.8	-6.3	2.9
19	4.159	9.1	760	ENE	3.3	12.7	N	14.34	2.36	0.43	6.22	-0.4	-2.1	5.9
20	4.060	8.7	761	SSE	4.1	11.7	S	11.72	0.89	-2.38	5.05	-1.0	-2.7	5.3
21	4.277	9.2	757	SSW	4.5	12.4	N	15.64	1.85	-1.98	9.22	-0.3	-3.2	5.4
22	4.650	8.8	763	NW	9.2	20.5	NNW	11.44	13.09	2.43	11.29	-1.7	-8.8	2.4
23	5.169	11.2	766	WNW	7.2	15.3	NNW	17.28	5.70	2.25	10.25	-1.9	-5.9	3.3
24	5.226	11.0	768	WNW	6.5	15.1	NNW	14.75	3.91	3.15	5.46	-1.1	-3.0	5.3
25	5.002	10.3	766	WNW	5.0	11.7	W	13.31	2.22	-2.43	7.70	-0.1	2.4	8.5
26	4.799	9.6	758	SSW	7.8	20.9	N	13.05	2.76	1.96	4.03	0.0	1.3	7.2
27	4.615	10.0	765	SW	4.5	20.5	NNE	13.16	0.05	-0.74	4.11	-0.7	-1.9	5.3
28	4.286	8.4	763	SE	3.3	10.1	SSW	14.13	1.17	-0.85	6.09	-0.5	2.6	9.1
29	1.894	2.4	763	ENE	3.5	10.0	NNW	4.75	2.28	-9.94	6.84	0.0	2.3	8.4
30	5.747	11.2	762	S	4.9	15.0	N	22.04	3.93	5.81	9.76	-0.6	-1.2	8.6
31	5.374	11.2	761	ESE	3.6	10.7	N	19.32	1.11	-0.14	10.10	-0.6	0.3	8.8
Average	4.345	9.7	762	S	4.7			13.99	2.79	0.40	6.24	0.5	-5.5	3.5
Maximum	5.747	11.2	770	NW	9.2	22.9	NNW	22.04	13.09	5.81	11.29	42.8	2.6	9.1
Minimum	1.894	2.4	756	S	2.4			4.75	0.00	-9.94	3.95	-2.6	-12.7	-2.7
Total	134.713	302.4						433.83	86.65	12.54	193.56	15.7		

Ins. = Instantaneous
Max. = Maximum
kWh/m2 = kilowatt hour per meter square
h = Hour
hPa = Hechta-Pascal (Millbrae)
m/s = Meter per second
kWh = kilowatt hour
Wh = Watt hour
℃ = Centigrade

Table II.2-2 Monthly Data of Bayan-Undur (11/14)

April (2000)	Solar Irradiation	Sunshine duration	Atmospheric Pressure	Wind direction	Wind Velocity	Maximum Ins. Velocity	Direction at max. Ins. velocity	PV power Generation	Wind power Generation	Charge / Discharge power	AC supply from Inverter	Supply to DC Refrigerator	Average Ambient Temp. 1	Average Temp. of Cubicle 2
	kWh/m2	h	hPa		m/s	m/s		kWh	kWh	kWh	kWh	Wh	℃	℃
1	5.398	9.1	762	S	2.7	11.6	WSW	17.49	0.55	1.96	5.98	-0.9	-0.1	8.2
2	5.544	11.2	760	WSW	3.7	14.9	WNW	16.20	0.78	-0.61	7.40	-0.3	2.0	10.0
3	4.415	9.1	763	SW	7.9	21.6	NNW	10.30	6.75	1.10	5.85	-1.2	-3.7	4.3
4	5.872	11.3	768	SSE	3.0	12.3	WNW	19.44	0.55	-1.20	10.66	-2.1	-3.0	5.8
5	4.550	6.6	761	WSW	8.6	22.1	NNW	15.09	5.34	-2.39	11.99	175.5	3.0	8.3
6	5.461	10.5	765	SSE	4.3	16.6	N	17.44	1.69	-12.42	19.19	649.5	-1.1	7.0
7	5.880	11.3	757	SSW	5.7	18.9	SW	18.98	4.86	3.49	9.63	235.2	3.5	10.4
8	4.265	7.1	759	NE	8.6	19.1	NNE	12.36	0.51	-14.04	15.72	229.0	-6.2	2.6
9	6.076	11.2	769	W	6.3	15.3	NNW	20.03	6.67	5.25	10.80	97.7	-4.3	2.3
10	6.322	11.5	761	SW	4.6	16.4	WSW	19.59	3.19	2.83	9.57	-0.4	5.3	11.4
11	6.052	10.1	756	SE	7.1	19.4	NE	19.45	11.22	11.48	8.80	0.6	7.0	14.1
12	4.852	9.1	765	NNE	9.9	18.7	NE	12.61	10.53	3.92	8.75	-1.1	-0.8	7.7
13	6.372	11.5	772	ESE	5.2	13.3	N	17.78	1.98	-1.29	10.41	93.2	-1.1	7.9
14	6.017	11.2	768	SE	4.2	13.0	SW	17.67	1.93	-1.66	10.45	232.0	2.4	10.6
15	6.030	11.1	764	ESE	3.4	10.8	N	17.75	1.61	-11.37	19.20	159.8	6.6	14.2
16	4.126	7.7	761	ENE	3.4	8.4	NNE	11.05	1.41	-9.31	10.66	545.6	8.5	14.8
17	4.258	6.9	758	SSE	3.5	14.2	NNW	11.41	2.88	-1.44	5.29	402.6	10.1	16.0
18	4.548	7.8	757	SE	5.0	17.3	NE	12.26	5.91	-8.81	15.39	523.1	8.2	15.3
19	2.120	3.3	756	E	9.4	23.5	N	4.82	16.54	1.26	9.11	457.7	1.8	7.7
20	4.831	9.2	761	SW	8.3	19.6	NNW	13.32	22.09	15.42	8.85	533.9	-1.0	6.8
21	5.720	9.3	763	SSW	5.3	18.7	NNW	16.56	6.57	4.11	8.30	395.5	-0.7	8.3
22	6.036	10.8	764	SSW	2.0	9.4	NW	16.44	0.54	-2.52	8.93	209.5	2.8	10.8
23	5.105	7.7	755	SW	4.5	19.6	SW	13.27	4.75	0.63	6.67	572.8	6.6	12.6
24	2.699	6.7	753	SE	15.7	29.5	N	10.15	11.61	1.98	8.85	497.3	-3.3	3.6
25	5.441	11.6	765	ESE	6.5	17.3	N	18.46	1.49	2.81	6.70	342.4	0.8	8.6
26	6.412	11.9	762	S	3.7	11.3	SSW	17.85	2.01	1.25	7.98	324.3	8.2	15.2
27	5.767	11.3	753	WSW	7.7	20.9	WSW	14.22	6.80	3.50	7.26	22.0	12.9	19.9
28	3.323	9.6	753	SW	9.6	25.4	N	9.15	2.56	-5.41	6.69	314.1	2.3	8.3
29	6.229	12.1	762	NW	7.1	20.5	NNW	11.96	9.30	6.41	4.69	77.1	9.2	17.5
30	6.381	11.1	762	SSE	3.8	17.8	WSW	17.06	1.39	-3.30	10.99	23.9	11.2	18.6
Average	5.203	9.6	761	S	6.0			15.00	5.13	-0.28	9.69	236.9	2.9	10.2
Maximum	6.412	12.1	772	SE	15.7	29.5	N	20.03	22.09	15.42	19.20	649.5	12.9	19.9
Minimum	2.120	3.3	753	SSW	2.0			4.82	0.51	-14.04	4.69	-2.1	-6.2	2.3
Total	156.102	288.9						450.16	154.01	-8.37	290.76	7108.3		

Ins. = Instantaneous
Max. = Maximum
kWh/m2 = kilowatt hour per meter square
h = Hour
hPa = Hechta-Pascal (Millbrae)
m/s = Meter per second
kWh = kilowatt hour
Wh = Watt hour
℃ = Centigrade

Table II.2-2 Monthly Data of Bayan-Undur (12/14)

May (2000)	Solar Irradiation	Sunshine duration	Atmospheric Pressure	Wind direction	Wind Velocity	Maximum Ins. Velocity	Direction at max. Ins. velocity	PV power Generation	Wind power Generation	Charge / Discharge power	AC supply from Inverter	Supply to DC Refrigerator	Average Ambient Temp. 1	Average Temp. of Cubicle 2
	kWh/m2	h	hPa		m/s	m/s		kWh	kWh	kWh	kWh	Wh	℃	℃
1	5.212	9.8	760	SW	7.6	21.2	NNW	13.03	7.00	0.25	8.88	369.9	14.4	19.6
2	5.754	13.4	764	SSE	7.6	19.0	N	18.05	4.03	2.51	7.88	932.9	7.8	16.0
3	3.775	5.1	760	WSW	6.1	19.3	WNW	9.44	6.43	-1.95	6.86	762.9	12.9	18.2
4	6.358	10.0	769	SSE	4.3	12.1	NNW	15.66	3.91	1.50	7.50	256.4	9.4	17.8
5	7.090	12.2	769	SSW	6.5	14.2	SSW	17.12	6.86	4.95	8.41	247.2	13.9	21.2
6	6.714	10.3	763	SW	8.9	23.2	N	12.28	3.47	-2.63	7.41	590.0	16.1	22.9
7	2.008	5.2	770	E	5.9	21.5	NNE	6.95	1.00	-8.37	5.99	182.4	3.4	11.9
8	6.300	13.0	768	SSW	4.4	12.2	SSW	16.33	2.69	2.23	6.44	259.5	5.1	13.5
9	3.756	12.8	763	S	5.1	17.1	SW	17.76	6.33	4.49	8.86	295.9	9.7	17.8
10	5.649	8.5	755	SW	6.5	14.5	NW	12.80	8.96	2.30	8.47	504.1	11.3	17.9
11	7.555	12.1	760	SSW	7.7	20.1	N	11.91	9.17	1.47	8.18	781.9	9.0	20.7
12	4.023	7.2	759	ESE	1.8	8.0	NW	9.06	0.11	-13.41	11.08	844.6	9.1	16.6
13	5.921	10.3	757	SW	4.4	16.2	NNW	13.67	5.66	0.12	8.23	596.4	11.4	19.3
14	5.593	8.2	761	NE	7.6	15.4	NNW	12.70	13.87	6.00	9.64	339.1	7.6	15.8
15	7.440	12.1	762	S	4.9	19.6	NNW	16.75	7.68	1.07	12.33	196.4	8.7	17.5
16	5.515	10.1	760	SSW	8.5	22.4	N	12.90	16.87	3.37	14.58	680.2	4.7	13.1
17	5.932	12.1	765	SSW	10.8	23.9	N	10.31	9.44	-1.73	9.93	760.3	6.4	14.1
18	7.351	13.2	765	SE	2.6	10.3	N	15.60	1.11	-2.19	7.90	678.3	11.2	18.5
19	7.073	11.5	760	SSW	4.9	16.2	N	15.74	5.08	3.99	5.85	724.7	16.3	23.6
20	6.320	8.2	763	E	4.8	13.1	N	14.20	3.29	-0.57	6.96	718.1	14.7	22.0
21	7.676	13.4	764	S	3.4	10.4	SW	16.05	1.52	-7.14	13.16	614.5	16.2	24.6
22	6.350	9.5	761	SW	4.6	13.1	WNW	12.80	3.92	-3.63	9.07	752.6	22.0	28.0
23	5.358	8.4	760	WSW	6.2	15.8	NW	10.89	10.06	0.70	8.72	948.7	19.5	25.9
24	3.632	7.0	764	E	6.3	14.1	N	7.94	6.78	-6.66	9.73	929.2	12.4	19.4
25	5.162	6.5	766	SSE	4.6	14.6	N	11.91	6.97	-1.35	9.08	610.6	10.4	18.3
26	7.448	13.4	766	SSW	3.5	10.9	NNW	15.79	2.20	-4.69	11.07	930.0	13.3	21.5
27	5.787	12.0	765	SSW	2.7	9.5	NW	13.63	0.58	-4.14	7.71	331.4	16.7	24.4
28	7.381	10.8	759	WSW	7.3	23.4	WSW	14.92	10.58	6.44	7.63	700.4	20.2	25.9
29	6.925	13.3	755	SSE	7.3	18.7	N	13.35	12.03	3.99	7.86	379.1	15.5	23.9
30	7.617	11.1	759	SSW	4.9	13.4	N	16.33	3.85	-2.69	9.11	601.1	12.6	21.2
31	5.584	13.5	763	E	2.6	11.3	N	14.98	0.20	-9.68	10.54	1114.8	15.0	24.7
Average	5.943	10.4	762	S	5.6			13.57	5.85	-0.83	8.87	601.0	12.1	19.8
Maximum	7.676	13.5	770	SSW	10.8	23.9	N	18.05	16.87	6.44	14.58	1114.8	22.0	28.0
Minimum	2.008	5.1	755	ESE	1.8			6.95	0.11	-13.41	5.85	182.4	3.4	11.9
Total	184.259	324.2						420.85	181.65	-25.45	275.06	18633.6		

Ins. = Instantaneous
Max. = Maximum
kWh/m2 = kilowatt hour per meter square
h = Hour
hPa = Hechta-Pascal (Millbrae)
m/s = Meter per second
kWh = kilowatt hour
Wh = Watt hour
℃ = Centigrade

Table II.2-2 Monthly Data of Bayan-Undur (13/14)

June (2000)	Solar Irradiation	Sunshine duration	Atmospheric Pressure	Wind direction	Wind Velocity	Maximum Ins. Velocity	Direction at max. Ins. velocity	PV power Generation	Wind power Generation	Charge / Discharge power	AC supply from Inverter	Supply to DC Refrigerator	Average Ambient Temp. 1	Average Temp. of Cubicle 2
	kWh/m2	h	hPa		m/s	m/s		kWh	kWh	kWh	kWh	Wh	℃	℃
1	4.113	13.1	765	SSE	3.1	11.1	SW	16.23	1.58	-5.44	9.31	887.1	17.7	26.3
2	1.849	13.7	766	SSE	3.8	14.2	S	17.55	3.57	-3.33	10.04	577.5	18.9	27.1
3	4.372	10.7	765	SSE	2.7	10.5	SSW	14.54	1.00	-7.51	9.04	847.4	19.5	27.5
4	5.216	11.5	766	E	3.2	13.1	N	13.75	1.52	-6.04	7.35	766.7	22.1	29.7
5	2.589	8.4	763	SW	7.6	19.0	NNW	11.16	7.66	-3.77	8.28	1056.2	19.1	24.9
6	6.568	11.9	763	SSE	5.9	14.6	N	16.37	2.67	-1.33	6.74	769.4	14.6	20.8
7	2.522	14.3	763	S	3.6	12.6	WSW	13.90	1.90	-11.03	12.38	1079.4	17.6	22.9
8	1.904	8.9	763	ESE	3.0	18.5	N	11.47	2.25	-13.97	13.15	1087.9	17.9	22.5
9	1.771	13.1	763	SSE	3.6	13.0	SSE	15.35	2.41	-6.43	10.04	950.0	20.2	24.4
10	5.627	13.3	763	SSW	3.4	11.8	WSW	15.13	1.73	-9.62	12.08	1061.1	22.7	26.7
11	6.554	12.0	766	SSW	3.8	16.9	SSW	14.61	3.03	-1.81	8.17	567.3	24.6	28.5
12	6.270	11.1	767	SE	2.8	12.4	NNE	13.62	1.28	2.22	3.32	466.8	23.5	27.7
13	6.285	12.8	763	SSE	6.0	17.2	SSE	15.09	8.69	2.97	6.68	1014.7	22.8	28.1
14	1.200	12.6	758	SW	6.6	17.0	SW	15.48	7.18	1.77	6.88	987.2	18.7	26.2
15	0.866	10.0	762	E	2.3	13.2	WSW	12.66	0.94	-8.49	9.20	767.3	17.8	24.5
16	2.638	7.8	768	E	4.3	14.8	NE	11.20	3.09	3.75	3.35	535.1	17.7	22.5
17	0.706	7.6	770	SSE	1.9	13.5	SE	10.41	0.89	2.07	2.59	374.9	18.7	23.6
18	0.358	13.3	767	ESE	2.0	8.3	W	15.16	0.10	-2.79	4.54	949.5	21.1	26.0
19	2.723	9.2	765	E	3.4	16.5	SE	10.20	3.25	-2.05	2.28	944.8	22.3	26.5
20	0.537	4.4	765	E	4.4	15.3	W	6.11	3.52	-6.09	2.33	968.8	17.9	23.3
21	1.461	7.0	762	SSE	2.8	14.3	WNW	11.25	0.51	7.77	0.61	153.2	19.3	24.1
22	1.355	3.8	759	ESE	8.2	24.1	N	7.17	14.79	12.58	1.51	532.8	13.9	18.1
23	0.151	13.6	766	ENE	9.3	21.7	N	16.48	21.05	18.62	4.95	992.3	10.2	16.1
24	0.600	14.6	765	S	1.6	9.6	N	15.65	0.05	-1.90	4.23	887.1	16.8	23.1
25	0.436	12.2	761	SSW	4.3	13.1	SW	14.52	4.63	3.44	2.13	1069.5	19.8	24.8
26	1.506	9.2	758	SW	4.9	19.0	SSW	10.03	4.92	-0.88	2.22	1051.2	18.8	24.3
27	0.306	10.0	760	SW	7.6	16.8	NNW	14.89	18.72	16.73	3.30	860.3	11.6	18.3
28	5.616	10.4	760	S	6.1	18.5	NNW	11.98	9.89	4.25	3.85	1054.8	11.8	17.8
29	4.153	14.4	762	S	2.2	10.3	NW	15.30	0.79	-1.30	3.97	742.3	18.3	23.8
30	1.466	11.5	760	S	4.2	17.0	WNW	13.69	3.91	0.27	3.84	761.0	21.4	25.9
Average	2.723	10.8	763	SSE	4.2			13.36	4.58	-0.58	5.94	825.4	18.5	24.2
Maximum	6.568	14.6	770	ENE	9.3	24.1	N	17.55	21.05	18.62	13.15	1087.9	24.6	29.7
Minimum	0.151	3.8	758	S	1.6			6.11	0.05	-13.97	0.61	153.2	10.2	16.1
Total	81.718	326.4						400.95	137.52	-17.34	178.36	24763.6		

Ins. = Instantaneous
Max. = Maximum
kWh/m2 = kilowatt hour per meter square
h = Hour
hPa = Hechta-Pascal (Millbrae)
m/s = Meter per second
kWh = kilowatt hour
Wh = Watt hour
℃ = Centigrade

Table II.2-2 Monthly Data of Bayan-Undur (14/14)

July (2000)	Solar Irradiation	Sunshine duration	Atmospheric Pressure	Wind direction	Wind Velocity	Maximum Ins. Velocity	Direction at max. Ins. velocity	PV power Generation	Wind power Generation	Charge / Discharge power	AC supply from Inverter	Supply to DC Refrigerator	Average Ambient Temp. 1	Average Temp. of Cubicle 2
	kWh/m2	h	hPa		m/s	m/s		kWh	kWh	kWh	kWh	Wh	℃	℃
1	2.045	5.1	759	SE	3.2	16.5	WNW	7.95	1.70	-11.44	7.16	1056.7	20.2	24.9
2	1.742	8.5	759	ESE	3.9	17.9	WNW	11.92	3.31	-4.34	5.92	809.7	19.3	24.6
3	4.491	12.2	765	E	5.8	14.5	N	15.91	6.84	1.82	6.98	1082.2	17.0	23.1
4	4.001	11.0	768	SSE	4.8	17.2	W	13.81	5.41	-0.31	5.73	1038.0	20.4	25.4
5	0.928	7.5	768	S	4.8	15.0	NW	11.20	5.37	-4.80	7.33	660.6	21.2	26.2
6	2.019	2.8	764	ESE	3.4	10.4	N	4.90	2.46	-8.46	3.23	146.5	15.6	21.0
7	3.245	13.3	762	S	3.1	15.5	NNW	13.05	1.88	-0.82	2.65	636.2	17.5	22.4
8	1.749	14.1	762	S	3.6	10.7	NW	15.22	2.88	1.42	3.23	906.1	18.1	23.0
9	1.686	10.1	763	SSE	3.4	15.2	WSW	13.12	1.81	-2.76	4.08	1058.3	19.8	23.8
10	1.567	13.6	765	ENE	3.5	10.3	ENE	15.03	1.91	-2.57	5.69	845.4	20.7	25.4
11	2.924	11.0	764	SW	3.9	18.5	NNW	13.62	3.29	-3.57	6.08	1074.2	22.9	26.7
12	3.617	11.4	761	S	3.9	11.0	NNW	13.39	2.39	-3.28	4.70	1071.6	24.4	28.2
13	2.658	10.9	759	SE	3.3	22.6	N	13.79	2.34	-7.17	8.76	1063.4	23.6	28.3
14	1.916	5.0	759	SSW	3.1	18.9	ESE	6.58	1.17	-12.46	5.92	1059.0	23.1	26.3
15	4.476	12.1	758	E	4.3	13.4	NE	14.09	4.65	13.02	1.28	247.5	22.5	28.1
16	6.169	11.9	760	ENE	7.5	15.1	NNW	15.05	12.21	13.89	4.17	1.7	22.5	26.1
17	2.148	7.6	759	ENE	4.4	14.0	SSW	12.66	3.59	-2.17	4.65	721.4	22.3	26.9
18	1.981	5.7	760	SE	5.3	14.1	N	6.90	7.67	-2.76	3.32	1080.4	18.8	24.1
19	5.136	8.9	760	NE	4.2	12.1	NNE	12.60	3.71	-0.57	3.00	1076.4	18.8	24.9
20	6.025	10.6	765	NE	7.0	15.6	N	15.31	11.73	8.72	3.37	910.2	18.6	24.9
21	4.336	11.8	768	ESE	2.9	9.3	NE	16.26	0.83	-7.94	6.86	835.5	19.7	26.3
22	0.610	8.9	767	E	2.0	7.1	E	11.28	0.02	-11.73	5.03	1054.8	20.1	26.3
23	0.910	8.7	765	SE	2.6	9.8	SSW	9.83	0.41	-11.45	4.25	787.3	20.0	26.7
24	0.704	2.0	761	SSE	4.2	13.3	W	5.16	2.54	-0.54	1.96	129.8	19.2	23.7
25	0.316	6.9	760	E	4.4	15.7	N	10.76	5.41	4.42	2.41	190.6	19.2	23.7
26	0.728	2.2	760	SE	3.0	18.3	NNW	4.43	1.90	-14.45	3.37	904.3	17.8	24.1
27	0.251	13.2	762	W	7.3	17.1	NNW	17.09	16.73	16.34	2.28	813.3	14.9	21.5
28	1.365	12.2	766	S	7.7	19.3	N	16.82	17.93	11.75	3.76	1072.1	14.4	21.5
29	1.753	12.1	768	NE	6.4	15.4	N	17.07	11.61	0.51	4.51	1088.2	14.8	22.6
30	0.860	10.6	763	ESE	3.7	15.5	N	11.35	2.32	-13.96	4.47	889.1	16.2	22.9
31	0.174	12.6	762	ESE	3.6	14.7	N	16.49	2.48	-1.08	3.13	790.2	17.4	24.6
Average	2.339	9.5	762	SE	4.3			12.34	4.79	-1.84	4.49	809.7	19.3	24.7
Maximum	6.169	14.1	768	S	7.7	22.6	N	17.09	17.93	16.34	8.76	1088.2	24.4	28.3
Minimum	0.174	2.0	758	E	2.0			4.43	0.02	-14.45	1.28	1.7	14.4	21.0
Total	72.530	294.5						382.64	148.50	-56.74	139.28	25100.7		

Ins. = Instantaneous
Max. = Maximum
kWh/m2 = kilowatt hour per meter square
h = Hour
hPa = Hechta-Pascal (Millbrae)
m/s = Meter per second
kWh = kilowatt hour
Wh = Watt hour
℃ = Centigrade

Table II.2-3 Monthly Data of Tariat (1/13)

July (1999)	Solar Irradiation	Sunshine duration	Atmospheric Pressure	Wind direction	Wind Velocity	Maximum Ins. Velocity	Direction at max. Ins. velocity	PV power Generation	Wind power Generation	Charge / Discharge power	AC supply from Inverter	Supply to DC Refrigerator	Average Ambient Temp. 1	Average Temp. of Cubicle 2
	kWh/m2	h	hPa		m/s	m/s		kWh	kWh	kWh	kWh	Wh	℃	℃
1	1.835	0.0	713	W	4.8	10.4	WNW	3.78	2.14	0.00	2.59	2.4	8.7	12.9
2	6.867	11.6	715	SW	3.8	16.2	W	13.14	0.82	3.45	2.52	3.4	11.2	16.7
3	7.791	10.7	720	WSW	3.1	10.9	W	16.23	0.77	6.14	2.83	3.5	10.8	18.1
4	7.127	12.0	724	SSW	2.9	7.1	ENE	13.16	0.03	2.63	2.50	3.5	11.1	19.1
5	6.509	9.6	726	SSE	1.8	10.0	NE	12.80	0.39	2.05	3.04	4.0	10.9	18.0
6	7.378	10.9	724	W	3.6	13.1	NW	14.47	0.98	4.29	3.08	4.4	11.9	18.5
7	6.360	9.9	722	SW	3.4	8.8	ENE	12.12	0.50	1.86	2.74	4.8	12.7	19.1
8	7.141	10.5	722	SSE	2.8	9.5	WSW	12.69	0.37	1.36	3.50	4.0	10.7	17.9
9	5.183	8.0	723	E	2.5	8.8	E	10.45	0.43	0.20	2.50	3.5	9.1	15.8
10	4.954	8.2	722	ESE	1.7	5.5	ESE	10.31	0.00	0.00	2.83	3.7	10.6	17.4
11	8.089	13.4	721	ENE	1.9	6.2	ENE	13.98	0.00	3.18	2.79	4.5	12.9	20.2
12	7.535	11.1	720	SSE	1.7	13.5	W	13.59	0.09	1.74	3.82	5.2	15.3	22.3
13	4.682	6.6	722	SW	3.5	12.5	W	9.72	1.49	0.54	2.71	5.5	16.0	21.2
14	7.065	11.6	723	WSW	2.6	19.4	WNW	12.01	0.37	1.98	2.56	5.8	17.3	23.7
15	5.342	8.1	724	WSW	2.5	7.8	WNW	10.68	0.22	1.09	2.03	6.0	17.3	23.1
16	5.964	9.5	725	S	1.9	8.8	E	11.49	0.07	1.14	2.55	5.8	16.3	23.0
17	7.613	12.6	725	S	3.0	9.1	E	12.29	0.68	2.24	2.48	5.5	16.8	23.4
18	8.191	13.7	723	S	1.8	6.7	WNW	12.23	0.00	1.65	2.71	5.6	18.2	25.3
19	7.791	11.0	720	S	2.9	12.5	W	12.57	0.12	2.01	2.86	6.2	20.2	26.8
20	6.305	10.9	722	S	2.2	9.6	SW	11.67	0.26	1.59	2.62	6.3	20.5	27.0
21	6.269	9.4	723	SE	3.2	10.6	E	12.56	0.60	0.52	4.65	6.3	21.5	27.4
22	6.978	12.3	726	ESE	3.7	10.7	ESE	14.19	1.07	2.38	4.91	6.4	22.0	27.9
23	7.619	11.9	726	ESE	3.8	10.2	S	14.52	0.46	2.68	4.41	7.0	23.9	29.6
24	6.915	10.0	722	SSE	3.9	11.5	S	12.46	1.73	2.16	4.16	7.4	23.5	29.5
25	2.355	1.8	721	W	3.9	11.5	W	4.90	0.33	0.00	1.54	5.7	16.6	22.4
26	6.495	8.6	723	SSE	2.9	7.6	ENE	14.95	0.00	4.31	2.64	5.8	17.0	23.6
27	2.497	1.7	722	SSE	2.8	8.9	ENE	5.39	0.52	0.00	3.31	4.9	16.4	21.2
28	8.160	13.2	722	W	4.1	11.8	NW	17.28	0.61	6.77	3.16	5.9	17.6	24.5
29	6.309	10.1	724	W	3.5	11.1	NW	13.59	0.40	3.17	2.86	5.4	16.2	22.7
30	8.496	13.9	725	WSW	2.6	8.6	WSW	15.38	0.03	0.77	6.16	5.5	15.5	23.1
31	8.013	13.6	726	S	2.4	8.9	WSW	15.71	0.21	2.30	5.24	5.3	15.8	23.6
Average	6.446	9.8	722	S	2.9			12.26	0.50	2.07	3.17	5.1	15.6	22.0
Maximum	8.496	13.9	726	W	4.8	19.4	WNW	17.28	2.14	6.77	6.16	7.4	23.9	29.6
Minimum	1.835	0.0	713	ESE/SSE	1.7			3.78	0.00	0.00	1.54	2.4	8.7	12.9
Total	199.828	306.4						380.31	15.69	64.20	98.30	159.2		

Ins. = Instantaneous
Max. = Maximum
kWh/m2 = kilowatt hour per meter square
h = Hour
hPa = Hechta-Pascal (Millbrae)
m/s = Meter per second
kWh = kilowatt hour
Wh = Watt hour
℃ = Centigrade

Table II.2-3 Monthly Data of Tariat (2/13)

Aug (1999)	Solar Irradiation	Sunshine duration	Atmospheric Pressure	Wind direction	Wind Velocity	Maximum Ins. Velocity	Direction at max. Ins. velocity	PV power Generation	Wind power Generation	Charge / Discharge power	AC supply from Inverter	Supply to DC Refrigerator	Average Ambient Temp. 1	Average Temp. of Cubicle 2
	kWh/m2	h	hPa		m/s	m/s		kWh	kWh	kWh	kWh	Wh	℃	℃
1	5.683	8.3	726	ESE	1.5	14.0	SSW	12.45	0.15	-4.44	8.32	5.1	15.1	22.5
2	1.885	0.0	722	SSE	3.0	7.3	ESE	3.77	0.00	-16.93	11.29	4.8	14.7	18.9
3	2.980	2.8	722	W	2.7	6.7	W	6.22	0.00	-18.87	15.42	4.7	14.7	19.9
4	2.281	0.9	721	E	3.4	7.6	E	4.34	0.00	-14.50	9.66	3.9	13.2	17.4
5	5.347	6.9	716	SSW	1.5	6.5	W	12.01	0.02	-10.20	12.59	4.2	13.9	20.4
6	4.706	7.0	713	WNW	5.7	17.3	W	10.17	3.96	-4.19	9.34	4.0	11.8	16.8
7	4.307	5.8	713	S	3.2	10.1	E	9.56	0.78	-7.29	8.70	3.1	9.8	15.6
8	2.285	1.8	712	W	7.8	18.3	W	4.27	6.71	-7.74	9.54	0.6	3.3	8.0
9	7.018	10.4	721	W	5.0	11.6	WSW	16.67	3.10	6.61	6.59	0.7	6.5	11.7
10	4.725	6.6	721	SW	2.3	12.0	WSW	10.64	0.39	-5.28	7.60	2.2	9.3	14.6
11	5.715	9.1	718	W	2.9	10.3	WNW	13.27	0.46	1.96	6.22	2.4	11.9	16.8
12	7.387	12.6	719	WSW	3.3	9.1	W	17.73	0.41	0.55	9.00	3.5	11.4	18.3
13	6.203	10.3	720	ENE	2.5	8.6	ENE	14.91	0.24	-2.14	8.68	3.4	12.2	18.1
14	5.212	7.2	720	SE	3.4	9.0	E	12.74	1.40	2.84	4.66	3.3	13.9	17.7
15	6.972	10.1	723	W	5.5	13.6	WNW	17.45	4.16	10.01	3.69	3.5	13.2	18.7
16	6.561	11.4	729	SSW	2.8	7.6	WSW	16.32	0.09	0.16	7.67	3.4	10.4	18.7
17	6.772	12.5	728	WSW	3.6	11.0	WNW	16.66	1.55	2.73	7.02	3.5	11.5	18.3
18	4.281	7.4	729	W	3.4	9.3	NNW	9.50	0.75	-3.53	5.38	2.8	10.0	15.8
19	7.324	13.4	730	WSW	2.4	8.3	WSW	18.66	0.19	3.54	6.87	3.0	10.5	18.2
20	6.925	13.2	728	W	2.9	10.4	W	18.29	0.47	5.64	4.98	3.4	12.7	19.7
21	6.947	13.0	725	SW	2.4	6.7	WNW	17.57	0.00	3.95	5.46	4.3	13.5	21.4
22	6.814	11.0	723	S	2.4	11.4	N	17.99	0.49	4.89	5.40	4.5	14.6	22.2
23	4.420	6.4	726	S	2.4	9.2	WNW	11.30	0.25	-2.28	5.45	4.0	13.4	19.7
24	6.538	11.2	729	SSE	2.0	7.4	ENE	17.82	0.11	5.95	4.03	4.2	14.0	22.0
25	6.852	12.3	724	W	4.2	14.0	NNW	18.84	2.68	8.70	4.74	4.3	14.3	20.7
26	7.787	12.1	724	WSW	3.5	12.2	WNW	22.18	2.09	10.79	4.86	3.3	11.0	17.7
27	6.879	12.8	722	WSW	3.6	12.1	WNW	19.16	1.72	10.13	2.85	3.0	11.6	18.4
28	6.811	12.1	722	WSW	3.4	11.3	NW	18.94	0.44	6.64	4.64	4.2	14.4	21.2
29	3.902	5.0	721	S	2.5	10.7	W	10.17	0.33	-5.21	7.15	3.9	13.9	19.7
30	5.788	11.1	721	WSW	3.1	11.1	W	16.59	1.39	7.52	2.64	4.1	14.7	20.7
31	4.006	6.8	721	SW	2.9	11.5	WNW	10.41	1.05	-0.99	4.26	3.6	13.4	18.7
Average	5.526	8.7	722	SW	3.2			13.76	1.14	-0.36	6.92	3.5	12.2	18.3
Maximum	7.787	13.4	730	W	7.8	18.3	W	22.18	6.71	10.79	15.42	5.1	15.1	22.5
Minimum	1.885	0.0	712	ESE/SSW	1.5			3.77	0.00	-18.87	2.64	0.6	3.3	8.0
Total	171.313	271.5						426.60	35.38	-10.98	214.70	108.9		

Ins. = Instantaneous
Max. = Maximum
kWh/m2 = kilowatt hour per meter square
h = Hour
hPa = Hechta-Pascal (Millbrae)
m/s = Meter per second
kWh = kilowatt hour
Wh = Watt hour
℃ = Centigrade

Table II.2-3 Monthly Data of Tariat (3/13)

Sep (1999)	Solar Irradiation	Sunshine duration	Atmospheric Pressure	Wind direction	Wind Velocity	Maximum Ins. Velocity	Direction at max. Ins. velocity	PV power Generation	Wind power Generation	Charge / Discharge power	AC supply from Inverter	Supply to DC Refrigerator	Average Ambient Temp. 1	Average Temp. of Cubicle 2
	kWh/m2	h	hPa		m/s	m/s		kWh	kWh	kWh	kWh	Wh	℃	℃
1	5.139	8.8	725	SE	2.9	8.3	E	15.19	0.69	2.39	5.15	3.3	11.0	17.6
2	4.737	6.6	724	SE	2.6	10.0	E	14.01	1.00	-3.77	9.76	3.2	12.3	18.4
3	5.811	11.0	723	WSW	3.1	7.4	NW	17.42	0.06	1.42	7.56	4.3	14.9	21.5
4	4.456	7.1	724	SW	2.7	12.1	NW	12.98	0.42	0.36	4.77	3.9	12.6	19.4
5	6.402	11.2	721	WSW	2.8	8.3	W	19.33	0.01	5.76	5.39	4.0	13.0	20.9
6	5.089	10.0	718	W	3.4	12.3	W	15.20	1.83	5.10	3.71	3.4	11.3	17.8
7	3.456	6.7	717	S	4.1	16.9	SW	9.32	3.32	0.57	3.75	2.2	9.8	14.8
8	5.491	9.7	717	W	5.2	15.2	WSW	17.49	4.63	10.19	3.86	2.9	12.5	17.3
9	4.688	7.5	718	WNW	5.4	13.6	W	14.38	3.88	6.31	3.76	2.3	8.5	14.2
10	5.447	10.7	720	WNW	5.5	13.8	W	17.76	4.03	9.17	4.07	1.1	4.1	11.2
11	4.511	8.1	720	WNW	5.2	13.4	W	11.56	3.63	1.44	5.02	1.0	5.3	10.9
12	4.565	7.5	722	S	2.8	9.5	E	14.18	1.06	2.23	4.00	1.0	3.3	10.1
13	2.631	4.0	725	E	4.3	8.0	E	6.32	1.41	-4.73	3.59	0.0	0.8	5.9
14	5.525	9.6	725	ESE	2.3	9.1	W	17.67	0.59	5.53	3.94	0.0	2.1	9.5
15	5.098	9.6	722	S	3.1	9.6	ENE	15.96	1.23	1.47	6.80	0.5	2.8	10.4
16	3.166	4.4	722	E	6.8	13.3	E	8.67	7.12	-0.91	7.41	0.0	0.2	4.1
17	2.794	5.1	724	E	7.1	13.0	ENE	7.92	8.51	0.45	6.53	0.0	-2.8	0.9
18	2.943	5.4	727	E	6.2	11.9	E	7.88	6.22	-5.90	10.16	0.0	-2.6	1.1
19	4.243	8.9	730	SE	1.6	5.8	ESE	13.26	0.13	-1.48	5.60	0.0	-2.3	6.0
20	5.252	9.0	729	W	4.2	9.5	W	20.49	0.80	7.81	4.49	0.0	-1.3	5.7
21	5.495	11.3	725	W	4.3	9.5	W	19.69	1.13	2.13	9.23	0.0	1.6	8.2
22	4.317	8.3	720	W	4.1	11.6	WNW	15.13	1.29	-2.60	9.61	0.8	4.7	10.4
23	5.126	9.5	723	W	6.0	15.8	W	15.13	5.01	6.54	4.73	0.5	1.5	8.9
24	3.844	7.3	718	WSW	2.6	7.5	W	12.55	0.00	-1.76	5.41	0.0	2.9	9.1
25	2.341	3.3	717	SSW	2.5	8.9	NNW	6.29	0.10	-7.32	4.87	0.2	3.3	9.0
26	4.534	8.4	722	SSW	2.3	11.2	NW	18.25	0.78	5.90	4.41	0.4	2.0	9.6
27	3.221	6.0	723	WSW	2.9	9.5	WNW	10.47	0.76	-0.74	3.34	0.4	1.7	8.7
28	4.714	9.5	726	W	4.3	11.0	WSW	14.59	2.05	5.18	2.81	0.0	-0.8	7.0
29	4.794	10.0	725	W	3.6	11.0	WSW	14.88	1.45	1.16	5.96	0.0	-0.1	7.3
30	3.660	8.5	725	WNW	3.7	10.3	WSW	13.02	1.07	-1.11	6.14	0.0	0.8	6.9
Average	4.449	8.1	722	SSW	3.9			13.89	2.14	1.69	5.52	1.1	4.4	10.7
Maximum	6.402	11.3	730	E	7.1	16.9	SW	20.49	8.51	10.19	10.16	4.3	14.9	21.5
Minimum	2.341	3.3	717	SE	1.6			6.29	0.00	-7.32	2.81	0.0	-2.8	0.9
Total	133.490	243.0						416.99	64.21	50.79	165.83	35.4		

Ins. = Instantaneous
Max. = Maximum
kWh/m2 = kilowatt hour per meter square
h = Hour
hPa = Hechta-Pascal (Millbrae)
m/s = Meter per second
kWh = kilowatt hour
Wh = Watt hour
℃ = Centigrade

Table II.2-3 Monthly Data of Tariat (4/13)

Oct (1999)	Solar Irradiation	Sunshine duration	Atmospheric Pressure	Wind direction	Wind Velocity	Maximum Ins. Velocity	Direction at max. Ins. velocity	PV power Generation	Wind power Generation	Charge / Discharge power	AC supply from Inverter	Supply to DC Refrigerator	Average Ambient Temp. 1	Average Temp. of Cubicle 2
	kWh/m2	h	hPa		m/s	m/s		kWh	kWh	kWh	kWh	Wh	℃	℃
1	3.990	5.8	730	ESE	2.9	7.7	WNW	14.24	0.13	0.56	4.76	0.0	-0.6	7.9
2	3.828	7.8	729	W	2.9	8.5	WNW	14.38	0.51	-1.97	7.53	0.0	0.9	7.9
3	3.188	7.1	726	W	2.8	9.3	SSW	11.40	0.23	-7.34	9.43	0.0	2.6	8.7
4	3.943	7.6	724	W	3.9	10.0	WSW	16.15	1.34	-3.43	11.26	0.0	1.9	8.6
5	3.498	8.2	723	WSW	3.9	10.9	WSW	15.28	1.82	-0.27	8.08	0.0	2.6	8.4
6	4.430	10.3	724	W	2.5	7.7	W	20.04	0.00	-6.60	16.44	0.0	4.0	11.4
7	4.247	10.4	723	W	3.4	10.0	WNW	20.05	0.76	-3.46	14.41	0.0	4.3	11.5
8	1.541	2.1	717	W	4.5	13.7	WNW	4.54	2.04	-13.18	10.13	0.0	1.5	6.6
9	2.799	4.7	716	WNW	5.0	12.5	W	9.96	2.85	-5.43	8.50	0.0	0.0	5.1
10	2.257	3.1	718	W	7.1	15.2	W	7.69	5.61	0.14	4.05	0.0	-3.4	1.5
11	1.842	1.8	716	W	7.1	14.5	W	4.44	5.83	-9.33	10.02	0.0	-0.3	3.7
12	3.592	7.6	724	WNW	4.3	11.0	WNW	16.98	2.08	1.27	8.17	0.0	-7.9	0.0
13	2.889	7.0	724	W	7.1	18.0	W	10.13	6.24	3.23	3.92	0.0	-5.1	-0.6
14	4.004	10.3	729	WNW	7.9	18.5	WNW	21.01	7.94	16.53	3.57	0.0	-3.1	2.2
15	3.570	9.2	733	W	5.4	11.3	W	15.25	3.66	6.09	3.87	0.0	-2.7	2.6
16	3.722	10.0	735	W	5.1	9.9	W	20.07	2.40	7.67	5.66	0.0	-1.3	4.5
17	3.778	10.1	729	W	4.7	9.7	W	21.03	2.37	10.46	4.01	0.0	-1.1	5.2
18	3.737	9.8	724	W	5.6	14.3	W	14.44	4.28	6.55	3.31	0.0	-0.2	5.6
19	3.231	9.8	727	W	4.7	10.9	W	13.96	2.10	3.07	4.04	0.0	0.9	6.3
20	3.589	9.9	725	W	4.6	10.1	WNW	17.38	1.81	2.97	6.88	0.0	-0.2	6.5
21	3.547	9.9	723	W	4.4	8.9	W	13.94	0.99	0.98	4.94	0.0	0.3	7.0
22	2.798	6.7	722	W	4.0	8.8	W	12.72	0.32	1.48	2.82	0.0	2.2	7.4
23	2.246	4.5	721	WSW	2.6	10.9	WSW	9.55	0.37	-4.77	5.52	0.0	-0.1	5.9
24	2.293	5.2	719	W	4.5	14.9	W	10.34	3.22	-0.85	5.23	0.0	-2.4	3.4
25	3.299	9.2	721	WSW	3.0	11.0	W	18.19	1.41	3.07	6.94	0.0	-5.1	2.4
26	3.191	9.2	715	WNW	5.9	17.6	WNW	12.22	4.34	4.29	3.12	0.0	-4.6	1.8
27	3.116	7.9	720	WNW	8.2	16.4	WNW	7.83	4.36	-2.37	4.95	0.0	-9.7	-3.5
28	3.024	8.8	723	W	5.0	12.5	W	16.29	0.00	-0.82	7.11	0.0	-7.4	-1.9
29	2.519	6.9	722	W	3.1	8.3	NW	12.88	0.00	-5.39	8.52	0.0	-3.4	1.9
30	2.951	7.1	727	W	2.8	6.8	WSW	15.22	0.00	-4.31	9.70	0.0	-5.1	2.6
31	2.927	8.3	728	WSW	3.8	10.9	W	19.07	0.00	-0.41	9.51	0.0	-6.5	-0.3
Average	3.212	7.6	723	W	4.6			14.08	2.22	-0.06	6.98	0.0	-1.6	4.5
Maximum	4.430	10.4	735	WNW	8.2	18.5	WNW	21.03	7.94	16.53	16.44	0.0	4.3	11.5
Minimum	1.541	1.8	715	W	2.5			4.44	0.00	-13.18	2.82	0.0	-9.7	-3.5
Total	99.586	236.3						436.67	69.01	-1.57	216.40	0.0		

Ins. = Instantaneous
Max. = Maximum
kWh/m2 = kilowatt hour per meter square
h = Hour
hPa = Hechta-Pascal (Millbrae)
m/s = Meter per second
kWh = kilowatt hour
Wh = Watt hour
℃ = Centigrade

Table II.2-3 Monthly Data of Tariat (5/13)

Nov (1999)	Solar Irradiation	Sunshine duration	Atmospheric Pressure	Wind direction	Wind Velocity	Maximum Ins. Velocity	Direction at max. Ins. velocity	PV power Generation	Wind power Generation	Charge / Discharge power	AC supply from Inverter	Supply to DC Refrigerator	Average Ambient Temp. 1	Average Temp. of Cubicle 2
	kWh/m2	h	hPa		m/s	m/s		kWh	kWh	kWh	kWh	Wh	℃	℃
1	2.817	8.0	727	W	4.4	11.0	W	17.95	0.38	-4.95	13.04	0.0	-4.6	1.0
2	2.764	8.1	725	W	3.7	7.9	W	16.54	0.56	-1.50	8.98	0.0	-3.0	2.6
3	2.647	8.3	721	W	3.8	8.2	W	16.50	0.16	-0.65	7.89	0.0	-1.0	4.4
4	2.351	5.9	721	W	3.7	7.6	W	12.76	0.00	-7.21	10.22	0.0	-0.8	4.2
5	1.273	0.0	721	SE	3.1	7.3	E	3.08	0.00	-15.79	9.20	0.0	-2.8	2.3
6	2.844	9.1	727	W	4.0	9.9	W	20.70	1.61	5.00	7.77	0.0	-6.7	0.7
7	2.705	8.9	727	W	5.1	9.6	WSW	20.10	2.15	0.41	11.62	0.0	-9.8	-2.2
8	1.789	4.2	724	W	4.6	8.2	W	7.44	0.46	-6.35	4.66	0.0	-9.3	-4.2
9	2.570	8.0	718	W	4.4	10.8	WSW	18.36	1.91	-2.93	12.91	0.0	-6.5	-0.8
10	2.332	6.0	712	W	5.6	12.7	W	15.46	2.73	-3.46	11.55	0.0	-6.7	-1.8
11	2.390	8.5	714	W	4.5	10.8	W	17.38	1.43	1.03	7.99	0.0	-8.8	-2.3
12	2.061	4.8	713	WSW	5.7	18.8	W	12.06	5.06	-0.28	7.63	0.0	-9.5	-4.1
13	2.750	9.5	722	W	4.7	12.7	W	21.22	2.31	4.64	8.53	0.0	-14.8	-7.3
14	2.492	8.6	723	W	5.6	9.6	W	19.66	3.03	1.95	10.46	0.0	-17.8	-10.3
15	1.971	6.5	723	W	4.8	10.9	W	11.82	2.18	-6.32	10.21	0.0	-13.4	-8.4
16	2.285	8.2	727	W	6.7	13.8	WNW	18.58	6.22	3.94	10.88	0.0	-9.8	-5.3
17	2.216	8.3	724	W	5.1	9.4	W	18.13	2.74	1.02	9.99	0.0	-8.2	-3.6
18	1.368	2.7	720	W	4.7	9.7	WNW	7.29	0.68	-12.18	10.27	0.0	-6.5	-2.5
19	1.821	7.3	717	W	4.2	8.3	W	13.68	-0.07	-7.26	11.49	0.0	-8.7	-3.9
20	1.787	7.0	711	W	3.3	9.8	WNW	13.14	0.20	0.57	6.23	0.0	-7.0	-3.2
21	1.760	5.9	709	W	4.8	10.7	WNW	11.30	1.83	-4.30	7.95	0.0	-4.0	-0.8
22	1.182	1.7	711	W	4.9	14.6	W	3.94	2.51	-3.91	4.41	0.0	-3.8	-1.6
23	1.838	6.4	720	SW	3.1	7.9	WSW	13.40	-0.07	3.84	2.93	0.0	-12.0	-5.8
24	1.415	3.3	724	S	1.8	7.5	WNW	6.44	-0.24	-4.62	4.87	0.0	-18.4	-10.3
25	2.193	7.9	726	W	7.8	16.9	WNW	17.33	6.31	10.61	5.79	0.0	-20.3	-15.0
26	2.043	7.4	726	W	6.9	15.0	W	17.02	5.54	8.47	4.60	0.0	-17.7	-12.0
27	1.988	8.0	687	W	7.1	14.8	WNW	17.47	5.40	8.36	5.06	0.0	-13.3	-8.9
28	1.907	7.8	603	W	3.7	9.0	W	17.52	0.23	3.21	4.98	0.0	-14.9	-9.1
29	1.879	7.8	603	W	5.4	11.5	W	17.58	1.86	3.02	6.60	0.0	-16.7	-10.7
30	1.856	7.8	603	W	4.8	10.2	W	15.29	2.05	3.24	4.49	0.0	-16.3	-11.0
Average	2.109	6.7	707	W	4.7			14.63	1.97	-0.75	8.10	0.0	-9.8	-4.4
Maximum	2.844	9.5	727	W	7.8	18.8	W	21.22	6.31	10.61	13.04	0.0	-0.8	4.4
Minimum	1.182	0.0	603	S	1.8			3.08	-0.24	-15.79	2.93	0.0	-20.3	-15.0
Total	63.294	201.9						439.14	59.16	-22.40	243.20	0.0		

Ins. = Instantaneous
Max. = Maximum
kWh/m2 = kilowatt hour per meter square
h = Hour
hPa = Hechta-Pascal (Millbrae)
m/s = Meter per second
kWh = kilowatt hour
Wh = Watt hour
℃ = Centigrade

Table II.2-3 Monthly Data of Tariat (6/13)

December (2000)	Solar Irradiation	Sunshine duration	Atmospheric Pressure	Wind direction	Wind Velocity	Maximum Ins. Velocity	Direction at max. Ins. velocity	PV power Generation	Wind power Generation	Charge / Discharge power	AC supply from Inverter	Supply to DC Refrigerator	Average Ambient Temp. 1	Average Temp. of Cubicle 2
	kWh/m2	h	hPa		m/s	m/s		kWh	kWh	kWh	kWh	Wh	℃	℃
1	1.583	5.8	602	W	4.9	9.2	W	11.89	-0.06	-7.81	9.53	-6.7	-15.8	-11.1
2	0.855	0.0	600	W	3.7	9.5	NW	1.91	-0.02	-14.38	6.55	-6.0	-12.6	-9.3
3	1.535	5.4	602	WNW	4.4	8.0	WNW	9.27	-0.08	-8.43	7.76	-7.0	-16.8	-11.8
4	1.750	7.6	603	W	5.6	13.9	W	15.66	-0.06	-4.90	10.76	-6.4	-13.8	-9.8
5	1.657	7.6	603	W	5.1	12.4	NW	14.77	0.56	1.56	6.97	-7.5	-14.6	-10.9
6	1.653	5.7	602	W	5.4	10.4	WSW	12.67	2.91	-4.20	10.81	-6.0	-11.8	-8.2
7	1.626	6.8	603	W	5.2	16.6	W	13.90	3.42	7.00	3.85	-7.2	-11.3	-8.9
8	1.568	6.4	603	W	4.3	11.2	WSW	14.02	0.94	-3.82	8.97	-4.8	-8.9	-5.2
9	1.599	7.3	603	W	6.3	15.9	WNW	14.52	4.22	-1.54	10.40	-4.8	-9.6	-5.6
10	1.379	5.2	602	W	4.4	8.3	W	10.13	1.30	-5.13	7.32	-5.9	-13.9	-9.3
11	1.071	4.0	602	W	4.2	13.4	W	6.33	1.80	-5.17	6.56	-5.9	-12.6	-9.3
12	1.001	2.1	601	W	5.3	12.9	WNW	4.19	1.77	-0.11	0.99	-8.9	-16.0	-13.1
13	0.766	0.6	600	W	5.4	10.0	WNW	2.33	2.33	-3.81	1.06	-6.9	-14.8	-11.6
14	0.696	0.0	600	W	5.1	10.8	WNW	0.84	2.81	1.41	0.00	-9.6	-14.8	-13.1
15	1.341	3.7	601	W	4.4	10.3	W	6.37	1.71	-1.14	2.73	-9.6	-17.6	-14.4
16	1.297	4.7	602	W	3.7	9.2	W	8.28	0.31	-4.75	5.44	-8.7	-19.7	-14.6
17	1.795	6.3	603	W	3.4	9.4	WNW	15.05	0.11	7.19	1.60	-9.8	-21.0	-15.4
18	1.856	7.4	603	W	4.7	8.3	NW	16.73	0.79	1.75	5.75	-9.6	-25.0	-17.6
19	1.644	7.4	603	W	7.5	13.0	W	17.07	5.60	10.23	2.60	-10.6	-24.2	-18.2
20	1.633	7.4	603	W	5.9	9.9	W	14.68	1.35	2.27	3.88	-9.4	-22.8	-18.1
21	1.523	6.6	603	W	5.7	13.6	SW	14.27	0.57	0.83	4.21	-8.7	-19.5	-16.0
22	1.427	5.7	602	W	4.2	11.6	WSW	12.35	0.04	-4.46	7.07	-6.3	-12.7	-10.0
23	1.572	6.8	603	W	5.2	10.1	W	14.92	1.94	-4.03	10.95	-4.8	-8.8	-5.6
24	1.440	6.0	602	WSW	4.4	9.1	W	11.63	1.07	-8.05	11.78	-5.3	-13.6	-9.5
25	1.015	2.1	601	W	4.0	10.3	W	4.18	-0.04	-3.09	2.55	-6.6	-11.8	-9.6
26	1.564	7.3	603	W	4.7	12.4	W	15.55	2.85	9.25	2.69	-8.9	-18.2	-13.7
27	1.244	4.3	602	W	3.2	12.5	WNW	7.81	0.87	-7.14	6.06	-8.1	-18.0	-13.4
28	1.321	5.3	602	W	4.0	11.9	WNW	8.35	0.70	-5.18	4.70	-7.5	-17.1	-12.7
29	1.680	6.7	603	W	5.0	13.0	WNW	13.70	2.07	3.99	3.51	-8.3	-19.2	-14.2
30	1.361	5.4	602	W	4.0	8.2	WSW	9.46	-0.19	-5.96	5.45	-8.7	-20.5	-14.9
31	1.429	3.8	602	W	3.0	8.6	W	8.93	-0.17	-0.49	2.67	-9.6	-20.1	-15.5
Average	1.415	5.2	602	W	4.7			10.70	1.33	-1.88	5.65	-7.6	-16.1	-12.0
Maximum	1.856	7.6	603	W	7.5	16.6	W	17.07	5.60	10.23	11.78	-4.8	-8.8	-5.2
Minimum	0.696	0.0	600	W	3.0			0.84	-0.19	-14.38	0.00	-10.6	-25.0	-18.2
Total	43.881	161.4						331.76	41.42	-58.11	175.17	-234.1		

Ins. = Instantaneous
Max. = Maximum
kWh/m2 = kilowatt hour per meter square
h = Hour
hPa = Hechta-Pascal (Millbrae)
m/s = Meter per second
kWh = kilowatt hour
Wh = Watt hour
℃ = Centigrade

Table II.2-3 Monthly Data of Tariat (7/13)

January (2000)	Solar Irradiation	Sunshine duration	Atmospheric Pressure	Wind direction	Wind Velocity	Maximum Ins. Velocity	Direction at max. Ins. velocity	PV power Generation	Wind power Generation	Charge / Discharge power	AC supply from Inverter	Supply to DC Refrigerator	Average Ambient Temp. 1	Average Temp. of Cubicle 2
	kWh/m2	h	hPa		m/s	m/s		kWh	kWh	kWh	kWh	Wh	℃	℃
1	1.654	6.3	603	W	3.9	10.6	W	15.45	2.18	5.72	3.51	0.0	-23.0	-17.0
2	1.264	3.5	601	WSW	2.6	6.2	W	6.40	-0.23	-6.94	4.78	0.0	-22.7	-17.1
3	1.081	1.0	600	SW	1.8	6.4	WNW	3.12	-0.23	-2.31	0.80	0.0	-21.0	-17.2
4	1.663	6.9	653	W	4.4	9.4	WSW	14.60	0.68	5.27	2.99	0.0	-24.5	-19.4
5	1.412	5.2	715	W	4.6	10.6	WNW	7.75	-0.24	-7.70	5.67	0.0	-30.4	-23.6
6	1.621	6.5	713	W	3.7	8.7	W	11.91	-0.24	0.44	3.57	0.0	-32.4	-25.9
7	1.672	5.4	705	W	4.6	9.3	W	9.88	-0.17	-1.27	3.04	0.0	-24.4	-20.4
8	1.649	4.9	707	W	3.7	10.2	W	11.97	-0.01	2.02	2.56	0.0	-17.7	-14.6
9	1.585	5.5	710	W	4.4	9.1	WSW	12.58	1.46	2.05	3.26	0.0	-19.7	-16.0
10	1.208	3.4	716	SSW	1.4	5.2	W	5.18	0.00	-7.69	3.43	0.0	-17.0	-12.1
11	2.088	7.1	718	SW	2.8	7.4	WSW	16.39	-0.05	3.20	4.29	0.0	-23.7	-16.5
12	1.802	5.5	713	W	6.0	9.5	W	11.14	3.79	0.06	4.84	0.0	-26.6	-20.4
13	2.341	7.5	710	WSW	4.6	9.0	WSW	14.12	0.79	2.30	2.86	0.0	-26.4	-19.7
14	2.034	7.1	713	W	3.9	9.1	WSW	15.53	-0.07	2.82	2.94	0.0	-21.7	-16.4
15	1.740	6.0	715	W	4.7	10.1	W	12.61	-0.12	-0.64	3.18	0.0	-28.2	-22.1
16	1.686	5.3	714	W	5.0	8.5	W	9.02	-0.16	-5.27	4.02	0.0	-26.8	-21.7
17	1.656	5.4	718	W	4.5	12.8	WNW	11.33	2.23	-1.31	5.10	0.0	-22.7	-18.3
18	2.040	8.1	722	W	6.1	10.0	WNW	14.99	2.61	4.01	3.80	0.0	-25.2	-19.7
19	1.984	7.3	716	W	5.4	10.4	W	14.69	-0.14	1.12	3.54	0.0	-23.6	-18.4
20	1.433	4.6	716	SW	2.3	7.0	WSW	8.12	-0.06	-10.55	8.40	0.0	-20.6	-14.8
21	1.849	4.7	716	SSW	0.8	4.4	WSW	11.50	-0.06	-2.29	5.01	0.0	-22.8	-15.7
22	2.093	6.6	719	WSW	1.8	6.0	W	15.09	-0.09	4.11	2.26	0.0	-24.8	-16.3
23	2.201	7.3	726	S	2.2	7.8	ESE	14.79	-0.19	1.92	2.81	0.0	-29.7	-19.9
24	2.346	7.9	730	WSW	3.3	6.9	WSW	14.47	-0.23	0.35	3.76	0.0	-32.6	-23.0
25	2.498	7.8	732	WSW	6.6	10.0	W	12.55	0.26	-0.69	3.18	0.0	-33.0	-26.1
26	2.900	8.0	728	W	7.0	10.8	W	11.67	0.41	-0.59	2.55	0.0	-31.3	-25.8
27	2.178	6.9	723	WSW	5.3	11.0	WNW	10.78	2.34	0.19	3.08	0.0	-23.3	-19.2
28	2.053	8.0	726	W	4.0	8.9	W	12.33	1.13	-1.85	5.27	0.0	-25.3	-19.2
29	2.356	8.2	730	W	5.1	10.0	W	15.14	1.36	-0.38	6.62	0.0	-27.4	-21.2
30	2.585	8.5	731	W	5.3	10.4	W	15.44	-0.21	-0.45	5.38	0.0	-29.3	-22.7
31	2.584	8.5	725	WSW	6.2	9.5	W	14.83	-0.21	-0.23	4.70	0.0	-28.7	-22.5
Average	1.911	6.2	705	WSW	4.1			12.10	0.53	-0.48	3.90	0.0	-25.4	-19.5
Maximum	2.900	8.5	732	W	7.0	12.8	WNW	16.39	3.79	5.72	8.40	0.0	-17.0	-12.1
Minimum	1.081	1.0	600	SSW	0.8			3.12	-0.24	-10.55	0.80	0.0	-33.0	-26.1
Total	59.256	194.9						375.37	16.53	-14.58	121.20	0.0		

Ins. = Instantaneous
Max. = Maximum
kWh/m2 = kilowatt hour per meter square
h = Hour
hPa = Hechta-Pascal (Millbrae)
m/s = Meter per second
kWh = kilowatt hour
Wh = Watt hour
℃ = Centigrade

Table II.2-3 Monthly Data of Tariat (8/13)

Feb (2000)	Solar Irradiation	Sunshine duration	Atmospheric Pressure	Wind direction	Wind Velocity	Maximum Ins. Velocity	Direction at max. Ins. velocity	PV power Generation	Wind power Generation	Charge / Discharge power	AC supply from Inverter	Supply to DC Refrigerator	Average Ambient Temp. 1	Average Temp. of Cubicle 2
	kWh/m2	h	hPa		m/s	m/s		kWh	kWh	kWh	kWh	Wh	℃	℃
1	2.774	9.5	719	W	6.1	10.9	W	16.19	1.44	2.02	4.98	-11.4	-28.2	-22.4
2	2.554	8.7	717	W	4.5	8.8	W	13.07	0.07	0.13	3.24	-10.4	-26.0	-19.3
3	2.758	8.3	715	WSW	5.2	10.4	W	12.76	1.39	0.86	3.46	-10.5	-26.4	-19.4
4	2.249	8.0	715	WSW	3.5	9.5	WSW	12.98	0.26	0.46	3.17	-8.0	-20.4	-15.2
5	1.458	2.5	716	WSW	3.1	7.6	WNW	4.35	-0.03	-11.04	5.40	-8.7	-21.5	-16.5
6	3.031	8.9	723	W	4.7	9.9	WNW	20.74	1.55	8.13	4.47	-8.1	-20.7	-14.3
7	2.864	9.0	718	W	7.0	12.2	W	13.64	4.18	5.04	3.21	-7.9	-20.5	-14.1
8	2.428	7.7	716	WSW	4.7	8.2	WSW	14.81	-0.03	-1.11	5.97	-7.9	-21.5	-15.3
9	2.874	8.8	714	WSW	3.8	9.2	W	17.74	0.11	4.16	4.09	-6.9	-18.2	-11.4
10	2.952	8.5	715	WSW	3.7	8.0	W	16.22	0.00	3.38	3.30	-7.2	-18.6	-12.1
11	2.234	5.0	713	W	4.6	8.5	W	10.33	0.08	-2.39	3.29	-6.5	-16.3	-11.4
12	2.935	7.2	717	W	4.7	10.7	WNW	16.10	0.92	2.86	4.62	-5.9	-18.5	-11.3
13	2.986	8.2	719	W	4.0	10.8	W	13.97	1.19	1.12	4.25	-8.4	-24.4	-15.9
14	2.869	6.5	719	W	4.9	9.8	W	14.20	3.13	0.55	6.70	-7.8	-21.7	-15.4
15	3.117	8.3	716	W	4.9	9.1	W	16.45	2.46	1.46	7.51	-6.7	-17.8	-10.8
16	3.110	8.7	715	W	4.8	9.4	W	16.14	0.78	-0.02	7.03	-6.8	-19.1	-11.9
17	2.823	8.1	717	W	4.6	14.3	WNW	15.18	1.62	0.69	6.25	-6.1	-16.7	-10.7
18	3.419	9.7	720	W	4.5	9.0	WSW	17.19	1.32	1.20	7.24	-7.4	-22.4	-13.5
19	3.432	9.2	716	WSW	5.1	9.4	W	13.60	1.21	1.46	3.66	-7.9	-23.5	-14.9
20	3.545	9.6	713	W	4.8	8.1	W	13.73	-0.09	0.51	3.40	-7.8	-22.8	-14.9
21	3.447	9.0	716	WSW	4.0	8.4	W	14.35	-0.07	-0.29	4.66	-7.5	-21.3	-13.7
22	3.561	9.0	722	W	3.9	11.2	W	14.58	1.04	2.61	3.55	-6.7	-17.9	-10.6
23	3.550	9.4	724	WSW	3.7	9.5	WSW	13.82	0.28	-0.51	4.81	-6.9	-18.0	-10.8
24	3.085	4.9	723	W	5.9	12.5	W	11.55	3.25	2.43	2.84	-7.0	-16.9	-10.9
25	3.890	9.3	722	W	7.9	14.6	W	10.01	5.41	2.99	3.16	-4.6	-12.3	-5.9
26	3.856	10.2	720	W	3.7	9.9	W	14.00	0.14	0.28	4.26	-5.2	-15.0	-7.1
27	3.987	10.2	719	W	5.3	9.9	WNW	13.60	0.79	-2.26	6.74	-6.4	-18.5	-9.7
28	4.018	10.2	720	W	5.7	10.1	WNW	14.58	2.59	3.70	3.90	-6.6	-18.4	-10.2
29	4.005	10.2	718	W	4.7	8.9	W	12.76	1.08	0.93	3.48	-5.8	-15.8	-8.1
Average	3.096	8.3	717	W	4.7			14.09	1.24	1.01	4.57	-7.5	-20.0	-13.1
Maximum	4.018	10.2	724	NNE	7.9	14.6	W	20.74	5.41	8.13	7.51	-4.6	-12.3	-5.9
Minimum	1.458	2.5	713	SSE	3.1			4.35	-0.09	-11.04	2.84	-11.4	-28.2	-22.4
Total	89.811	242.8						408.64	36.07	29.35	132.64	-215.0		

Ins. = Instantaneous
Max. = Maximum
kWh/m2 = kilowatt hour per meter square
h = Hour
hPa = Hechta-Pascal (Millbrae)
m/s = Meter per second
kWh = kilowatt hour
Wh = Watt hour
℃ = Centigrade

Table II.2-3 Monthly Data of Tariat (9/13)

March (2000)	Solar Irradiation	Sunshine duration	Atmospheric Pressure	Wind direction	Wind Velocity	Maximum Ins. Velocity	Direction at max. Ins. velocity	PV power Generation	Wind power Generation	Charge / Discharge power	AC supply from Inverter	Supply to DC Refrigerator	Average Ambient Temp. 1	Average Temp. of Cubicle 2
	kWh/m2	h	hPa		m/s	m/s		kWh	kWh	kWh	kWh	Wh	℃	℃
1	3.357	7.0	714	W	5.0	13.0	WNW	11.33	0.87	-1.11	3.76	-6.0	-14.4	-8.3
2	2.560	5.6	714	W	6.4	15.5	W	7.70	4.46	-7.00	8.87	-5.2	-12.9	-8.6
3	4.254	10.5	721	W	5.8	12.7	WSW	19.70	3.41	4.38	8.81	-4.3	-13.7	-6.8
4	4.102	8.8	719	WNW	6.3	15.4	WNW	14.75	1.98	2.00	5.06	-5.5	-14.6	-7.6
5	4.159	8.4	720	W	5.6	11.8	W	13.42	1.93	0.81	5.04	-4.0	-11.4	-4.9
6	2.710	6.7	722	SW	3.5	11.1	N	10.47	0.82	-2.43	4.30	-4.8	-13.1	-6.3
7	4.833	10.8	725	WNW	5.4	10.3	W	14.88	0.08	2.01	3.41	-6.2	-17.3	-8.5
8	4.555	10.1	722	W	4.7	9.1	W	14.22	0.00	0.37	4.15	-5.9	-16.3	-8.5
9	4.553	10.6	722	W	3.9	7.4	W	16.83	0.00	-1.27	8.05	-5.3	-15.3	-7.0
10	4.564	10.2	719	W	3.7	8.9	WNW	17.56	0.00	-0.20	7.84	-4.5	-13.7	-5.7
11	4.561	10.1	717	WSW	3.2	8.1	W	18.94	0.00	2.81	6.47	-3.7	-11.9	-4.1
12	2.518	5.6	716	WSW	2.5	8.6	N	6.20	0.00	-7.13	3.96	-4.2	-10.8	-4.3
13	4.048	8.7	718	WSW	4.4	10.3	NW	14.90	0.29	2.10	3.87	-3.5	-10.0	-2.7
14	5.012	10.2	720	W	4.0	8.1	W	18.16	0.00	4.97	3.79	-3.7	-14.2	-4.7
15	5.149	11.2	718	W	5.8	11.0	WNW	15.67	1.08	1.43	5.68	-4.4	-13.3	-5.2
16	5.085	11.0	715	W	4.3	12.2	W	13.50	1.38	0.87	4.65	-3.5	-11.4	-3.8
17	5.395	10.7	714	W	6.0	12.9	W	10.78	3.32	2.11	2.91	-2.9	-8.4	-1.1
18	3.935	8.9	716	WSW	3.5	8.8	WNW	12.80	0.09	-0.80	4.24	-3.2	-9.9	-3.2
19	5.448	11.0	716	WSW	4.2	12.8	W	13.41	1.23	1.81	3.63	-2.9	-9.3	-1.0
20	2.688	4.0	715	WSW	2.5	9.0	WNW	7.09	0.00	-8.24	5.68	-3.9	-11.4	-4.8
21	3.090	3.6	714	SW	3.1	14.2	WNW	7.98	0.87	-6.91	6.25	-3.6	-10.1	-2.5
22	4.848	8.6	720	W	6.5	12.8	WNW	18.74	4.41	8.03	5.48	-4.4	-14.4	-7.1
23	5.418	10.0	723	W	7.0	15.8	W	15.19	3.62	5.16	4.28	-3.1	-8.9	-2.4
24	5.466	11.3	726	WSW	4.6	11.6	W	16.12	1.53	1.49	6.54	-2.6	-7.5	-0.3
25	5.073	8.8	722	W	5.4	10.9	W	16.13	1.44	1.56	6.59	-2.2	-4.1	1.6
26	4.329	11.2	718	WNW	6.9	16.4	WNW	13.20	5.13	-3.35	11.75	-0.6	-2.7	2.7
27	4.219	9.5	723	W	4.8	11.6	W	12.15	2.02	-8.40	12.61	-1.5	-2.3	3.0
28	2.922	4.8	721	W	4.5	13.1	NW	6.36	1.08	-10.41	8.46	0.0	0.8	4.9
29	4.748	10.1	720	W	3.8	14.5	W	14.64	2.19	-2.12	9.52	0.3	-0.5	5.8
30	5.884	11.8	718	W	4.5	13.4	WNW	20.50	2.09	6.52	6.85	-0.5	-3.3	3.8
31	5.983	11.9	717	W	3.4	11.1	W	20.80	0.90	7.20	5.39	-0.8	-4.0	4.6
Average	4.369	9.0	718	W	4.6			14.00	1.49	-0.13	6.06	-3.5	-10.1	-3.0
Maximum	5.983	11.9	726	W	7.0	16.4	WNW	20.80	5.13	8.03	12.61	0.3	0.8	5.8
Minimum	2.518	3.6	714	WSW	2.5			6.20	0.00	-10.41	2.91	-6.2	-17.3	-8.6
Total	135.466	281.7						434.12	46.22	-3.74	187.89	-106.6		

Ins. = Instantaneous
Max. = Maximum
kWh/m2 = kilowatt hour per meter square
h = Hour
hPa = Hechta-Pascal (Millbrae)
m/s = Meter per second
kWh = kilowatt hour
Wh = Watt hour
℃ = Centigrade

Table II.2-3 Monthly Data of Tariat (10/13)

April (2000)	Solar Irradiation	Sunshine duration	Atmospheric Pressure	Wind direction	Wind Velocity	Maximum Ins. Velocity	Direction at max. Ins. velocity	PV power Generation	Wind power Generation	Charge / Discharge power	AC supply from Inverter	Supply to DC Refrigerator	Average Ambient Temp. 1	Average Temp. of Cubicle 2
	kWh/m2	h	hPa		m/s	m/s		kWh	kWh	kWh	kWh	Wh	℃	℃
1	6.023	11.1	718	W	4.9	13.4	W	20.01	3.34	8.18	5.96	-0.8	-3.6	3.7
2	5.744	11.3	716	W	6.6	15.8	W	16.03	5.45	2.40	9.42	-0.8	-2.5	4.8
3	6.088	11.9	721	W	7.4	20.8	NW	14.36	6.56	3.00	8.22	-1.2	-6.7	1.4
4	6.792	13.1	724	W	5.2	13.3	W	21.15	3.42	0.67	13.32	-1.6	-3.2	3.5
5	6.266	11.3	720	WNW	9.0	19.6	WNW	14.82	11.16	6.56	9.84	0.0	-1.0	6.2
6	0.624	2.4	719	SW	3.1	11.2	W	1.29	0.50	-3.86	2.89	0.0	2.1	8.2
7	5.703	9.1	712	W	5.9	15.3	WSW	15.32	4.00	3.38	6.73	0.4	1.1	7.5
8	5.254	11.0	718	WNW	8.1	19.6	NW	9.98	3.18	-0.47	4.17	0.0	-9.0	-1.4
9	6.597	12.2	727	W	5.8	12.2	WNW	17.02	0.00	-4.06	10.89	0.0	-4.7	1.4
10	6.600	10.5	717	W	5.1	14.1	W	19.52	2.78	0.78	11.72	0.0	1.2	7.1
11	5.083	8.1	714	SW	3.7	9.7	NW	15.01	0.96	-5.60	11.85	0.4	1.6	9.0
12	6.249	8.1	723	ESE	4.6	12.4	E	21.13	3.94	6.21	9.31	0.0	-4.6	5.7
13	7.114	12.4	729	WSW	2.4	6.4	W	22.31	0.00	-0.44	12.70	0.0	-5.1	6.4
14	6.521	11.0	724	W	5.1	12.1	W	18.56	2.46	-0.06	11.20	0.0	-1.0	6.1
15	5.951	9.3	721	W	3.8	10.0	NW	17.12	0.18	-1.60	9.51	0.4	3.6	9.9
16	4.103	6.7	718	SE	2.2	6.9	ESE	10.07	0.00	-8.17	8.97	0.4	5.1	11.7
17	5.172	7.5	716	SW	3.3	12.9	W	13.68	0.63	-7.09	11.91	0.4	4.2	11.3
18	2.327	5.9	715	SSW	2.5	8.5	WSW	8.90	0.00	-12.08	11.32	0.0	0.5	7.6
19	5.109	8.7	719	W	5.3	14.4	W	21.92	2.52	-0.89	15.28	0.0	-0.6	7.6
20	7.695	11.7	720	W	7.1	15.2	WNW	23.97	6.34	7.51	12.87	0.0	-5.1	3.8
21	6.834	11.6	721	WNW	5.6	14.0	NW	20.73	3.79	4.02	10.72	0.0	-2.7	4.9
22	7.126	11.5	720	SW	1.7	5.4	NNW	22.30	0.00	1.45	11.15	1.0	-2.1	9.6
23	5.119	7.1	712	W	5.0	18.7	WNW	14.73	2.76	-2.53	10.37	0.0	-1.5	6.8
24	7.535	11.3	718	W	7.5	21.5	NW	23.50	8.72	12.84	9.61	0.0	-6.1	2.1
25	7.460	12.9	723	W	3.9	12.2	WNW	22.46	0.90	0.48	12.99	0.6	0.9	9.3
26	7.509	12.6	719	W	3.3	8.4	W	21.19	0.07	-1.77	13.19	1.4	3.1	11.6
27	5.791	8.9	708	W	4.2	11.8	WNW	15.25	2.09	2.50	6.02	1.2	4.8	11.0
28	6.187	8.1	715	WNW	8.3	17.6	NW	18.36	8.88	8.54	9.18	0.0	-1.8	5.4
29	7.645	12.9	721	W	6.0	12.8	WNW	18.71	4.62	3.67	10.16	1.0	5.0	11.0
30	7.119	11.8	719	WSW	3.6	11.6	W	17.61	1.18	-2.33	11.61	1.8	6.6	13.1
Average	5.978	10.0	718	WSW	5.0			17.23	3.01	0.70	10.10	0.1	-0.8	6.8
Maximum	7.695	13.1	729	WNW	9.0	21.5	NW	23.97	11.16	12.84	15.28	1.8	6.6	13.1
Minimum	0.624	2.4	708	SW	1.7			1.29	0.00	-12.08	2.89	-1.6	-9.0	-1.4
Total	179.340	302.0						517.01	90.43	21.24	303.08	4.6		

Ins. = Instantaneous
Max. = Maximum
kWh/m2 = kilowatt hour per meter square
h = Hour
hPa = Hechta-Pascal (Millbrae)
m/s = Meter per second
kWh = kilowatt hour
Wh = Watt hour
℃ = Centigrade

Table II.2-3 Monthly Data of Tariat (11/13)

May (2000)	Solar Irradiation	Sunshine duration	Atmospheric Pressure	Wind direction	Wind Velocity	Maximum Ins. Velocity	Direction at max. Ins. velocity	PV power Generation	Wind power Generation	Charge / Discharge power	AC supply from Inverter	Supply to DC Refrigerator	Average Ambient Temp. 1	Average Temp. of Cubicle 2
	kWh/m2	h	hPa		m/s	m/s		kWh	kWh	kWh	kWh	Wh	℃	℃
1	4.663	6.1	718	WSW	4.3	14.6	WNW	10.82	2.55	-12.79	16.11	0.0	5.0	11.3
2	7.267	12.0	720	W	5.2	14.8	W	17.12	2.87	-3.23	13.49	1.6	5.6	11.9
3	5.523	8.5	718	WNW	5.9	16.3	NNW	13.00	3.90	-7.40	14.62	0.0	9.1	13.8
4	7.198	12.7	725	SW	2.6	10.1	NW	16.72	0.61	-7.34	14.97	0.0	7.8	16.4
5	7.472	11.7	724	WSW	4.6	13.7	W	17.40	2.30	-0.77	11.28	0.0	10.8	17.1
6	5.053	9.8	720	WNW	6.6	16.2	W	10.33	5.85	-2.86	9.89	0.0	8.1	13.7
7	8.149	13.8	727	SSW	2.2	13.8	NW	18.46	0.71	6.73	4.88	0.0	2.2	12.8
8	7.332	11.4	723	WSW	3.3	10.7	W	16.64	0.28	1.28	6.64	0.0	4.4	12.9
9	7.156	10.2	718	W	4.9	16.7	W	16.45	2.86	-2.75	12.53	0.0	6.2	13.0
10	5.448	7.4	715	WNW	6.5	14.6	WNW	12.59	5.74	-5.53	13.72	0.9	5.6	11.5
11	7.923	13.2	719	WNW	5.0	13.8	WNW	17.17	3.02	-1.50	12.93	2.0	6.7	12.8
12	4.377	7.2	716	WSW	2.9	10.0	W	8.80	0.17	-0.87	3.92	2.3	6.8	12.7
13	6.020	8.8	716	WSW	4.3	14.9	WNW	13.31	2.32	8.14	2.03	0.8	7.5	12.0
14	7.192	10.7	720	SW	3.3	14.0	W	16.20	0.31	-0.53	7.91	2.6	5.5	14.0
15	4.525	6.0	719	W	5.3	15.0	WNW	9.29	3.23	-7.98	10.90	1.7	3.1	10.4
16	2.669	1.4	722	WNW	7.0	15.7	W	4.92	5.88	-9.71	10.81	0.0	1.1	6.0
17	8.542	13.6	726	W	4.4	11.9	NW	17.78	1.63	-0.46	10.43	1.7	5.2	11.7
18	8.004	12.9	722	W	3.8	10.0	W	17.33	1.06	0.88	10.49	2.4	10.2	15.6
19	6.642	9.5	719	WNW	5.8	17.2	W	13.99	3.79	-7.54	15.62	4.4	14.3	18.9
20	6.119	9.8	721	WSW	2.8	17.5	NW	12.85	0.31	7.85	1.91	3.0	10.9	17.6
21	7.674	11.4	721	W	3.8	10.6	W	15.97	1.23	-0.20	8.43	3.9	12.1	18.7
22	6.022	9.6	718	W	4.3	13.4	W	12.05	1.90	-2.67	7.89	5.3	15.8	21.5
23	8.407	12.6	719	WNW	6.4	14.8	WSW	16.89	5.27	3.20	9.96	4.5	11.8	18.7
24	7.515	10.5	723	WSW	4.0	10.9	NW	15.83	0.74	-1.50	8.98	3.6	8.0	16.6
25	8.733	14.0	724	W	3.4	9.8	W	17.09	0.52	0.38	8.28	3.7	7.8	17.1
26	8.300	13.3	724	SSW	3.8	10.4	N	16.60	0.42	-2.92	11.21	3.8	9.0	17.3
27	6.376	10.3	721	SW	3.0	15.0	SW	12.74	0.69	-1.34	7.70	3.5	10.7	17.4
28	5.777	9.5	716	WSW	3.3	15.0	WSW	11.43	1.90	5.12	3.32	3.3	10.4	16.6
29	3.020	1.7	714	W	4.3	11.3	WNW	6.02	1.41	-6.18	6.41	2.3	5.8	11.8
30	8.110	11.7	718	W	3.5	16.1	WSW	16.55	0.72	3.99	7.59	1.6	8.2	14.6
31	8.899	14.3	721	SW	2.6	7.3	WSW	17.00	0.00	11.34	2.18	3.2	11.4	18.4
Average	6.648	10.1	720	W	4.2			14.17	2.07	-1.20	9.25	2.0	7.9	14.6
Maximum	8.899	14.3	727	WNW	7.0	17.5	NW	18.46	5.88	11.34	16.11	5.3	15.8	21.5
Minimum	2.669	1.4	714	SSW	2.2			4.92	0.00	-12.79	1.91	0.0	1.1	6.0
Total	206.107	315.6						439.34	64.19	-37.16	287.03	62.1		

Ins. = Instantaneous
Max. = Maximum
kWh/m2 = kilowatt hour per meter square
h = Hour
hPa = Hechta-Pascal (Millbrae)
m/s = Meter per second
kWh = kilowatt hour
Wh = Watt hour
℃ = Centigrade

Table II.2-3 Monthly Data of Tariat (12/13)

June (2000)	Solar Irradiation	Sunshine duration	Atmospheric Pressure	Wind direction	Wind Velocity	Maximum Ins. Velocity	Direction at max. Ins. velocity	PV power Generation	Wind power Generation	Charge / Discharge power	AC supply from Inverter	Supply to DC Refrigerator	Average Ambient Temp. 1	Average Temp. of Cubicle 2
	kWh/m2	h	hPa		m/s	m/s		kWh	kWh	kWh	kWh	Wh	℃	℃
1	6.543	9.8	720	SSE	2.8	15.1	S	12.85	0.57	-5.91	9.85	4.5	14.0	19.8
2	3.590	4.3	722	S	2.3	12.5	NNW	7.65	0.66	-9.22	9.55	4.3	12.4	18.2
3	5.966	9.3	722	WSW	3.4	17.0	WNW	11.42	2.17	12.82	0.00	2.3	13.1	17.8
4	5.942	10.7	723	SSW	3.4	13.9	SW	12.17	0.36	-1.54	8.64	2.8	14.1	18.6
5	3.004	3.6	721	W	3.2	10.6	W	5.80	0.92	-9.67	9.38	3.4	10.3	16.7
6	8.995	14.5	722	W	3.8	12.4	WNW	16.79	1.34	7.33	5.68	2.4	10.0	16.5
7	8.079	12.5	721	SSW	3.2	16.1	ENE	15.17	0.31	-0.10	6.93	4.6	12.4	19.8
8	6.026	8.4	722	SW	3.1	10.3	SW	11.07	0.78	-5.68	9.50	4.9	12.6	19.7
9	6.135	9.6	721	SSE	1.3	9.8	S	11.51	0.28	11.01	0.00	2.7	13.5	19.2
10	7.064	10.5	721	WSW	3.3	9.8	W	13.88	0.35	2.01	7.14	4.0	17.4	22.1
11	6.366	7.9	724	SSE	2.4	16.3	SW	12.96	0.56	-3.88	8.76	6.2	18.4	24.9
12	6.119	7.4	725	ESE	3.3	17.9	SE	12.81	2.00	-2.87	9.00	6.2	18.8	25.1
13	7.443	11.5	719	SE	4.5	13.8	SSE	14.72	3.25	0.02	9.32	6.3	18.9	25.6
14	7.211	10.7	714	W	4.1	11.1	W	14.38	0.76	10.54	2.00	4.8	13.9	22.1
15	6.433	10.0	721	ESE	5.1	15.2	ENE	12.31	3.09	4.33	5.46	3.6	13.4	19.4
16	7.483	12.6	727	SSE	2.3	10.4	SE	14.08	0.59	-5.06	10.64	5.5	14.2	22.7
17	8.517	13.9	728	SW	2.1	7.9	SW	16.15	0.02	-5.23	12.24	5.7	16.7	25.4
18	4.817	6.9	726	SSW	3.2	11.0	NNE	9.04	0.45	5.40	1.42	5.0	16.3	22.3
19	5.148	6.3	724	SSE	2.5	11.5	N	9.86	0.67	-0.33	5.33	3.7	14.3	19.7
20	4.705	6.9	724	ESE	4.0	10.9	E	8.99	1.14	-0.52	5.93	4.6	13.8	19.3
21	5.210	7.0	720	SW	2.5	7.1	WSW	10.13	0.00	-2.65	7.20	3.7	14.3	19.8
22	2.068	1.3	720	S	3.6	10.9	ESE	3.97	1.11	0.07	1.90	2.6	8.6	14.0
23	9.051	14.6	726	SSE	1.3	5.3	W	16.49	0.00	5.28	5.49	2.5	9.3	17.7
24	9.109	14.6	723	WSW	3.1	7.9	W	16.43	0.00	-2.43	9.85	4.9	13.6	21.4
25	7.399	12.7	719	W	3.6	9.4	W	14.13	0.35	-3.63	9.31	5.4	15.4	22.2
26	4.933	7.6	718	WNW	3.8	12.7	NNW	9.57	1.72	-1.62	6.58	4.1	11.5	18.0
27	4.181	5.9	719	W	4.7	11.6	W	7.80	2.03	-0.35	3.83	2.6	7.4	13.6
28	8.033	12.9	721	WNW	4.7	11.0	NW	14.82	1.70	3.02	6.14	3.5	12.2	18.1
29	8.806	13.5	721	WSW	2.8	9.1	W	16.63	0.21	3.48	6.61	4.8	16.0	22.4
30	6.332	8.3	718	WSW	3.6	10.9	NW	13.31	0.61	-0.27	7.15	5.6	16.4	22.4
Average	6.356	9.5	721	SSW	3.2			12.22	0.93	0.14	6.69	4.2	13.7	20.1
Maximum	9.109	14.6	728	ESE	5.1	17.9	SE	16.79	3.25	12.82	12.24	6.3	18.9	25.6
Minimum	2.068	1.3	714	SSE	1.3			3.97	0.00	-9.67	0.00	2.3	7.4	13.6
Total	190.708	285.7						366.89	28.00	4.35	200.83	127.2		

Ins. = Instantaneous
Max. = Maximum
kWh/m2 = kilowatt hour per meter square
h = Hour
hPa = Hechta-Pascal (Millbrae)
m/s = Meter per second
kWh = kilowatt hour
Wh = Watt hour
℃ = Centigrade

Table II.2-3 Monthly Data of Tariat (13/13)

July (2000)	Solar Irradiation	Sunshine duration	Atmospheric Pressure	Wind direction	Wind Velocity	Maximum Ins. Velocity	Direction at max. Ins. velocity	PV power Generation	Wind power Generation	Charge / Discharge power	AC supply from Inverter	Supply to DC Refrigerator	Average Ambient Temp. 1	Average Temp. of Cubicle 2
	kWh/m2	h	hPa		m/s	m/s		kWh	kWh	kWh	kWh	Wh	℃	℃
1	7.555	9.8	718	SW	3.4	9.5	SSE	14.78	0.74	3.57	5.34	5.6	16.2	23.3
2	6.528	10.2	720	W	4.0	11.2	WSW	11.67	0.88	-5.39	9.69	6.0	15.2	22.5
3	8.676	13.5	723	E	4.9	12.8	E	17.00	3.86	12.98	2.90	4.4	13.8	20.3
4	2.801	2.9	723	S	3.8	14.5	W	5.35	2.01	-9.14	8.09	4.8	12.5	18.2
5	3.542	4.4	725	SE	2.1	10.6	SE	6.96	0.39	6.41	0.00	2.5	12.5	16.6
6	6.663	8.4	723	W	4.0	12.7	W	13.10	0.80	0.24	7.66	3.0	12.7	18.3
7	6.663	9.8	721	W	4.8	13.5	NW	12.90	2.15	-1.01	7.36	4.9	13.5	19.7
8	8.044	13.7	722	W	4.0	11.6	WNW	15.16	1.96	-0.53	8.84	5.4	14.8	21.6
9	6.023	9.6	721	SW	2.8	11.5	WSW	11.69	0.55	-0.52	5.84	5.4	14.8	21.6
10	8.193	13.2	723	SSW	2.3	12.9	SE	15.97	0.13	11.35	1.60	5.3	16.4	23.8
11	7.966	13.8	722	S	3.3	9.6	E	15.41	0.69	7.48	3.83	4.8	18.9	24.9
12	7.869	11.1	720	SW	4.3	19.4	WNW	15.63	2.31	2.24	7.37	6.7	21.4	27.6
13	5.898	11.5	719	WSW	2.9	18.9	W	11.63	0.66	3.49	3.32	6.5	19.1	26.3
14	6.743	10.6	718	SW	2.7	10.9	WNW	13.80	0.76	3.42	4.34	5.2	17.7	24.6
15	7.404	9.5	718	SSW	3.2	10.3	W	15.88	0.32	1.06	4.17	6.3	16.3	24.8
16	2.217	1.8	719	SE	3.4	9.4	ENE	4.67	0.44	-16.32	9.88	5.7	13.8	20.6
17	7.764	10.6	719	S	3.0	8.5	WSW	16.40	0.16	1.53	4.13	6.1	17.0	25.5
18	4.764	6.8	719	SSE	3.8	9.4	WSW	9.80	0.62	-5.84	6.10	6.4	16.9	23.9
19	7.738	11.9	720	WSW	3.2	12.6	WNW	15.11	0.80	7.37	3.05	5.0	16.8	23.8
20	7.937	12.3	725	WSW	3.2	9.9	W	16.26	0.78	0.71	5.36	6.2	15.2	24.0
21	7.609	13.0	726	S	2.3	11.0	WNW	15.98	0.92	2.94	5.61	5.9	14.8	23.8
22	5.206	7.5	725	E	3.0	9.1	E	11.38	0.74	-7.57	8.91	6.1	15.6	23.3
23	3.612	4.1	721	SSE	3.2	8.6	ESE	6.93	0.80	6.95	0.00	3.6	15.9	20.3
24	5.623	8.2	720	S	2.8	8.5	E	11.42	0.11	2.97	2.56	4.3	17.0	22.8
25	2.515	2.2	720	SW	2.7	7.0	SW	4.60	0.00	-9.58	4.31	5.4	14.8	21.0
26	3.631	4.3	719	WSW	3.2	12.8	WNW	7.30	0.66	0.62	2.68	3.4	14.4	18.8
27	7.727	13.6	723	W	5.7	16.0	WNW	15.68	4.18	10.33	2.36	3.3	10.8	17.3
28	7.619	12.7	727	WNW	5.4	13.5	WNW	16.15	3.14	-7.20	15.40	4.7	11.0	18.9
29	8.162	13.9	727	W	3.6	10.1	WNW	17.41	0.45	9.91	1.71	3.7	13.2	20.1
30	5.581	9.9	722	W	3.7	13.8	WNW	11.37	1.53	-4.49	6.13	5.0	13.5	20.5
31	5.403	7.0	719	SSW	3.0	11.8	WNW	11.86	0.94	-0.51	4.43	4.2	11.8	19.3
Average	6.247	9.4	721	SSW	3.4			12.55	1.11	0.88	5.25	5.0	15.1	21.8
Maximum	8.676	13.9	727	W	5.7	19.4	WNW	17.41	4.18	12.98	15.40	6.7	21.4	27.6
Minimum	2.217	1.8	718	SE	2.1			4.60	0.00	-16.32	0.00	2.5	10.8	16.6
Total	193.676	291.8						389.25	34.48	27.47	162.97	155.8		

Ins. = Instantaneous
Max. = Maximum
kWh/m2 = kilowatt hour per meter square
h = Hour
hPa = Hechta-Pascal (Millbrae)
m/s = Meter per second
kWh = kilowatt hour
Wh = Watt hour
℃ = Centigrade

CHAPTER 3 METEOROLOGICAL AGENT DATA

3. METEOROLOGICAL AGENT DATA

3.1 Monthly Average Wind Power（1988－1997）

UMNUGOVI

No.	Sum	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ave.
1	Bayandalai	1.6	2.4	3.7	5.2	5.2	4.3	3.3	3.1	3.3	2.9	2.5	1.7	3.3
2	Bayan-Ovoo	3.6	4.1	4.4	5.5	4.9	4.1	3.4	3.3	4.1	4.1	4.2	4.0	4.1
3	Bulgan	5.7	3.8	3.7	4.4	3.6	3.0	3.0	2.7	2.9	4.1	6.3	5.9	4.1
4	Gurvantes	2.5	2.6	3.4	5.5	5.0	4.5	4.0	3.6	3.7	3.3	3.6	2.4	3.7
5	Mandal-Ovoo	1.9	2.6	3.6	4.1	4.4	3.6	3.1	2.6	2.7	2.7	2.8	2.1	3.0
6	Manlai	5.0	4.9	5.3	5.9	5.7	4.8	4.6	4.0	4.7	4.3	5.3	5.2	5.0
7	Noyon	4.1	4.7	4.4	6.4	5.8	4.9	3.9	4.3	5.1	4.8	4.9	4.5	4.8
8	Nomgon	2.7	3.2	3.6	4.7	5.3	4.3	3.7	3.1	3.4	3.4	3.9	3.3	3.7
9	Sevrei	3.6	3.8	4.1	5.1	4.6	4.7	4.1	3.8	4.3	3.9	4.0	3.6	4.1
10	Khanbogd	3.5	4.6	3.7	5.1	4.0	3.9	3.2	3.0	3.1	3.7	4.7	3.5	3.8
11	Tsogt-Ovoo	2.7	3.2	4.2	5.2	4.9	4.4	4.2	3.6	4.0	3.7	3.9	2.9	3.9
12	Khurmen	3.5	3.8	4.8	5.6	4.7	3.3	2.9	2.6	3.5	3.8	4.1	4.0	3.9
13	Tsogttsetsii	4.0	4.4	5.0	6.5	6.7	5.9	5.1	4.5	4.3	3.9	4.6	4.0	4.9

GOVI-ALTAI

No.	Sum	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ave.
14	Erdene	2.1	2.5	2.6	3.8	3.2	3.1	2.6	2.2	3.0	2.7	3.3	2.7	2.8
15	Tsogt	1.0	1.5	2.4	4.0	3.9	3.5	2.9	2.6	2.8	1.9	1.5	0.9	2.4
16	Chandmani	3.2	3.3	3.6	4.4	4.4	3.8	2.8	3.4	2.9	3.0	3.8	2.9	3.5
17	Altai	2.2	2.5	3.0	3.9	4.1	3.3	2.7	2.8	2.9	2.6	2.3	1.5	2.8
19	Taishir	2.5	2.9	3.1	4.2	3.7	3.9	3.2	3.2	3.6	3.2	3.0	2.7	3.3
20	Bugat	2.0	2.5	2.7	4.5	4.1	3.8	3.0	3.0	3.4	2.4	3.2	2.3	3.1
21	Tseel	3.6	4.1	4.4	5.4	5.1	4.7	4.1	4.0	4.7	4.0	4.1	3.5	4.3
22	Tugrug	1.9	2.7	3.2	4.3	3.7	2.8	2.3	2.4	3.3	3.2	2.9	1.9	2.9
23	Sharga	1.2	1.3	2.4	4.0	3.6	3.1	1.9	2.3	2.2	1.8	1.5	1.1	2.2
24	Tonkhil	1.7	2.3	3.2	4.6	4.0	3.2	2.7	2.7	3.3	2.9	2.8	1.7	2.9
25	Darvi	2.5	3.7	4.6	5.4	5.3	4.4	3.6	3.5	3.4	3.6	3.2	2.3	3.8
26	Khaliun	4.1	3.9	4.8	5.5	5.0	4.9	4.4	4.1	4.4	4.4	4.5	4.4	4.5
27	Biger	1.0	1.4	2.6	4.0	4.2	3.6	2.4	2.5	2.6	1.6	1.6	0.9	2.4
28	Khukhmorit	1.0	1.4	2.0	3.1	3.1	2.6	2.2	2.0	2.2	2.0	1.6	1.2	2.0
29	Bayan-Uul	1.3	1.5	2.0	3.0	2.5	2.1	1.4	1.9	1.8	2.1	1.9	1.5	1.9
30	Jargalan	1.8	1.7	2.5	3.8	3.7	2.8	2.4	2.3	2.1	2.0	1.9	1.7	2.4

BAYANKHONGOR

No.	Sum	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ave.
32	Shinejinst	2.4	3.1	4.0	5.1	5.0	4.5	3.7	4.0	4.1	3.8	3.3	2.2	3.8
33	Bayan-Undur	4.1	4.0	4.2	5.0	4.2	3.7	2.3	3.4	3.8	4.1	4.8	4.5	4.0
34	Bayanlig	2.3	3.0	3.7	4.8	4.6	3.9	3.1	2.1	3.0	3.0	2.3	2.6	3.2
35	Bayangovi	2.2	2.3	2.8	4.5	4.1	2.6	2.1	1.9	3.0	2.8	2.6	2.5	2.8
36	Bogd	1.7	2.0	2.4	3.9	3.6	2.9	2.3	2.3	2.6	2.5	2.7	2.2	2.6
37	Jinst	2.6	2.8	2.9	4.4	3.6	3.1	2.6	2.6	2.9	3.0	3.3	2.5	3.0
38	Baatsagaan	1.3	1.9	2.0	2.8	2.9	2.3	1.5	1.5	2.1	1.5	2.0	1.4	1.9
39	Bayantsagaan	2.5	2.0	2.1	3.2	2.5	2.2	1.1	1.3	1.8	2.5	2.2	2.0	2.1
40	Khureemaral	2.0	2.1	2.7	4.0	3.7	2.7	2.3	2.3	2.5	2.4	2.7	2.2	2.6
41	Gurvanbulag	0.9	1.3	2.5	3.9	3.7	2.6	1.2	1.3	2.2	2.0	1.7	1.3	2.1
42	Jargalant	0.5	1.1	1.9	3.6	4.0	3.5	2.3	2.1	2.3	1.6	1.0	0.6	2.0
43	Galuut	0.2	0.4	0.8	2.2	2.2	1.5	1.0	0.8	1.0	0.8	0.5	0.2	1.0
44	Erdenetsogt	3.6	2.3	2.2	2.7	1.7	1.3	2.1	1.5	2.2	1.9	1.9	1.6	2.1
46	Bayanbulag	1.0	1.1	1.9	3.5	3.4	2.7	1.9	1.9	2.1	1.6	1.6	1.0	2.0
47	Buutsagaan	2.7	2.7	3.4	4.9	4.2	3.3	2.6	2.3	2.9	2.4	3.2	2.7	3.1
48	Bumbugur	2.8	3.1	3.5	4.5	4.2	3.7	3.1	3.1	3.6	3.0	2.9	2.9	3.4
50	zag	1.0	1.3	1.8	3.8	3.6	3.1	2.5	1.6	2.0	1.5	1.4	0.9	2.0

DORNOGOVI

No.	Sum	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ave.
51	Erdene	2.3	2.1	3.2	4.2	3.6	3.2	2.7	2.1	2.5	2.3	3.0	2.9	2.8
52	Delgerekh	3.0	3.3	3.9	5.3	4.6	4.1	3.1	2.6	2.6	3.0	3.5	3.1	3.5
53	Zamiin-Uud	1.9	2.2	2.7	4.0	3.4	3.1	2.6	2.0	2.5	2.4	2.3	1.9	2.6
54	Mandakh	3.7	3.4	3.8	5.1	4.5	3.9	3.5	3.1	3.4	3.6	4.2	3.6	3.8
55	Saikhandulaan	5.9	5.4	5.6	6.7	5.8	5.6	5.1	5.3	5.6	5.1	5.5	6.6	5.7
56	Khatanbulag	3.5	4.0	4.5	6.4	5.7	4.3	3.1	2.6	4.2	4.0	4.1	4.0	4.2
57	Khuvsgul	1.9	2.1	2.7	3.7	3.1	2.7	2.6	2.2	2.3	2.3	2.4	1.7	2.5
9041	Ulaanbadrakh	2.6	2.8	3.7	5.2	3.8	3.8	2.7	1.9	2.5	2.9	3.7	2.8	3.2

SUKHUBAATAR

No.	Sum	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ave.
58	Ongon	4.1	4.7	5.5	6.9	6.5	6.1	5.3	4.8	5.1	4.8	4.8	4.2	5.2
59	Dariganga	3.0	2.9	3.8	5.5	5.3	4.4	3.6	3.6	3.6	3.9	3.5	3.0	3.8
60	Naran	2.7	3.4	3.8	6.0	5.5	4.6	4.0	3.7	4.2	3.7	3.8	3.2	4.1
61	Bayandelger	4.0	3.7	4.5	6.2	5.5	4.5	3.9	3.6	4.2	4.4	4.7	3.9	4.4
62	Erdenetsagaan	5.7	5.3	5.4	6.5	5.8	4.6	4.2	3.9	4.8	4.9	5.4	4.9	5.1
63	Sukhbaatar	4.1	3.6	4.1	5.5	5.2	3.9	2.9	2.9	3.3	3.4	3.8	3.6	3.9
64	Tumentsogt	3.9	3.9	4.4	5.4	5.0	3.8	3.4	2.9	3.7	3.8	4.3	3.7	4.0
65	Tuvshinshiree	4.4	4.5	5.2	7.0	6.9	6.0	5.0	4.7	5.6	5.1	5.1	4.8	5.4
66	Uulbayan	1.3	1.2	1.3	1.8	1.7	1.3	1.1	1.0	1.2	1.3	1.5	1.2	1.3
67	Munkhkhaan	5.0	5.0	5.2	5.9	5.2	4.1	3.6	3.5	4.4	4.5	5.1	4.9	4.7
68	Burentsogt	3.8	3.4	4.7	5.3	5.6	4.6	4.8	3.6	3.8	3.8	3.5	2.8	4.1

DORNOD

No.	Sum	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ave.
69	Matad	3.9	3.4	3.7	5.1	4.3	3.4	3.0	2.7	3.4	3.5	3.8	3.4	3.6
71	Khalkh gol	2.2	2.0	2.7	4.2	3.5	2.8	2.6	2.5	3.0	2.8	2.9	1.7	2.7
72	Khulunbuir	4.5	4.5	4.2	5.3	4.6	3.7	3.2	3.1	3.8	4.1	4.8	3.2	4.1
73	Tsagaan-Ovoo	1.9	2.1	3.0	4.2	4.3	3.5	2.8	2.4	3.0	2.8	2.6	1.8	2.9
74	Chuluunkhoroot	3.7	3.5	4.0	5.8	5.3	4.5	4.1	4.0	4.6	4.3	4.1	3.5	4.3
75	Bayan-Uul	2.5	2.6	3.1	4.9	4.4	3.2	2.5	2.3	3.1	2.8	2.8	2.3	3.0
76	Bayandun	3.1	2.9	3.9	5.1	4.7	3.5	2.5	2.7	3.7	3.6	3.8	2.9	3.5

KHENTII

	Sum	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ave.
78	Bayan-Adraga	1.8	2.1	2.9	4.6	4.2	3.3	2.8	2.6	3.2	3.0	2.7	2.2	3.0
79	Binder	1.5	1.7	2.8	4.0	3.7	2.9	2.2	1.9	2.5	2.4	2.0	1.3	2.4
80	Batshireet	1.7	2.4	2.7	4.1	3.8	3.1	1.9	1.7	2.7	2.8	3.2	2.5	2.7
81	Norovlin	2.7	3.4	3.6	4.6	4.7	3.4	3.2	3.0	4.2	3.6	4.3	3.6	3.7
83	Dadal	1.6	1.7	2.2	2.8	2.6	2.0	1.8	1.4	1.7	2.0	2.0	1.5	1.9
9071	Galshar	2.2	3.0	3.6	5.8	5.3	4.8	4.7	4.0	4.0	3.3	3.7	2.9	3.9
9072	Bayan-Ovoo	3.9	3.6	3.7	4.9	4.3	3.2	2.7	2.5	3.1	3.2	3.6	3.6	3.5

DUNDGOVI

No.	Sum	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ave.
84	Ulziit	3.7	4.1	4.2	5.3	5.3	4.3	3.6	3.2	3.8	3.9	4.4	4.1	4.2
85	Undurshil	2.3	2.8	4.0	5.5	5.0	4.4	3.9	3.5	3.1	2.9	2.9	2.4	3.6
86	Bayanjargalan	4.0	4.0	4.3	5.7	5.1	4.4	4.2	4.3	4.3	4.6	4.4	3.9	4.4
87	Adaatsag	4.0	4.9	6.0	7.0	7.3	7.4	6.2	5.1	5.2	5.0	5.2	5.3	5.7
88	Erdenedalai	1.8	2.7	3.3	4.6	5.2	4.3	3.6	2.7	2.9	2.8	2.6	1.7	3.2
9081	Saikhan-Ovoo	1.0	1.7	2.9	4.1	4.0	3.8	3.3	2.9	2.9	2.8	2.2	1.5	2.8
9082	Khuld	3.9	4.2	4.5	5.5	5.1	4.2	3.4	2.9	3.8	4.2	4.9	4.5	4.3
9083	Delgerkhangai	3.1	3.7	4.7	6.7	6.4	4.5	4.3	4.1	4.4	4.3	4.6	4.1	4.6

UVRUKHANGAI

No.	Sum	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ave.
89	Bogd	1.6	2.0	2.3	3.9	3.5	2.9	2.4	2.4	2.6	2.6	2.8	1.8	2.6
90	Baruunbayan-Ulaan	1.8	1.8	2.4	3.4	3.1	2.4	1.4	1.6	1.5	1.6	2.2	2.3	2.1
91	Guchin-Us	2.7	3.4	3.5	4.4	3.8	3.0	2.4	3.3	3.0	2.8	3.2	2.9	3.2
92	Bayan-Undur	2.3	2.5	2.7	4.1	3.5	2.6	2.1	1.9	2.8	2.2	3.2	3.1	2.8
93	Khairhandulaan	2.0	2.3	2.6	4.4	4.1	3.3	2.5	2.7	3.0	2.4	2.1	1.8	2.8
94	Nariinteel	1.5	2.0	2.6	2.8	2.9	2.6	2.3	2.6	3.3	2.8	2.2	1.7	2.4
95	Bayanteeg	1.5	1.9	2.4	2.4	2.5	2.6	2.2	2.6	3.3	2.7	2.2	1.6	2.3

KHUVSGUL

No.	Sum	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ave.
96	Jargalant	0.8	1.2	1.6	2.4	2.1	1.3	1.0	1.0	1.3	1.1	1.3	0.9	1.3
97	Galt	0.8	1.4	2.2	3.2	2.9	2.0	1.6	1.7	2.1	1.6	1.5	1.0	1.8
98	Shine-Ider	1.8	2.4	3.0	3.9	3.4	2.6	2.2	2.2	2.7	2.5	3.1	2.2	2.7
99	Tumurbulag	3.0	3.3	4.3	4.5	4.1	3.2	3.0	2.5	3.2	3.1	3.9	3.3	3.5
100	Burentogtokh	1.5	1.7	2.2	2.9	1.9	1.3	0.9	1.0	1.3	1.5	2.3	1.7	1.7
101	Tsetserleg	0.5	0.5	1.1	2.8	2.8	2.3	1.8	1.6	2.0	1.5	1.2	0.5	1.6
102	Arbulag	1.7	1.9	2.3	3.4	3.0	2.4	2.0	1.6	2.3	2.1	2.5	2.1	2.3
103	Bayanzurkh	0.2	0.7	1.8	3.2	2.4	1.4	0.8	1.2	1.5	1.0	1.0	0.4	1.3
104	Chandmani-Undur	1.2	1.3	1.9	2.4	1.9	1.5	1.6	1.6	2.0	2.0	2.0	1.3	1.7
105	Tsagaan-Uur	0.3	0.3	0.9	2.0	1.7	1.1	0.8	0.8	0.9	0.9	0.7	0.3	0.9
106	Tsagaan-Uul	2.4	2.7	3.4	4.6	4.3	3.3	2.3	2.7	3.5	3.1	3.2	2.5	3.2
107	Ulaan-Uul	0.8	1.2	1.7	2.6	2.2	1.4	1.6	1.9	1.8	1.5	1.4	1.0	1.6
108	Renchinlkhunbe	0.1	0.2	0.6	2.2	2.0	1.4	0.8	0.7	0.9	0.7	0.4	0.1	0.8
109	Tunel	2.7	2.3	2.4	3.1	2.6	2.2	2.1	1.6	2.7	2.3	2.8	2.6	2.5
110	Tosontsengel	2.7	3.0	3.7	4.3	3.7	3.3	2.8	2.8	3.6	3.4	3.6	3.1	3.3
111	Alag-Erdene	1.6	2.4	2.8	4.1	3.3	2.5	1.9	2.1	2.7	2.6	2.5	2.1	2.6
112	Khatgal	2.6	2.8	3.1	3.9	3.2	2.7	2.2	2.4	2.8	3.1	3.5	2.6	2.9
113	Tsagaannuur	0.6	0.8	1.5	3.3	3.3	2.7	1.7	2.3	2.1	1.9	1.2	0.6	1.8
114	Erdenebulgan	0.7	0.9	1.7	2.5	1.5	0.7	0.5	0.4	0.9	1.8	1.5	0.8	1.2
9101	Khankh	1.3	1.5	1.8	2.7	2.2	1.6	1.1	1.6	2.6	3.7	4.8	3.4	2.4

ARKHANGAI

No.	Sum	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ave.
115	Khangai	1.7	1.8	2.4	4.1	3.8	2.9	2.0	2.0	2.8	2.2	2.6	1.9	2.5
116	Tariat	2.4	2.3	2.6	3.4	2.9	2.4	2.1	2.1	2.4	2.4	2.7	2.3	2.5
117	Tsakhir	1.5	2.1	2.4	3.3	2.7	1.9	1.3	1.4	1.7	1.5	1.9	1.3	1.9
9111	Chuluut	1.5	2.1	2.4	3.3	2.7	1.9	1.3	1.4	1.7	1.5	1.9	1.3	1.9

ZAVKHAN

No.	Sum	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ave.
118	Shiluustei	1.4	1.9	2.0	3.2	3.3	2.9	2.0	2.0	2.1	1.9	1.8	1.5	2.2
119	Durvuljin	0.8	1.0	1.9	2.5	2.3	2.0	1.7	1.6	1.9	1.5	1.5	0.8	1.6
120	Yaruu	1.8	1.9	2.0	2.9	2.9	2.5	2.3	2.4	2.5	2.5	2.3	1.6	2.3
121	Erdenekhairkhan	1.7	1.6	2.1	3.8	3.5	2.8	2.1	2.3	2.3	2.0	2.0	1.8	2.3
122	Zavkhanmandal	1.1	1.5	2.2	3.3	3.2	2.9	2.1	2.0	2.0	1.8	1.8	1.3	2.1
123	Urgamal	1.7	1.8	2.2	2.9	2.8	2.7	2.4	2.2	2.0	2.0	1.8	1.7	2.2
124	Santmargats	1.0	1.1	1.6	2.9	2.2	1.9	1.6	1.7	1.8	1.5	1.1	0.9	1.6
125	Tsetsen-Uul	0.6	0.8	1.0	2.3	2.0	1.9	1.3	1.3	1.4	1.4	1.2	0.6	1.3
126	Ider	2.3	2.5	2.8	3.9	3.9	3.2	2.7	2.8	3.1	2.7	2.9	3.4	3.0
127	Ikh-Uul	1.6	1.5	1.7	2.4	2.0	1.7	1.3	1.9	1.9	1.7	1.8	1.6	1.8
128	Tes	0.5	0.7	1.1	2.0	1.8	1.2	0.9	0.8	1.1	1.1	1.0	0.8	1.1
129	Tsagaanchuluut	2.5	2.7	3.3	3.5	2.9	2.6	2.3	2.1	3	2.6	2.5	2.3	2.7
130	Tsagaankhairkhan	1.6	2.0	2.0	3.1	2.9	2.4	1.6	1.8	2.5	2.5	2.0	1.3	2.1
131	Telmen	0.9	1.2	1.5	2.5	3.1	3.1	2.5	1.9	2.1	1.7	1.6	1.2	1.9
132	Tudevtei	2.0	2.0	2.1	3.5	3.8	3.4	2.6	2.1	2.6	2.6	2.4	1.8	2.6
133	Songino	1.6	1.7	2.2	3.6	3.6	2.6	1.8	2.6	2.9	2.3	2.0	1.6	2.4
134	Otgon	0.4	0.8	1.3	2.4	2.6	2.4	1.9	1.6	1.9	1.4	1.1	0.5	1.5
135	Numrug	0.4	0.6	0.8	2.1	2.1	1.5	0.7	1.1	1.5	1.4	0.9	0.8	1.2
136	Asgat	0.5	1.0	0.9	2.6	3.6	2.9	2.7	2.4	2.7	2.4	1.5	0.8	2.0
137	Bayankhairkhan	1.5	1.6	1.9	3.1	2.9	2.3	1.6	1.9	2.8	2.0	1.8	1.4	2.1
138	Tsontsengel	0.4	0.7	1.1	2.4	2.1	1.5	1.0	1.0	1.3	1.1	0.6	0.3	1.1
9121	Bayantes	0.2	0.2	0.5	1.6	1.9	1.6	1.0	0.9	1.1	0.7	0.5	0.2	0.9
9122	Aldarkhaan	1.7	1.8	2.1	3.2	3.0	2.8	1.9	2.1	2.4	2.0	1.8	1.8	2.2

BULGAN

No.	Sum	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ave.
139	Teshig	0.4	0.6	1.0	1.8	1.6	1.1	0.6	0.6	0.8	0.8	0.7	0.6	0.9

UVS

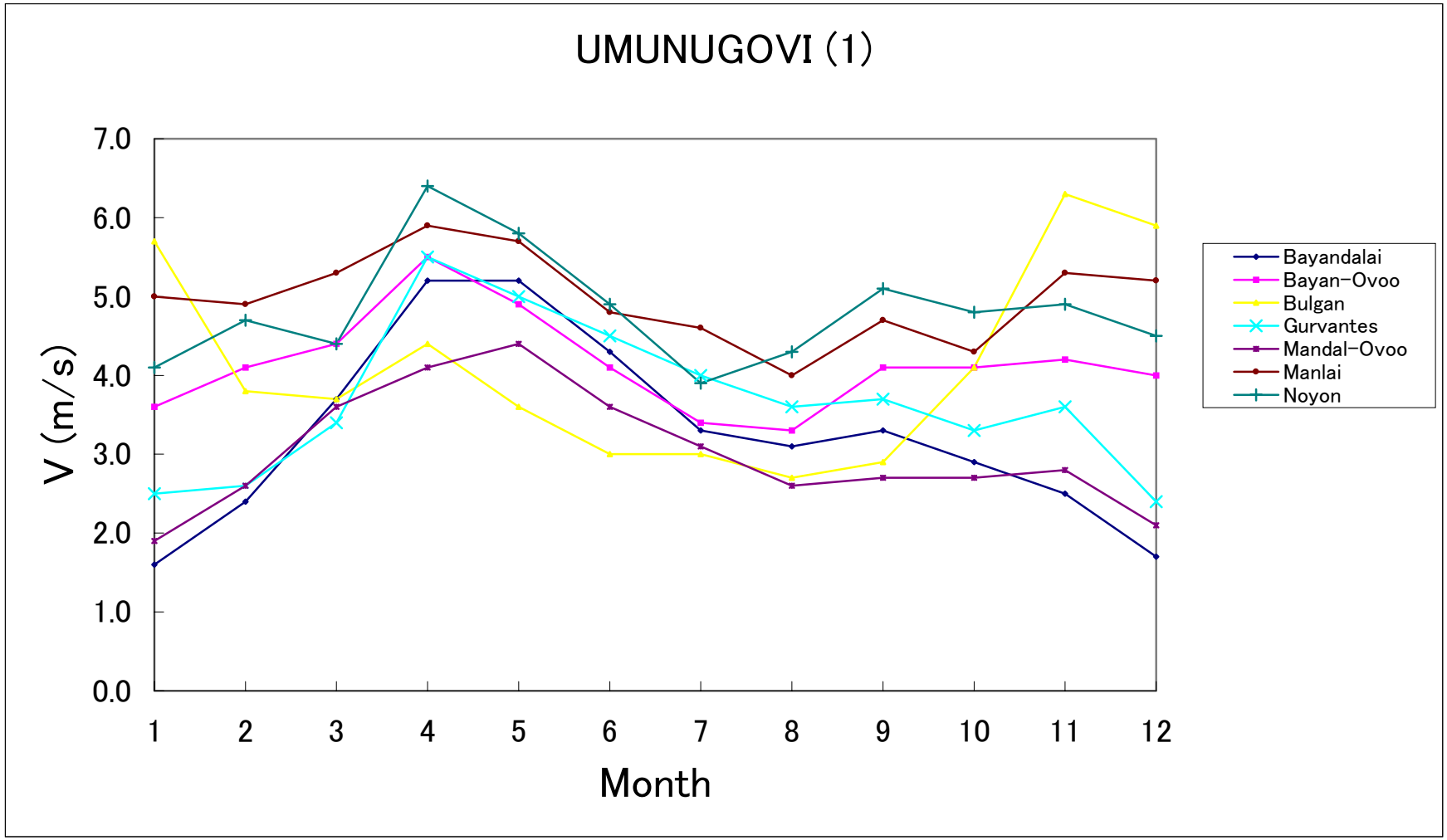
No.	Sum	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ave.
140	Undurkhangai	1.5	2.0	2.8	3.9	3.5	3.1	2.1	2.8	3.1	2.6	2.3	1.8	2.6
141	Tsagaankhairkhan	1.4	2.0	1.6	2.4	2.3	1.6	0.9	1.3	2.2	2.7	2.6	2.3	1.9
142	Zuunkhangai	1.9	2.3	2.8	4.0	4.0	3.3	2.7	2.9	3.5	3.3	2.9	2.4	3.0
143	Khyargas	0.3	0.5	0.8	2.9	3.3	2.2	1.6	2.0	3.2	1.9	0.9	0.5	1.7
144	Baruuntruun	0.1	0.2	0.4	1.7	2.2	1.7	1.2	1.2	1.3	0.9	0.5	0.2	1.0
145	Malchin	0.4	0.7	0.5	2.4	2.5	1.6	0.7	1.2	1.8	1.7	2.3	0.5	1.4
146	Zuungovi	1.0	0.9	1.2	2.2	2.3	2.4	1.6	1.6	1.9	1.4	1.0	0.8	1.5
147	Bukhmurun	0.6	1.1	1.6	2.7	2.5	2.0	1.5	1.4	1.7	1.3	1.1	0.6	1.5
148	Zavkhan	0.5	0.6	1.9	3.2	3.1	3.0	2.5	2.4	2.3	1.6	1.3	0.5	1.9
149	Tes	0.3	0.3	0.5	1.1	1.1	0.8	0.7	0.7	0.8	0.7	0.7	0.5	0.7

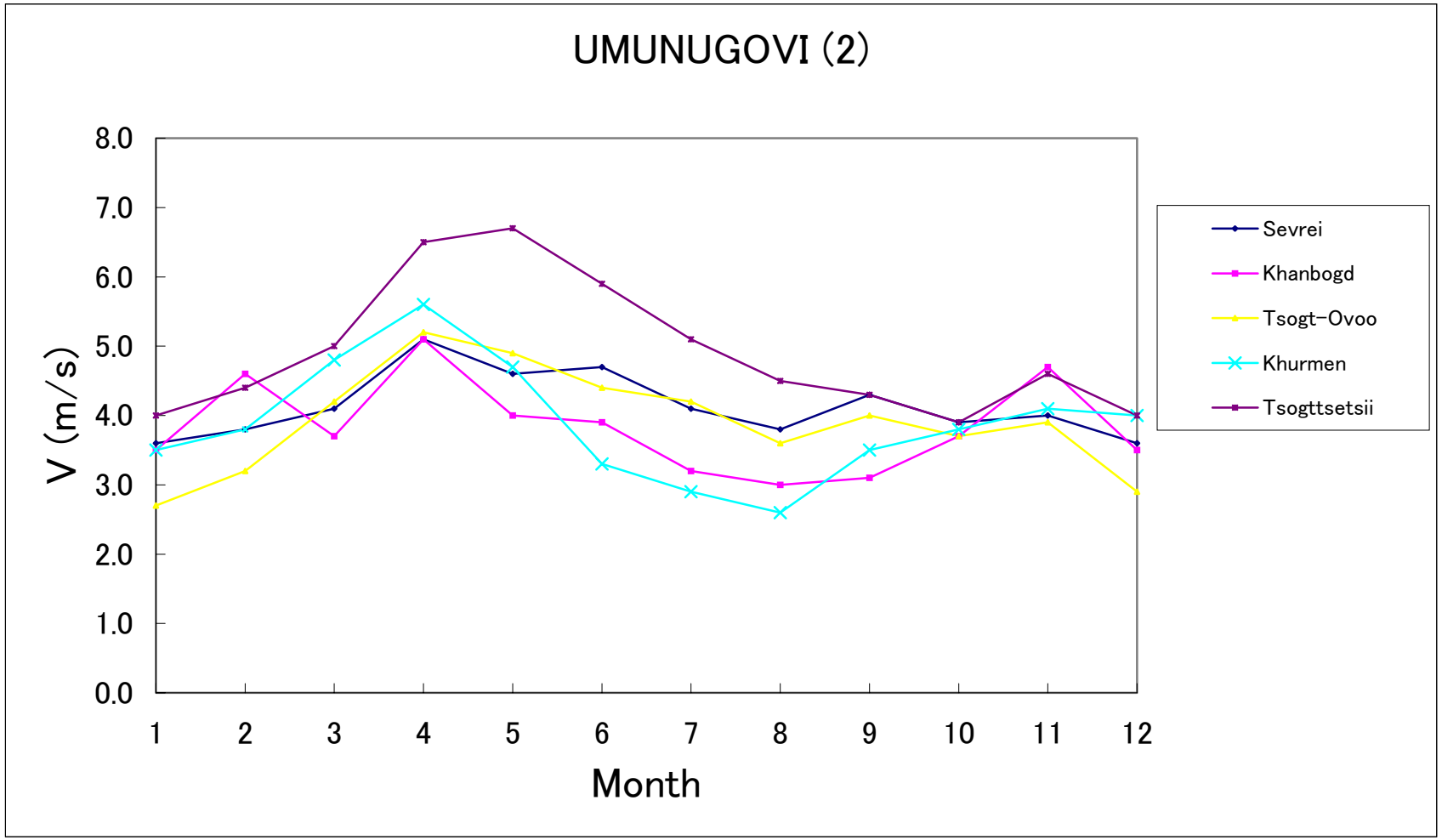
KHOVD

No.	Sum	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ave.
151	Zereg	0.1	0.2	0.7	1.6	1.5	1.2	0.8	0.7	0.8	0.4	0.6	0.2	0.7
152	Darvi	2.7	2.9	3.0	3.9	3.2	3.0	3.4	3.1	3.5	3.2	3.4	2.8	3.2
153	Altai	1.0	1.2	1.5	2.7	2.3	1.9	1.7	1.3	1.7	1.3	1.0	0.9	1.5
154	Uyench	1.3	1.1	1.4	2.3	2.2	1.3	1.4	1.0	1.0	1.0	1.0	1.1	1.3
155	Bulgan	0.1	0.2	0.8	1.8	2.1	1.9	1.7	1.6	1.3	0.7	0.4	0.1	1.1
156	Tsetseg	0.3	1.1	2.0	3.0	2.6	2.2	1.5	1.5	1.4	1.5	1.1	0.6	1.6
157	Must	0.7	1.3	2.3	3.3	2.9	2.2	1.6	1.8	2.1	1.6	1.6	1.2	1.9
158	Munkhkhairkhan	1.4	1.9	2.3	2.7	2.4	2.3	2.3	1.8	2.1	2.1	1.9	1.8	2.1
159	Mankhan	0.3	0.6	0.9	1.6	1.2	1.0	0.9	0.7	0.5	0.8	0.9	0.7	0.8
160	Chandmani	0.7	1.1	1.5	2.6	2.4	2.2	1.4	1.5	1.6	1.5	1.5	1.2	1.6
163	Durgun	1.2	1.7	2.4	3.6	4.3	2.7	1.4	1.5	2.4	1.9	1.7	1.4	2.2
9151	Duut	2.0	2.5	2.2	3.0	2.9	1.9	1.6	–	2.9	2.5	2.6	2.3	2.4
9152	Erdeneburen	0.1	0.2	0.4	1.5	1.1	1.1	0.4	0.6	0.6	0.6	0.8	0.3	0.6

BAYAN-ULGII

No.	Sum	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ave.
164	Tolbo	1.6	2.0	2.6	3.0	2.3	2.5	1.9	2.1	2.1	2.0	1.9	2.3	2.2
165	Tsagaannuur	1.2	2.3	3.2	4.3	4.7	3.8	3.0	4.0	3.6	3.3	3.0	1.2	3.1
166	Bulgan	1.1	1.5	1.7	2.2	1.9	1.7	1.6	1.6	1.3	1.2	1.2	0.9	1.5
167	Deluun	0.6	0.8	1.1	2.5	2.3	1.7	1.3	1.3	1.3	0.9	0.9	0.6	1.3
168	Altai	0.6	0.9	1.1	2.2	2.1	1.8	1.2	1.3	1.3	0.8	0.9	0.7	1.2
169	Buyant	1.6	2.3	2.1	2.8	2.4	1.8	1.1	1.7	2.3	1.9	2.2	2.0	2.0
170	Bayannuur	0.2	0.4	1.0	2.1	2.1	2.2	1.7	1.7	1.6	1.6	0.8	0.5	1.3
171	Altantsugts	1.3	1.8	1.8	3.6	3.6	3.6	2.7	1.9	2.4	2.7	1.0	1.4	2.3
9161	Nogoonuur	0.5	1.1	1.5	2.6	2.6	1.9	1.4	1.4	1.7	1.3	1.0	0.8	1.5


UMUNUGOVI (1)
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
V (m/s)
1
2
3
4
5
6
7
8
9
10
11
12
Month
Bayandalai
Bayan-Ovoo
Bulgan
Gurvantes
Mandal-Ovoo
Manlai
Noyon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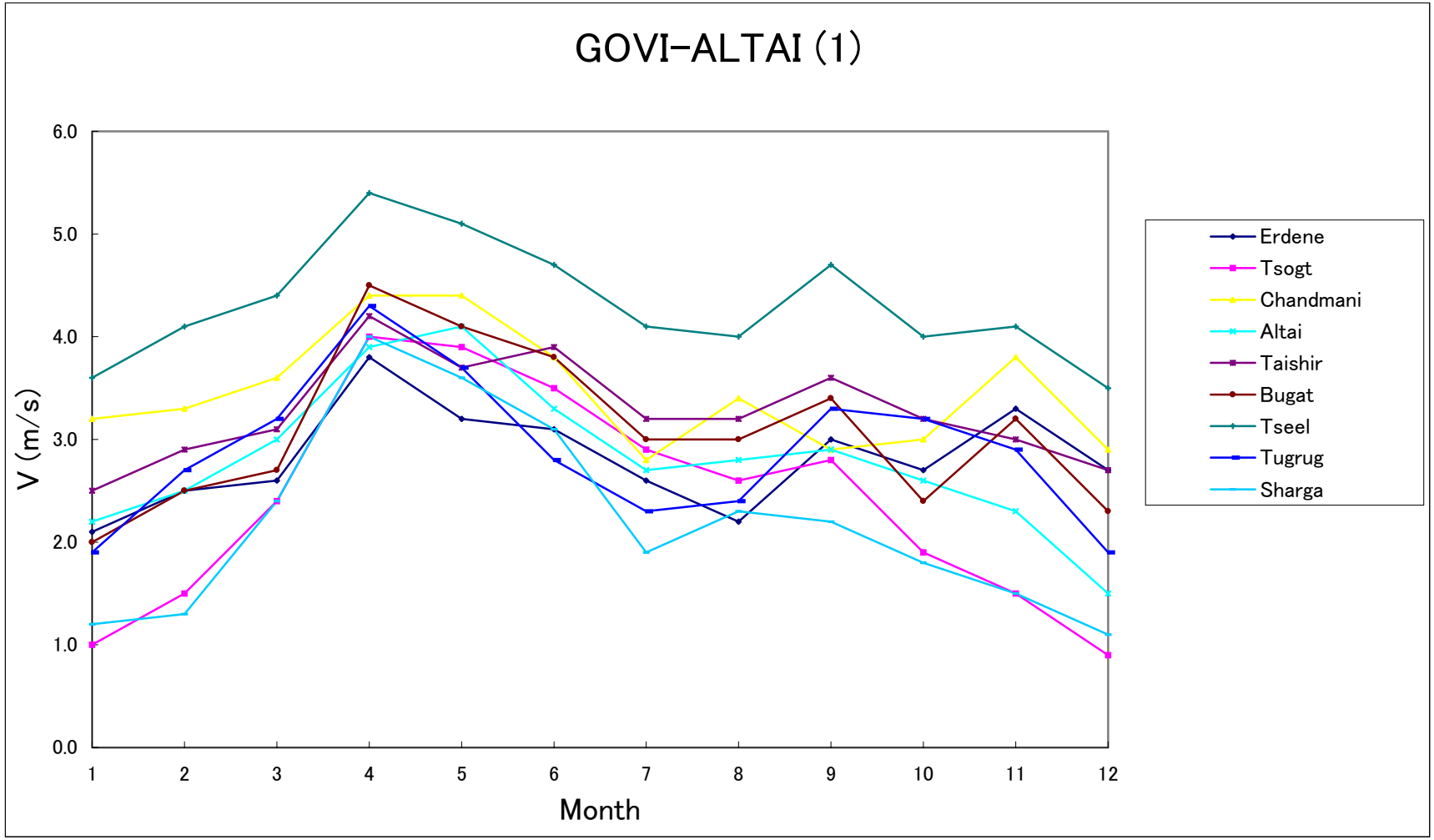
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
V (m/s)
1
2
3
4
5
6
7
8
9
10
11
12
Month
Sevrei
Khanbogd
Tsogt-Ovoo
Khurmen
Tsogttsetsii


GOVI-ALTAI (1)
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3.0
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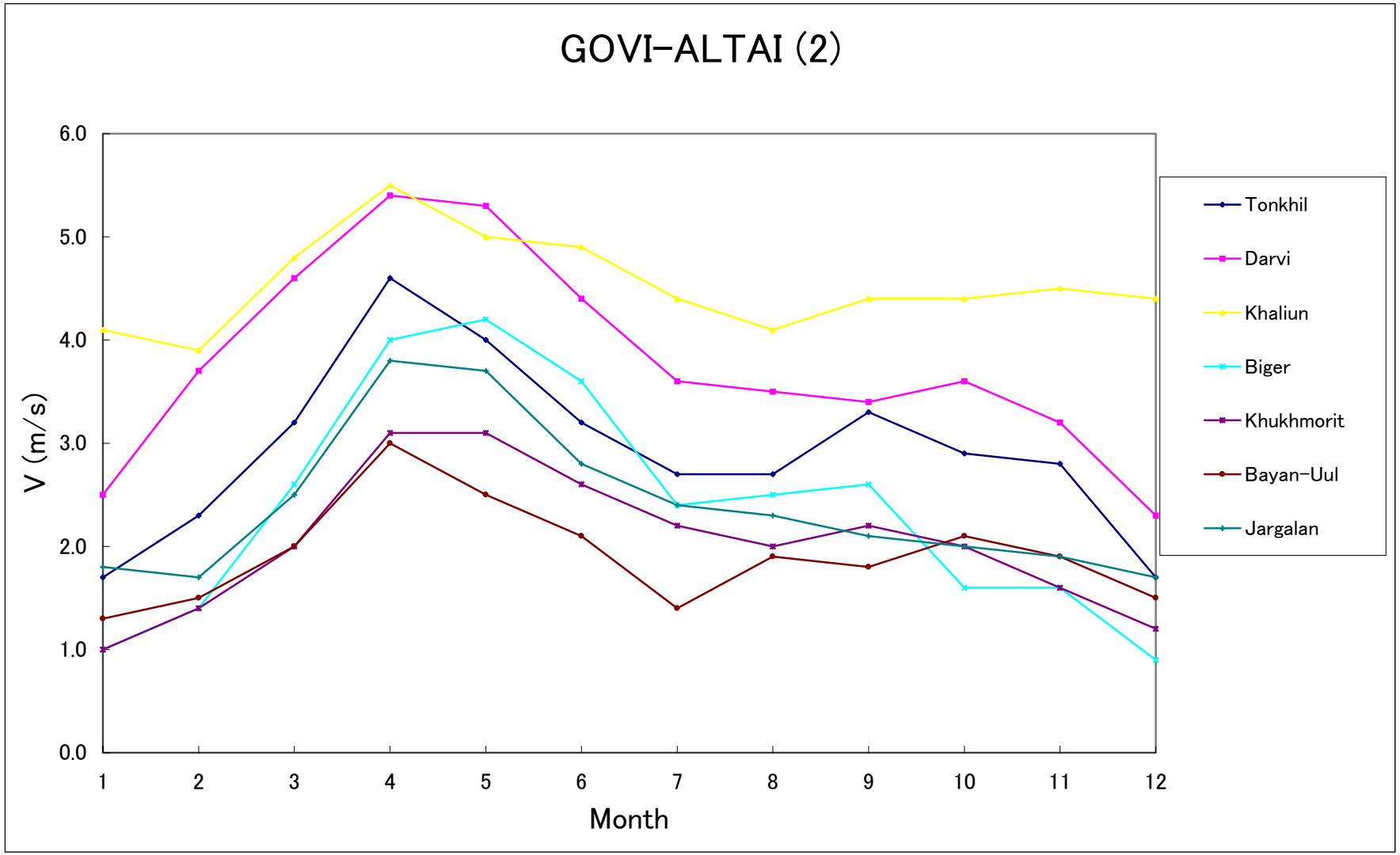
1.0
0.0
V (m/s)
1
2
3
4
5
6
7
8
9
10
11
12
Month
Erdene
Tsogt
Chandmani
Altai
Taishir
Bugat
Tseel
Tugrug
Sharga


GOVI-ALTAI (2)
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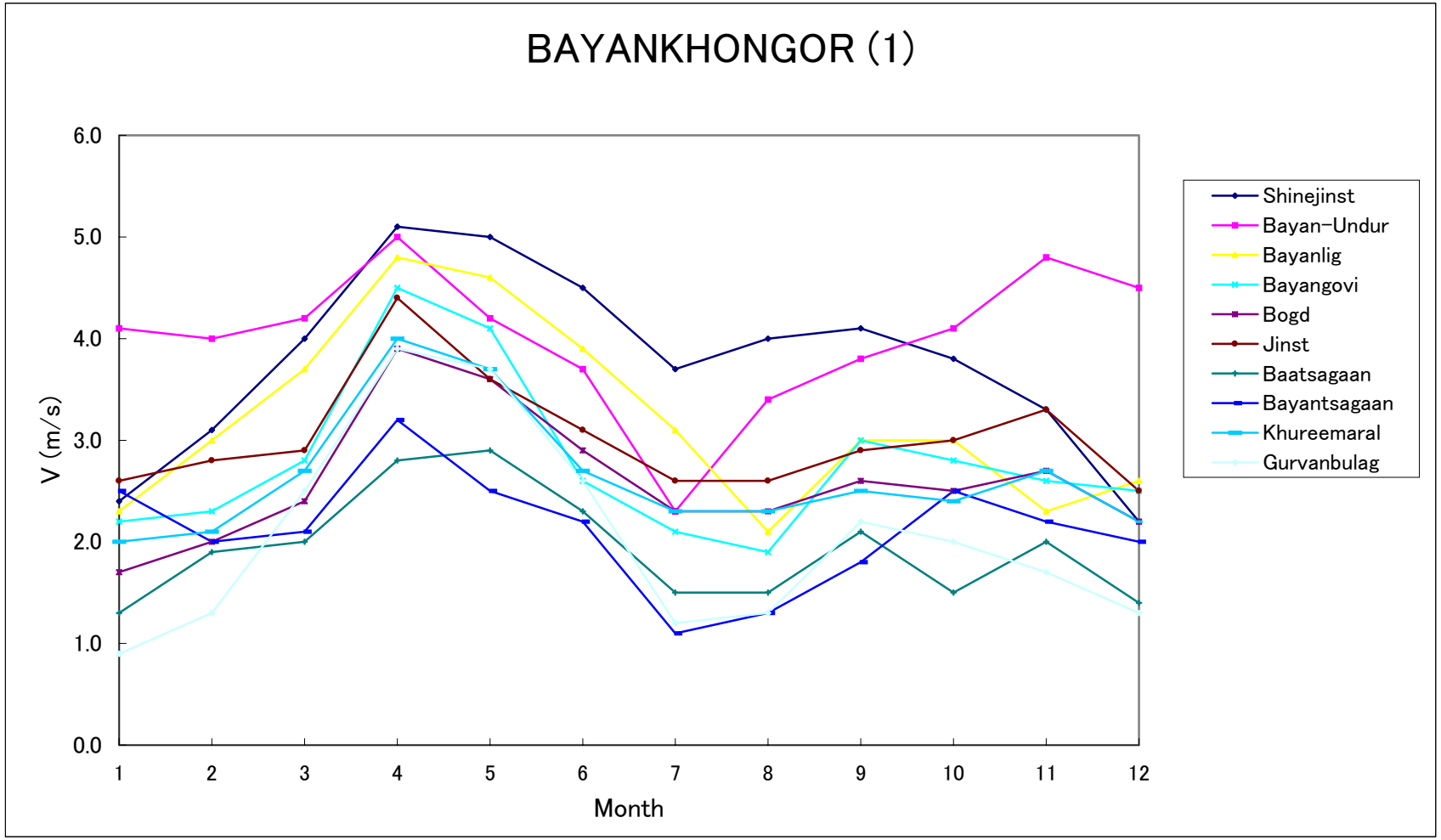
4.0
3.0
2.0
1.0
0.0
V (m/s)
1
2
3
4
5
6
7
8
9
10
11
12
Month
Tonkhil
Darvi
Khaliun
Biger
Khukhmorit
Bayan-Uul
Jargalan


BAYANKHONGOR (1)
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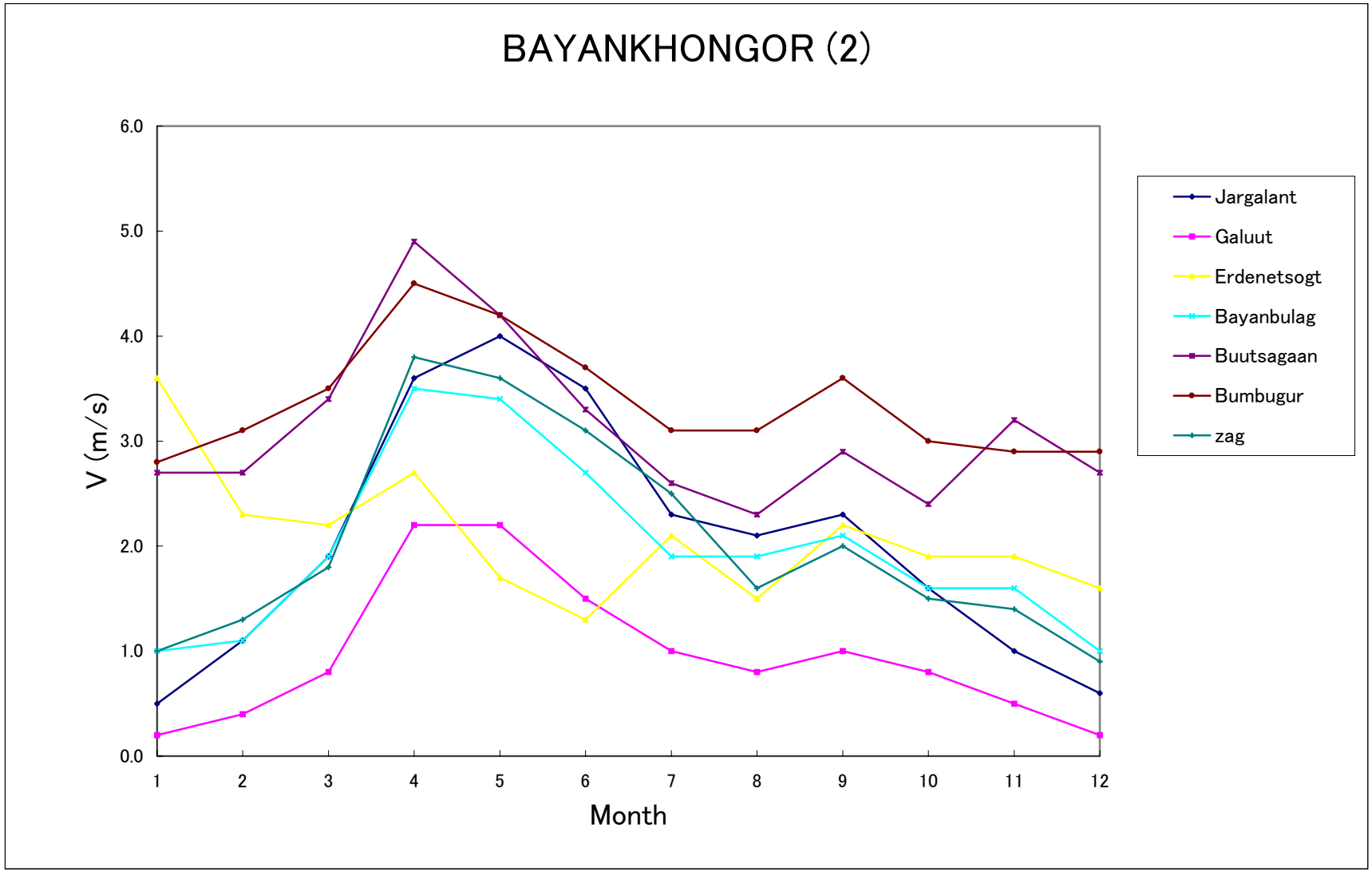
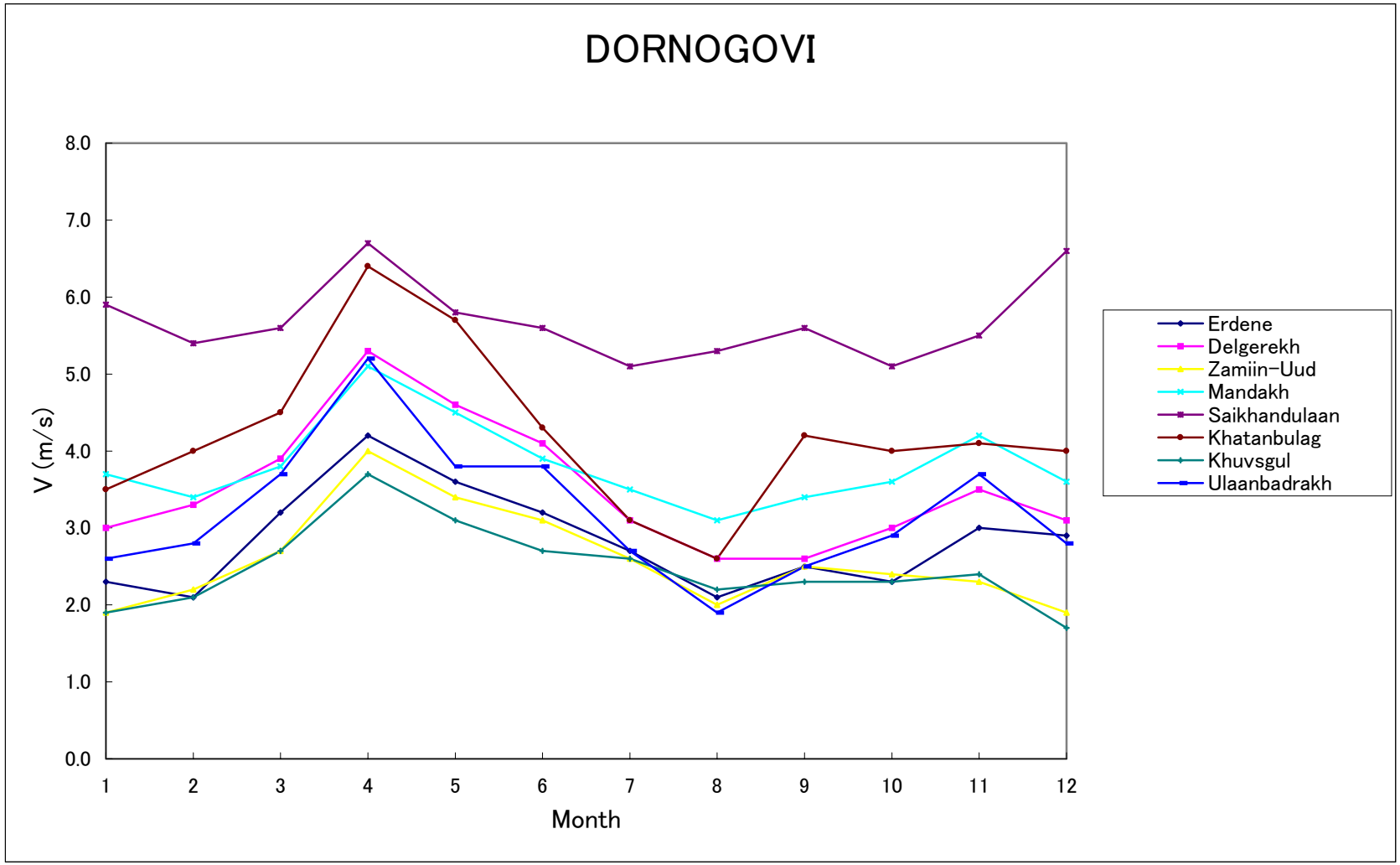
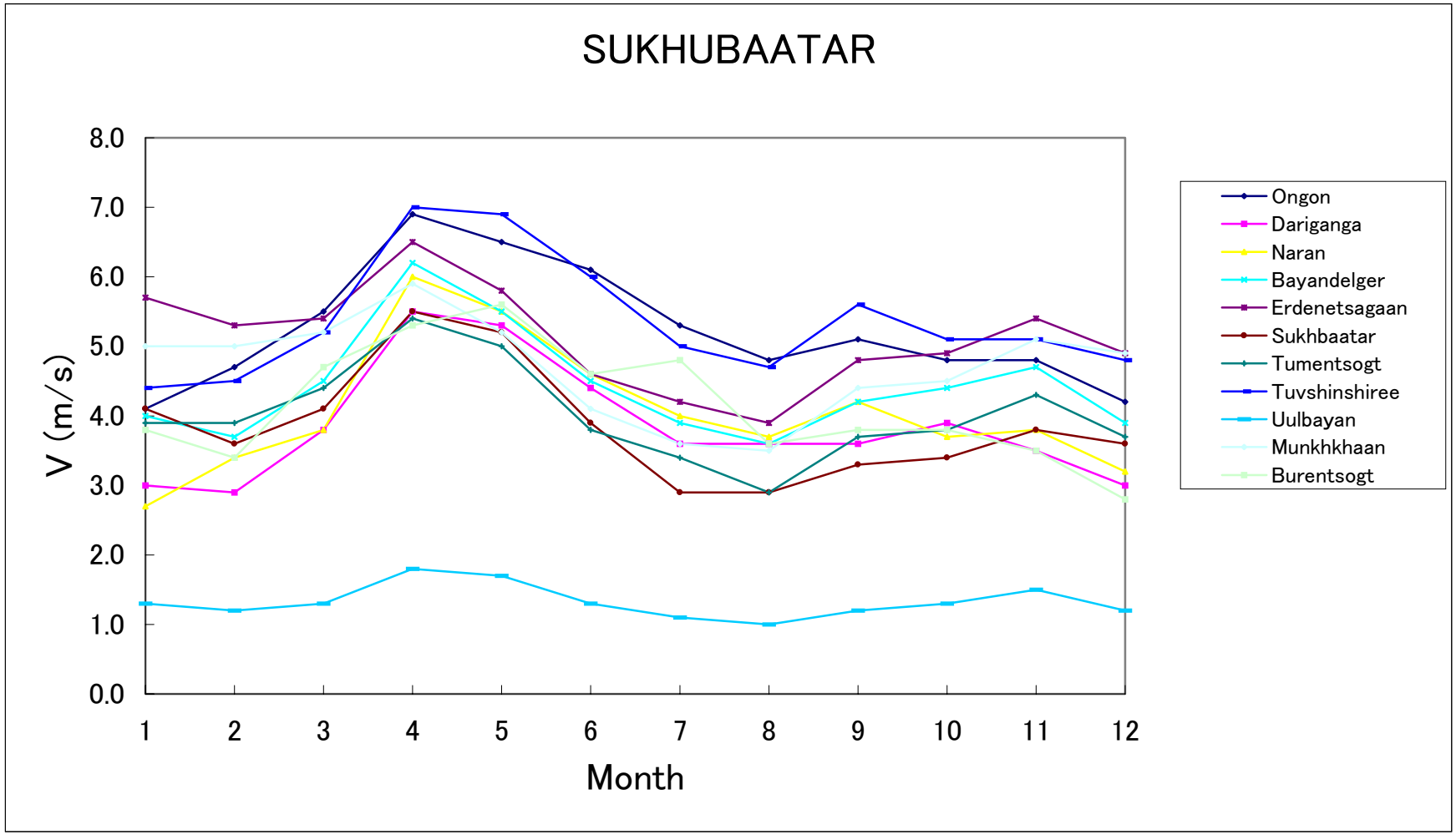
4.0
3.0
2.0
1.0
0.0
V (m/s)
1
2
3
4
5
6
7
8
9
10
11
12
Month
Shinejinst
Bayan-Undur
Bayanlig
Bayangovi
Bogd
Jinst
Baatsagaan
Bayantsagaan
Khureemaral
Gurvanbulag


BAYANKHONGOR (2)
6.0
5.0
4.0
3.0
2.0
1.0
0.0
V (m/s)
1
2
3
4
5
6
7
8
9
10
11
12
Month
Jargalant
Galuut
Erdenetsogt
Bayanbulag
Buutsagaan
Bumbugur
zag


DORNOGOVI
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
V (m/s)
1
2
3
4
5
6
7
8
9
10
11
12
Month
Erdene
Delgerekh
Zamiin-Uud
Mandakh
Saikhandulaan
Khatanbulag
Khuvsgul
Ulaanbadrakh


SUKHUBAATAR
8.0
7.0
6.0
5.0
4.0
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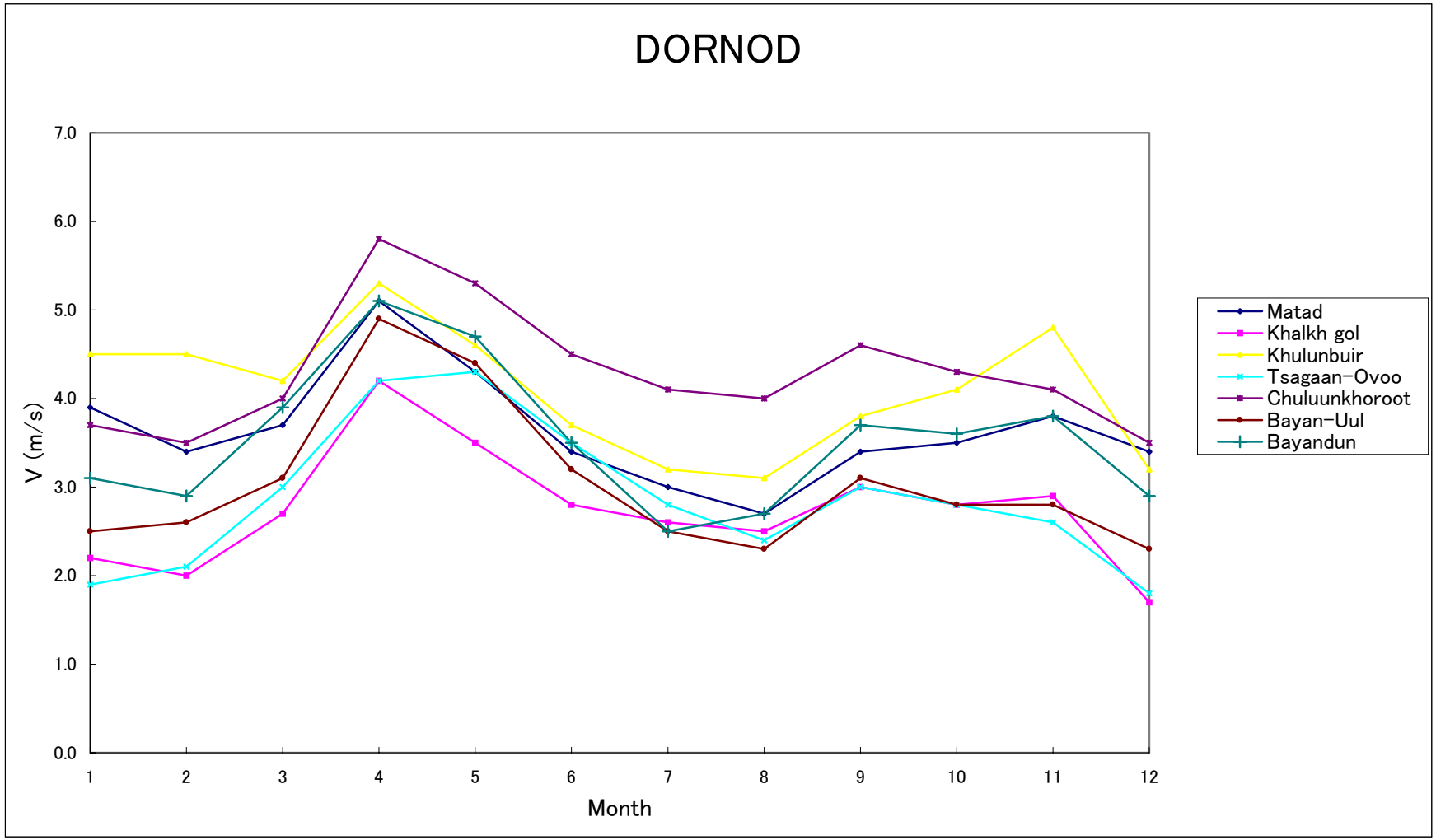
2.0
1.0
0.0
V (m/s)
1
2
3
4
5
6
7
8
9
10
11
12
Month
Ongon
Dariganga
Naran
Bayandelger
Erdenetsagaan
Sukhbaatar
Tumentsogt
Tuvshinshiree
Uulbayan
Munkhkhaan
Burentsogt


DORNOD
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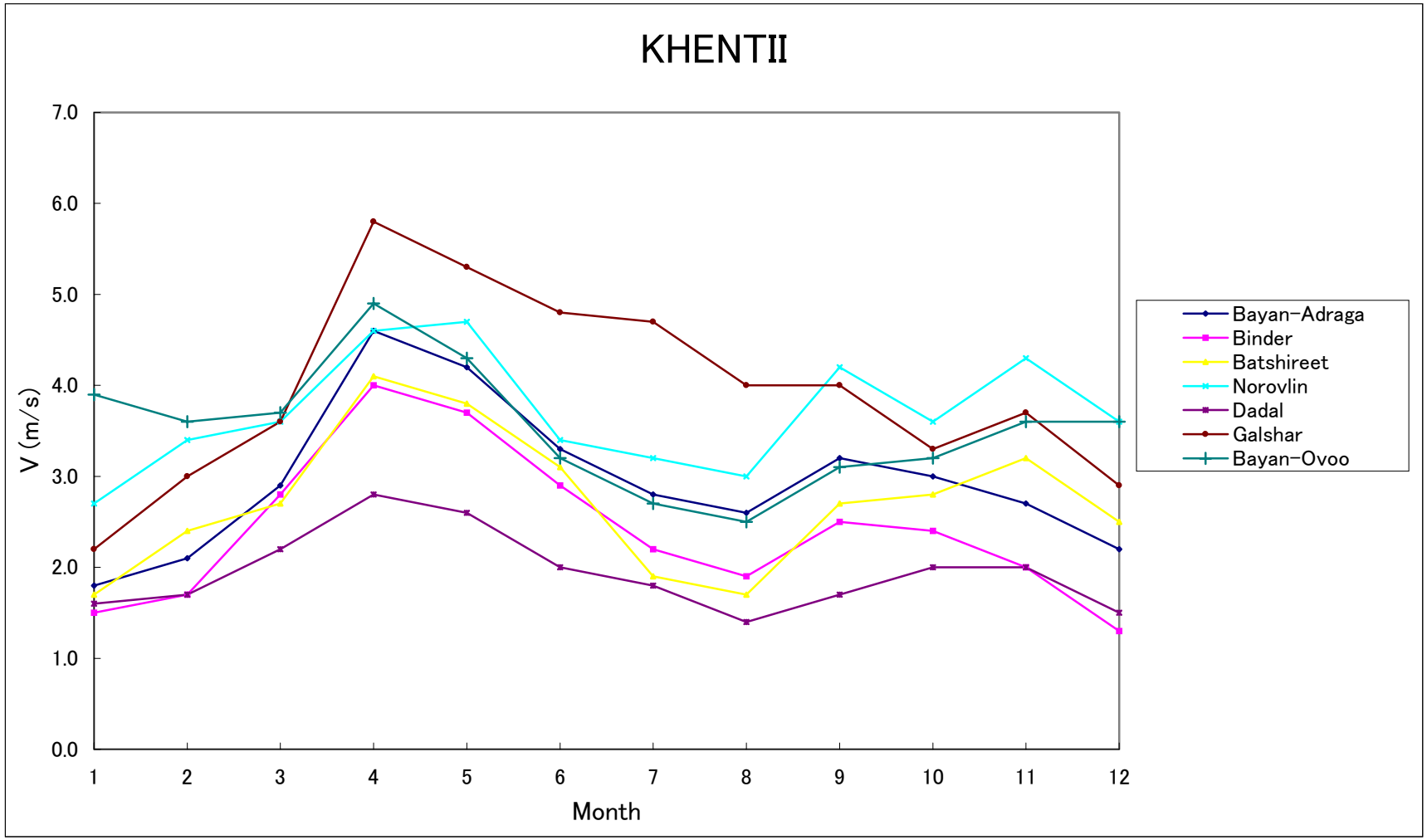
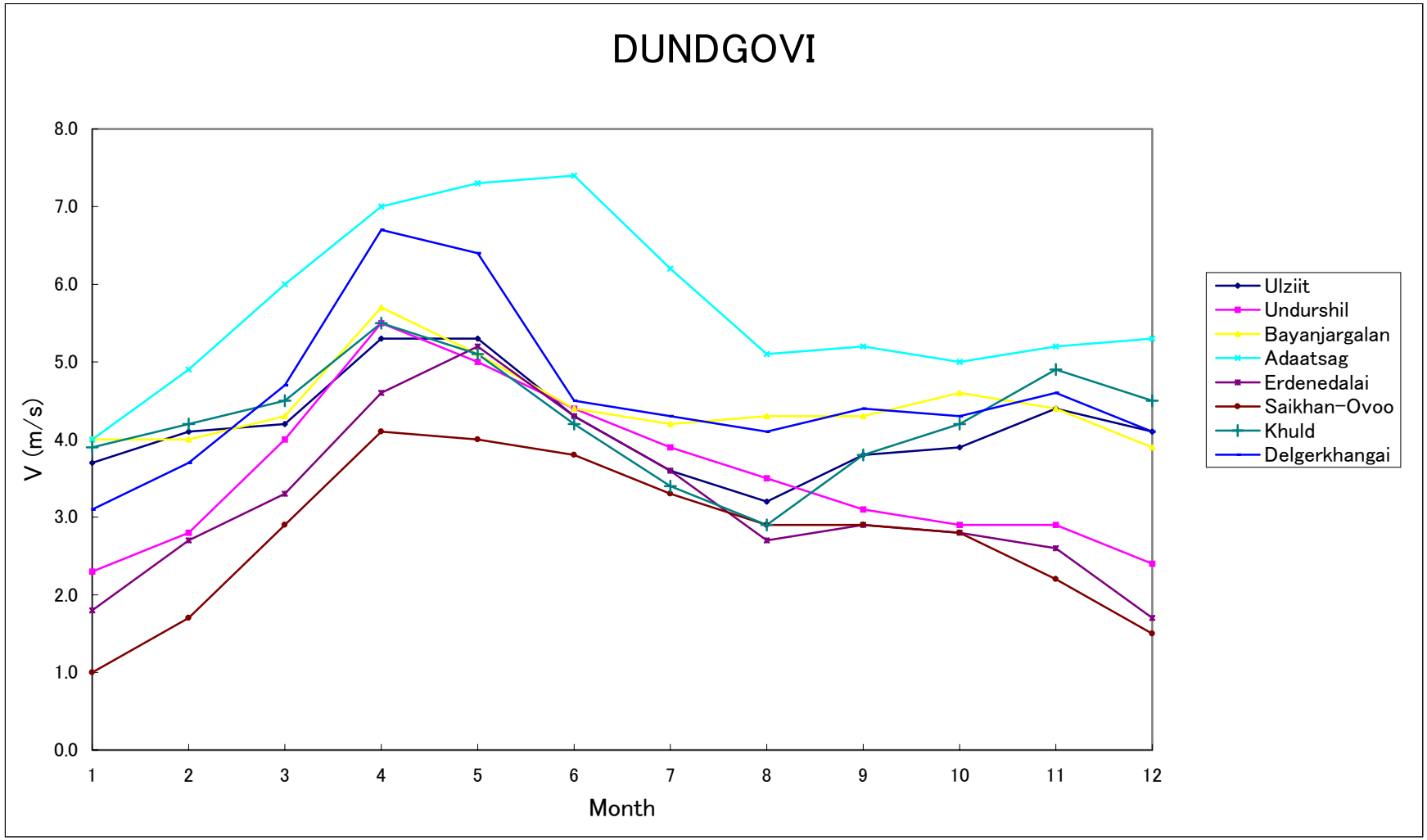
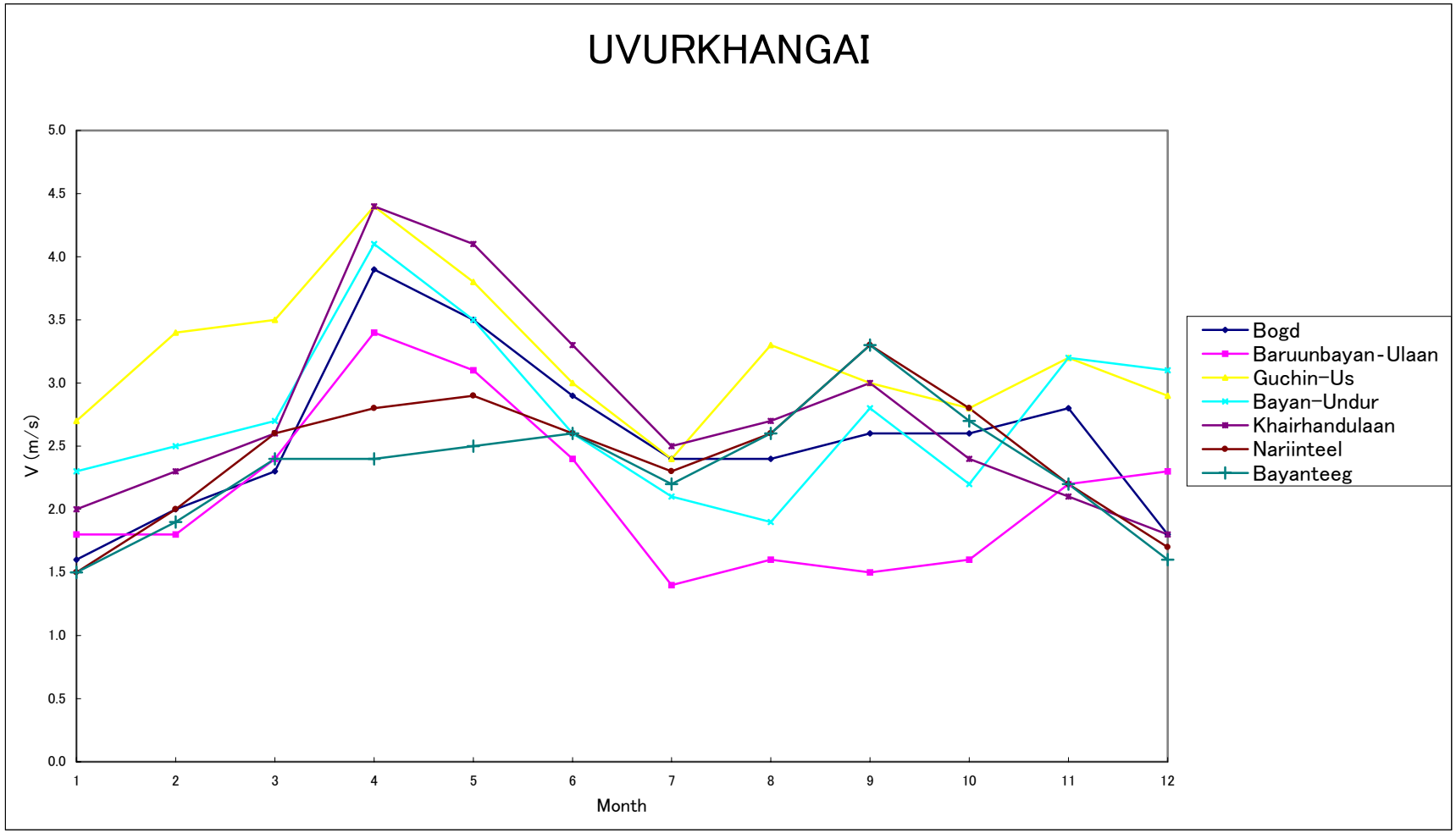
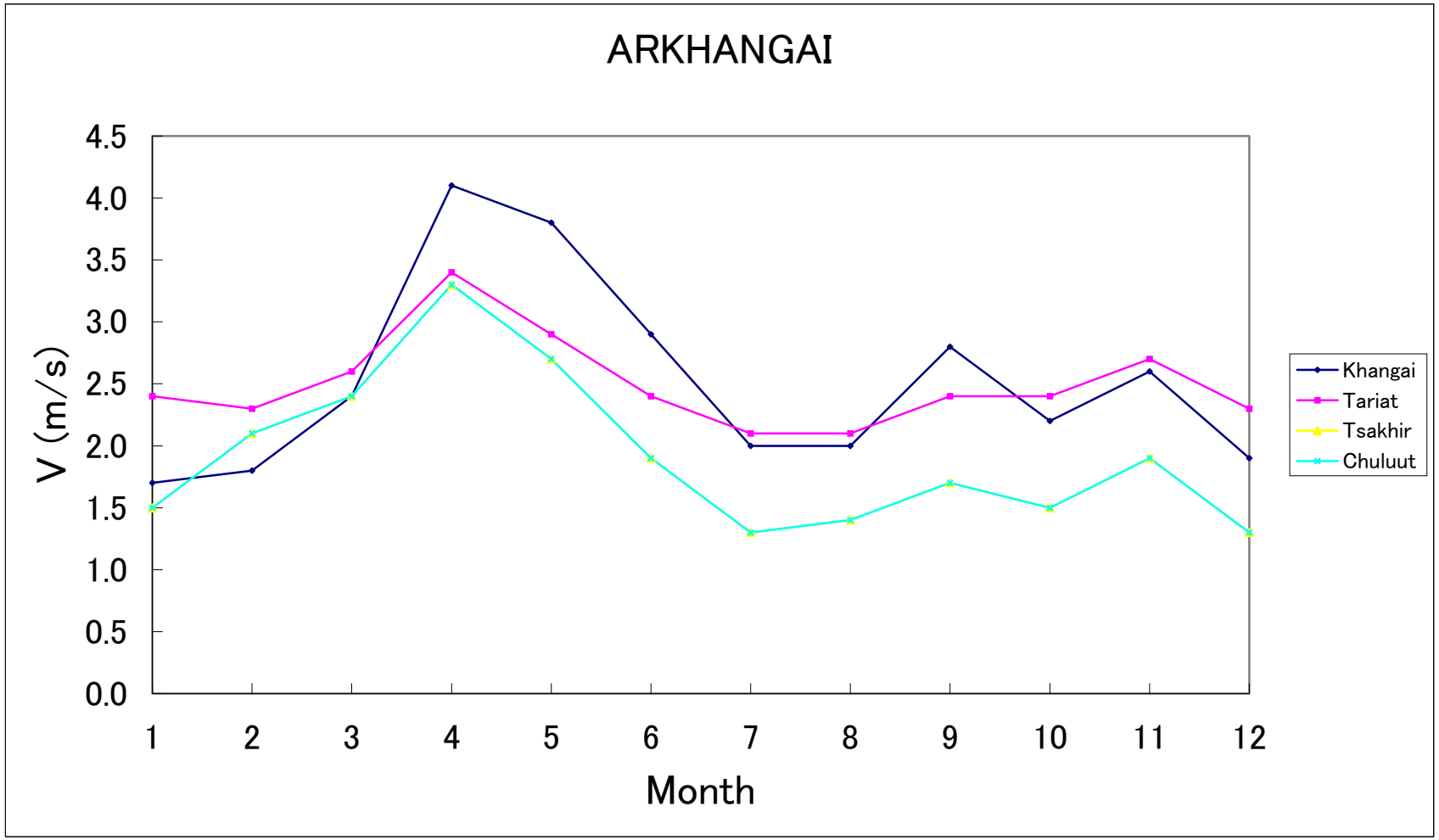
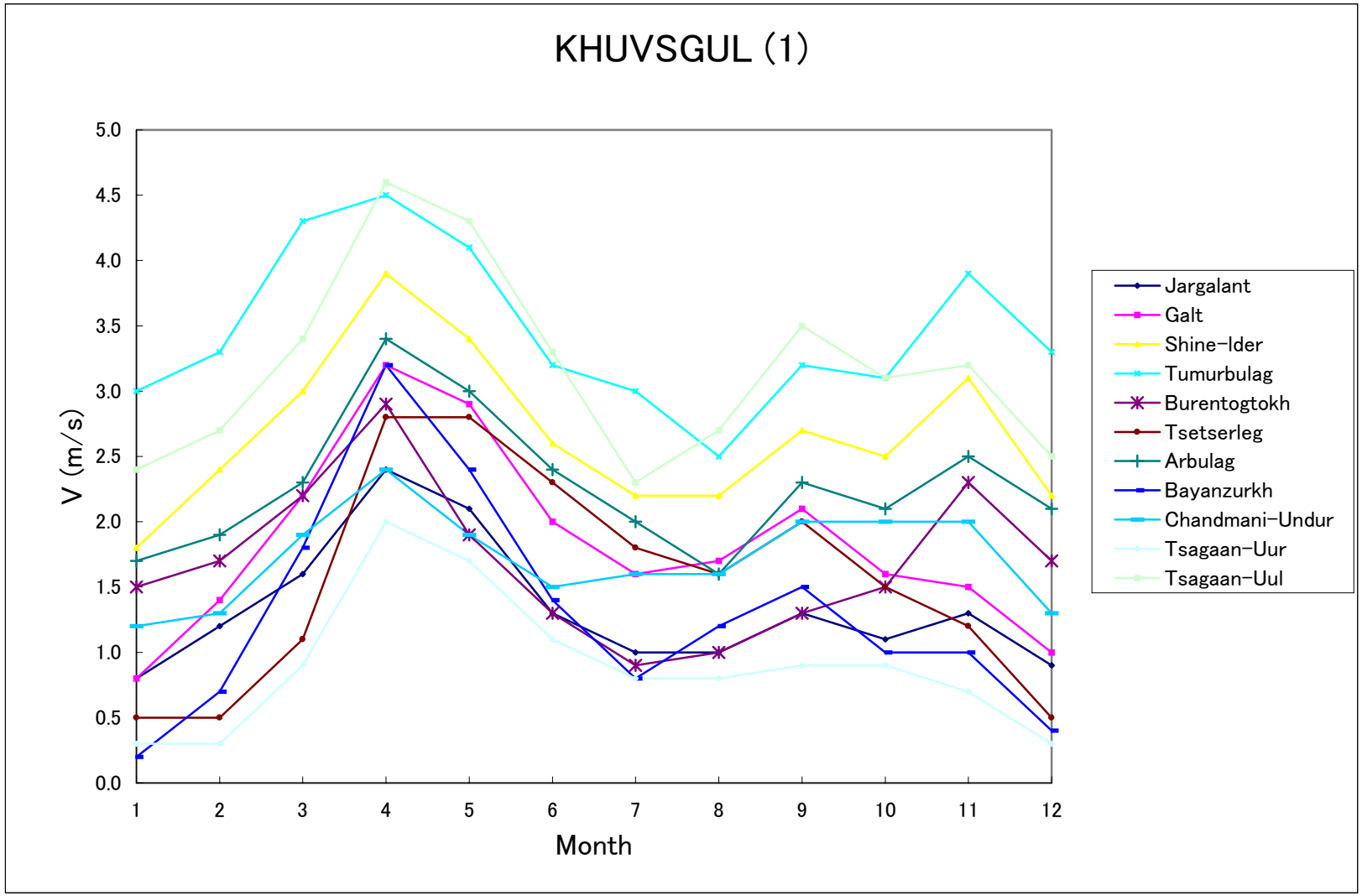
6.0
5.0
4.0
3.0
2.0
1.0
0.0
V (m/s)
1
2
3
4
5
6
7
8
9
10
11
12
Month
Matad
Khalkh gol
Khulunbuir
Tsagaan-Ovoo
Chuluunkhoroot
Bayan-Uul
Bayandun

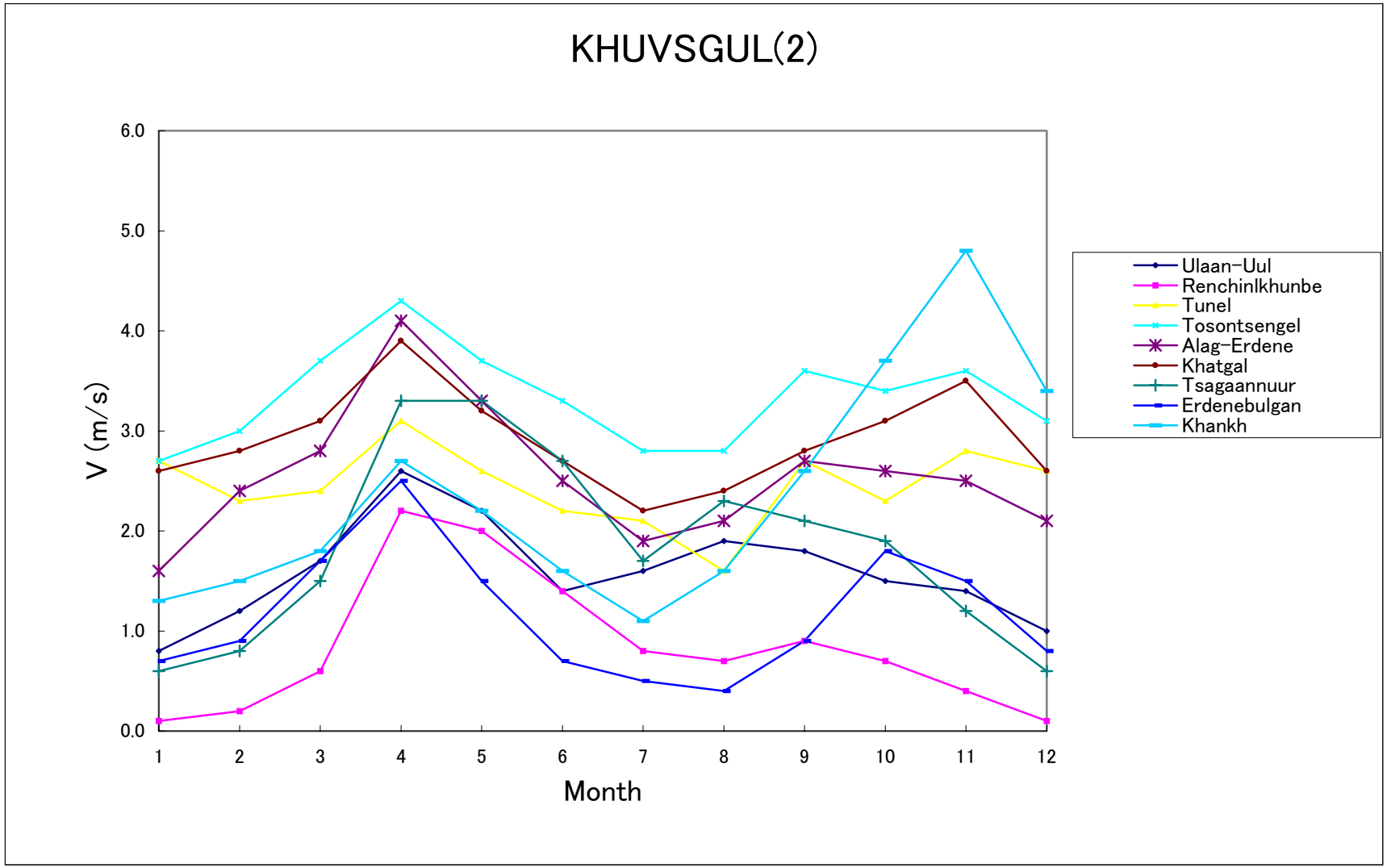

KHENTII
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
V (m/s)
1
2
3
4
5
6
7
8
9
10
11
12
Month
Bayan-Adraga
Binder
Batshireet
Norovlin
Dadal
Galshar
Bayan-Ovoo


DUNDGOVI
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
V (m/s)
1
2
3
4
5
6
7
8
9
10
11
12
Month
Ulziit
Undurshil
Bayanjargalan
Adaatsag
Erdenedalai
Saikhan-Ovoo
Khuld
Delgerkhangai


UVURKHANGAI
V (m/s)
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1
2
3
4
5
6
7
8
9
10
11
12
Month
Bogd
Baruunbayan-Ulaan
Guchin-Us
Bayan-Undur
Khairhandulaan
Nariinteel
Bayanteeg


ARKHANGAI
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
V (m/s)
1
2
3
4
5
6
7
8
9
10
11
12
Month
Khangai
Tariat
Tsakhir
Chuluut


KHUVSGUL (1)
V (m/s)
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1
2
3
4
5
6
7
8
9
10
11
12
Month
Jargalant
Galt
Shine-Ider
Tumurbulag
Burentogtokh
Tsetserleg
Arbulag
Bayanzurkh
Chandmani-Undur
Tsagaan-Uur
Tsagaan-Uul


KHUVSGUL(2)
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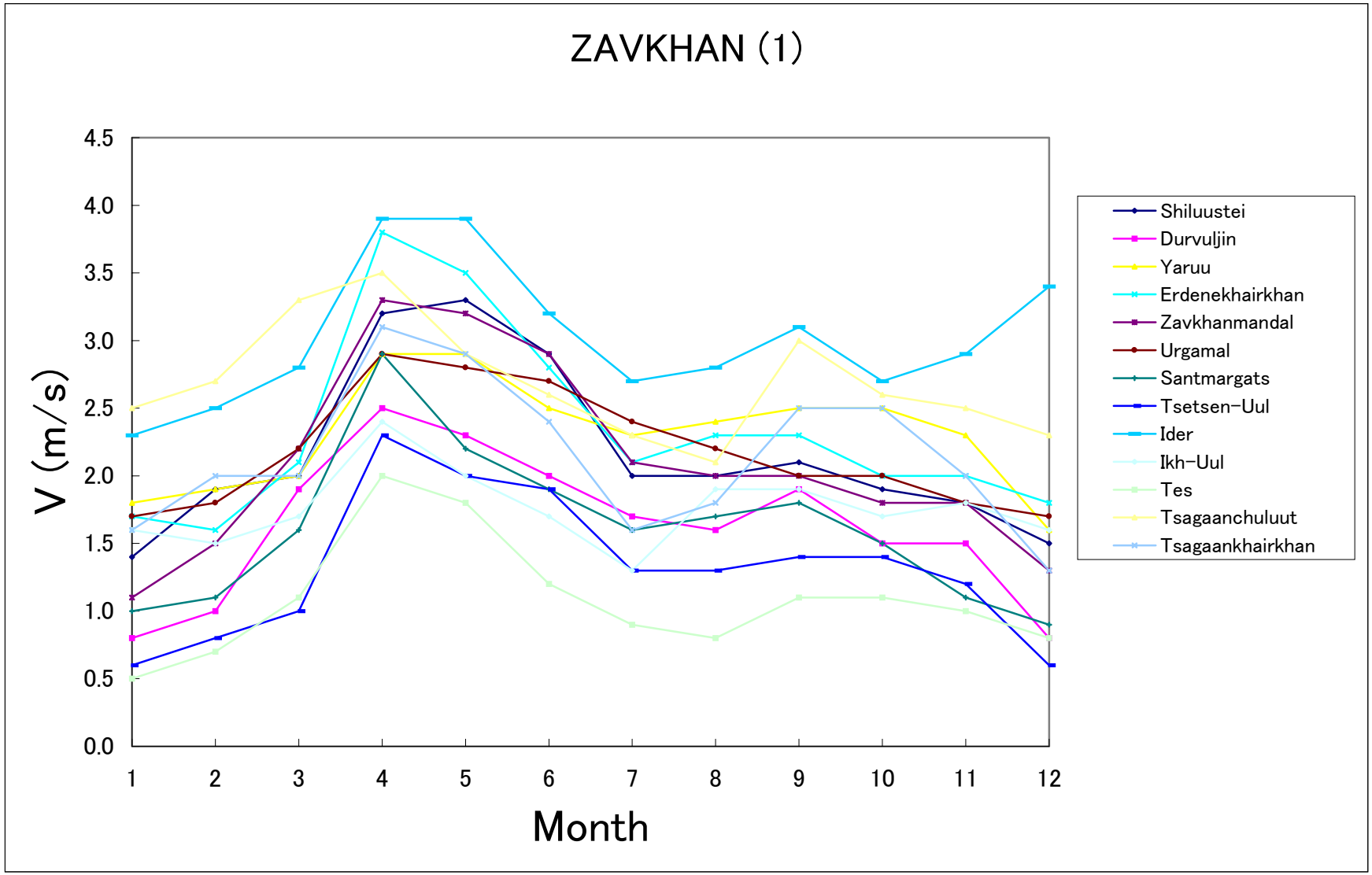
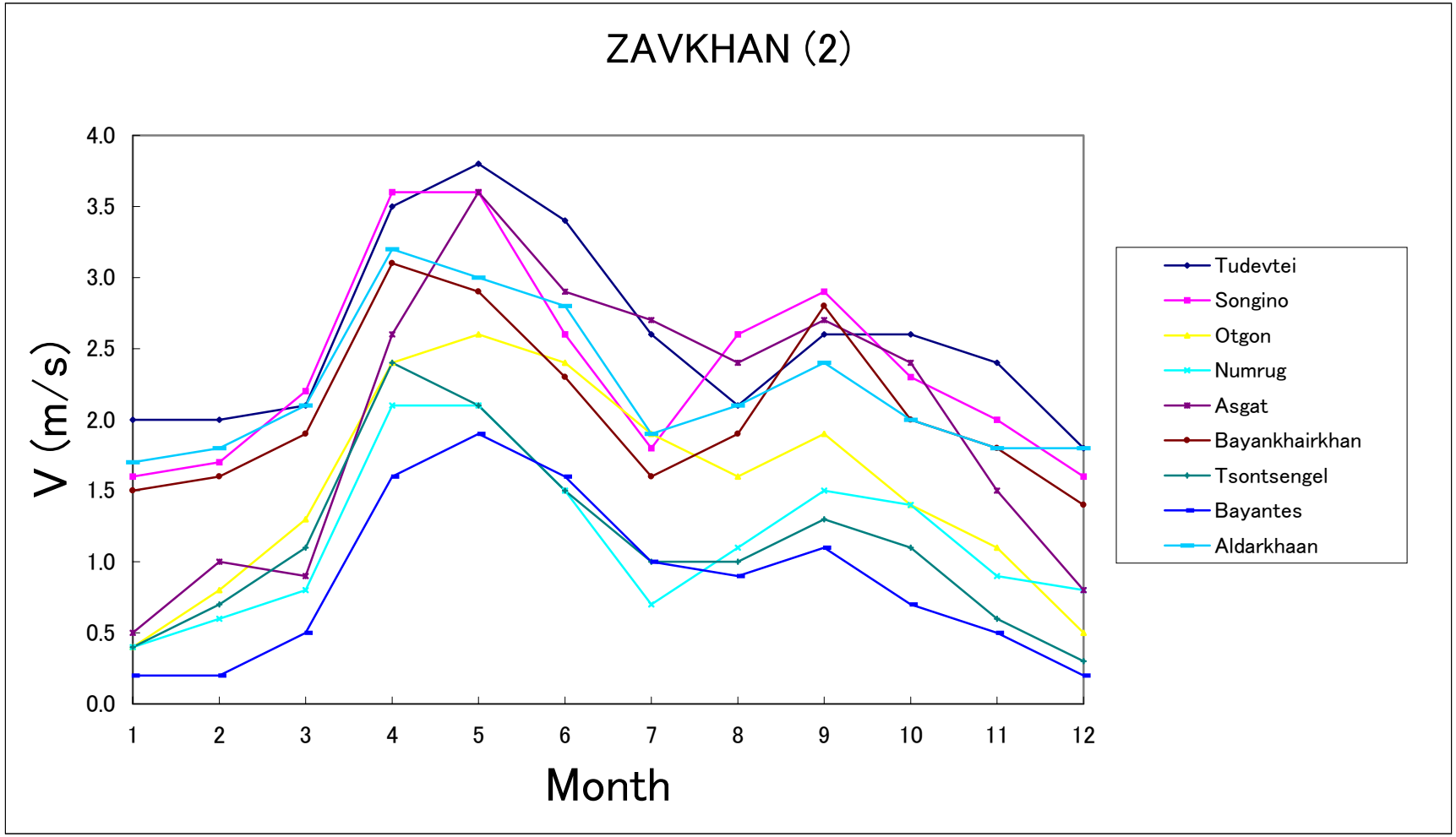
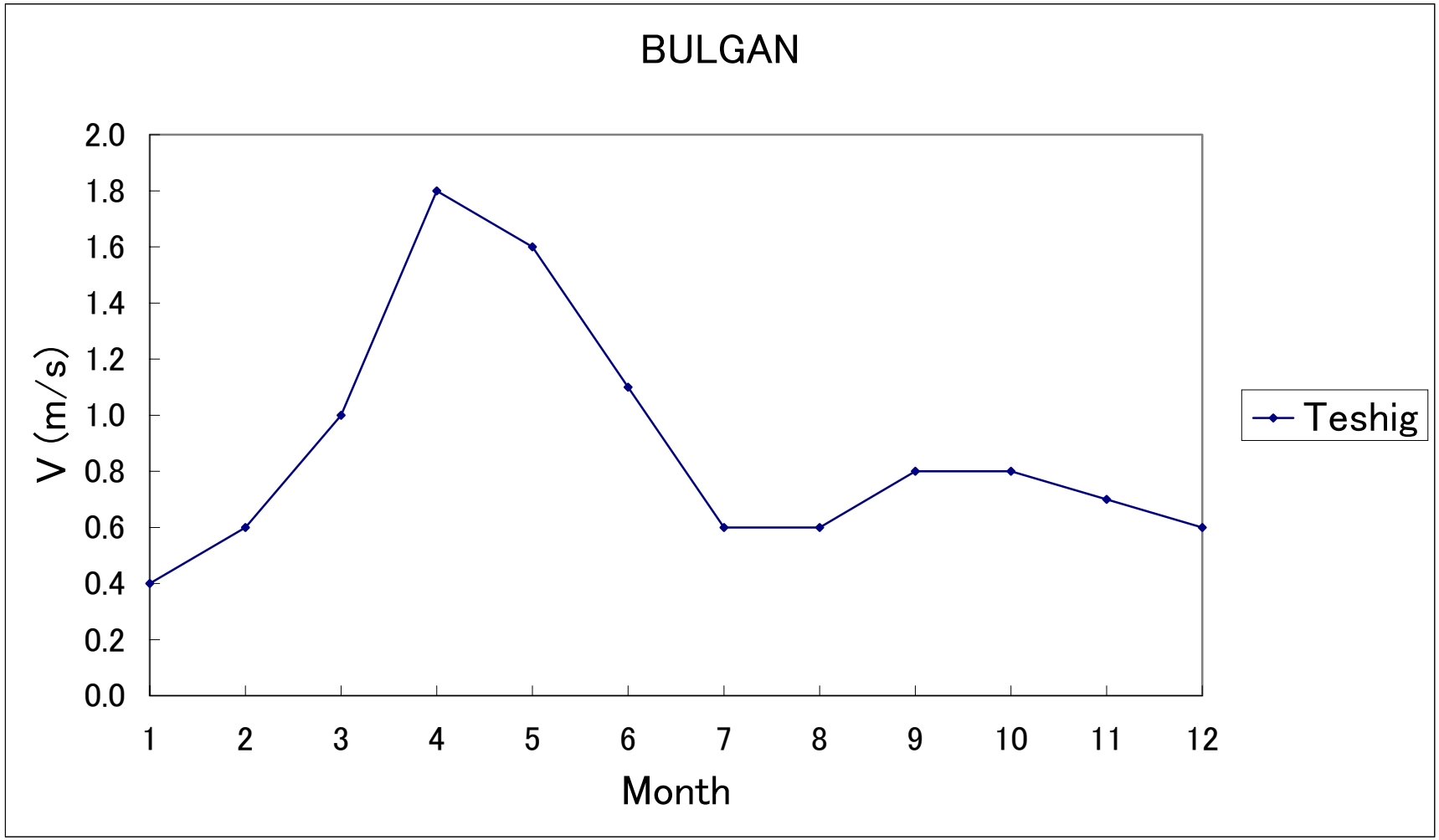
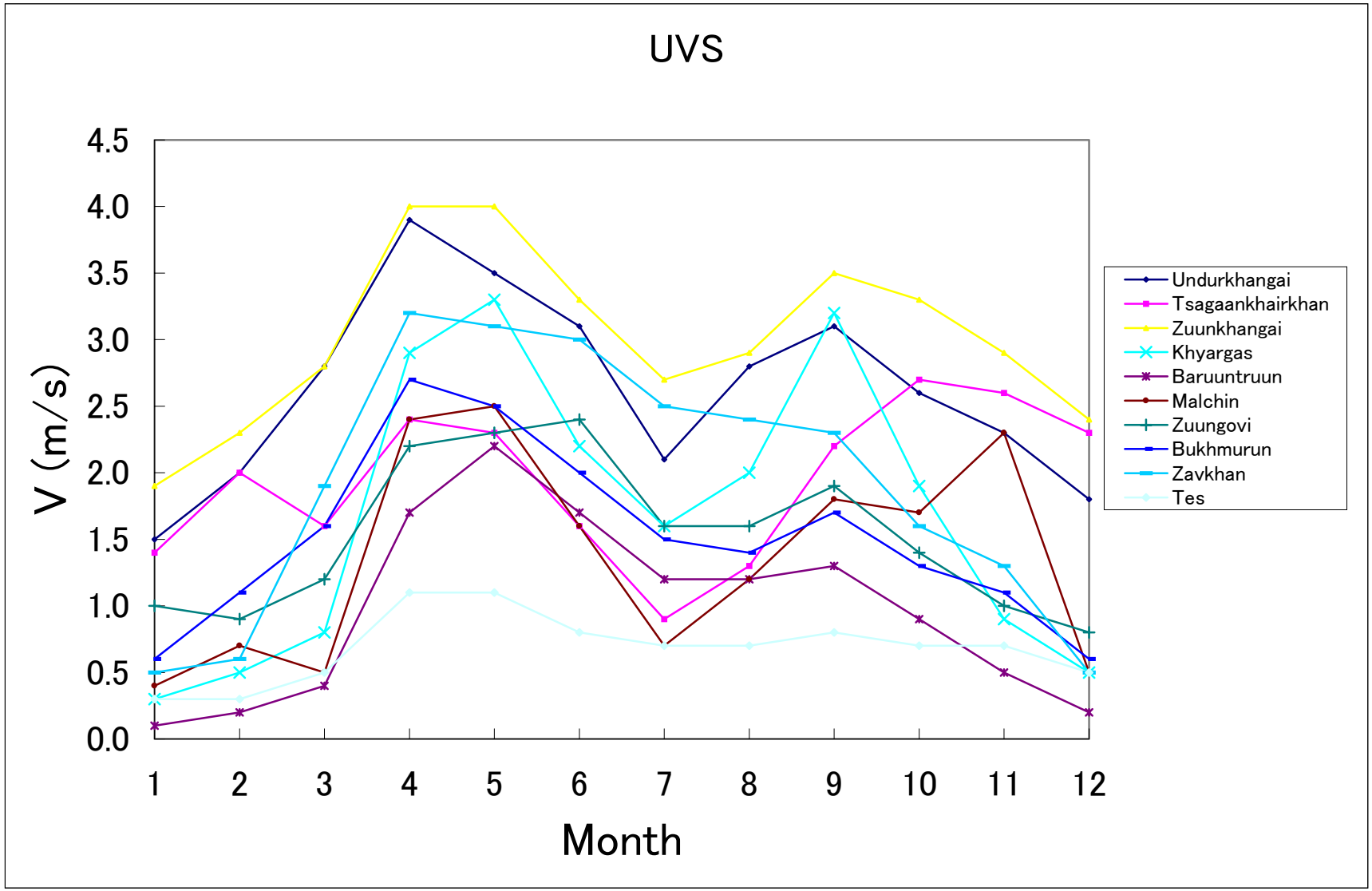
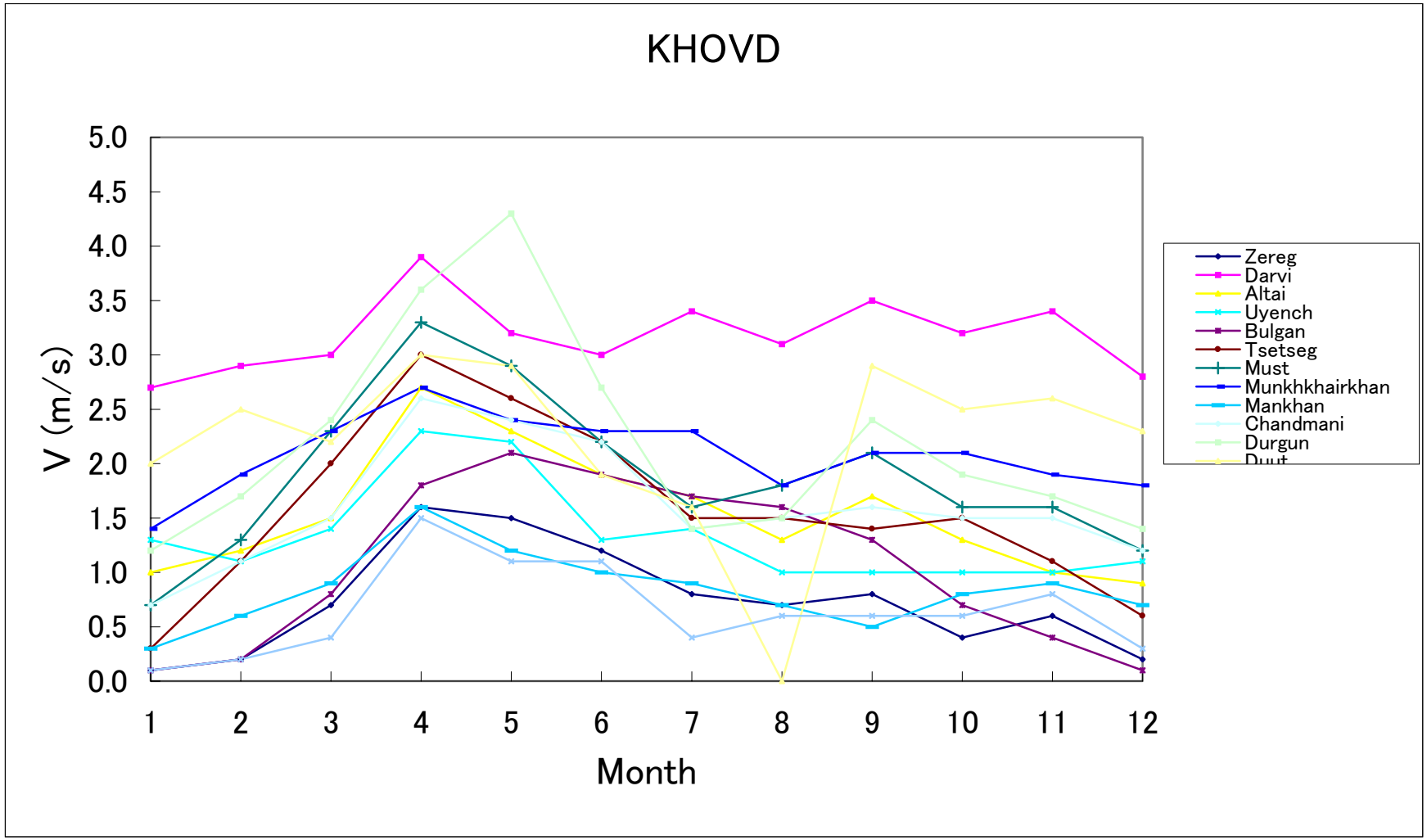
4.0
3.0
2.0
1.0
0.0
V (m/s)
1
2
3
4
5
6
7
8
9
10
11
12
Month
Ulaan-Uul
Renchinlkhunbe
Tunel
Tosontsengel
Alag-Erdene
Khatgal
Tsagaannuur
Erdenebulgan
Khankh

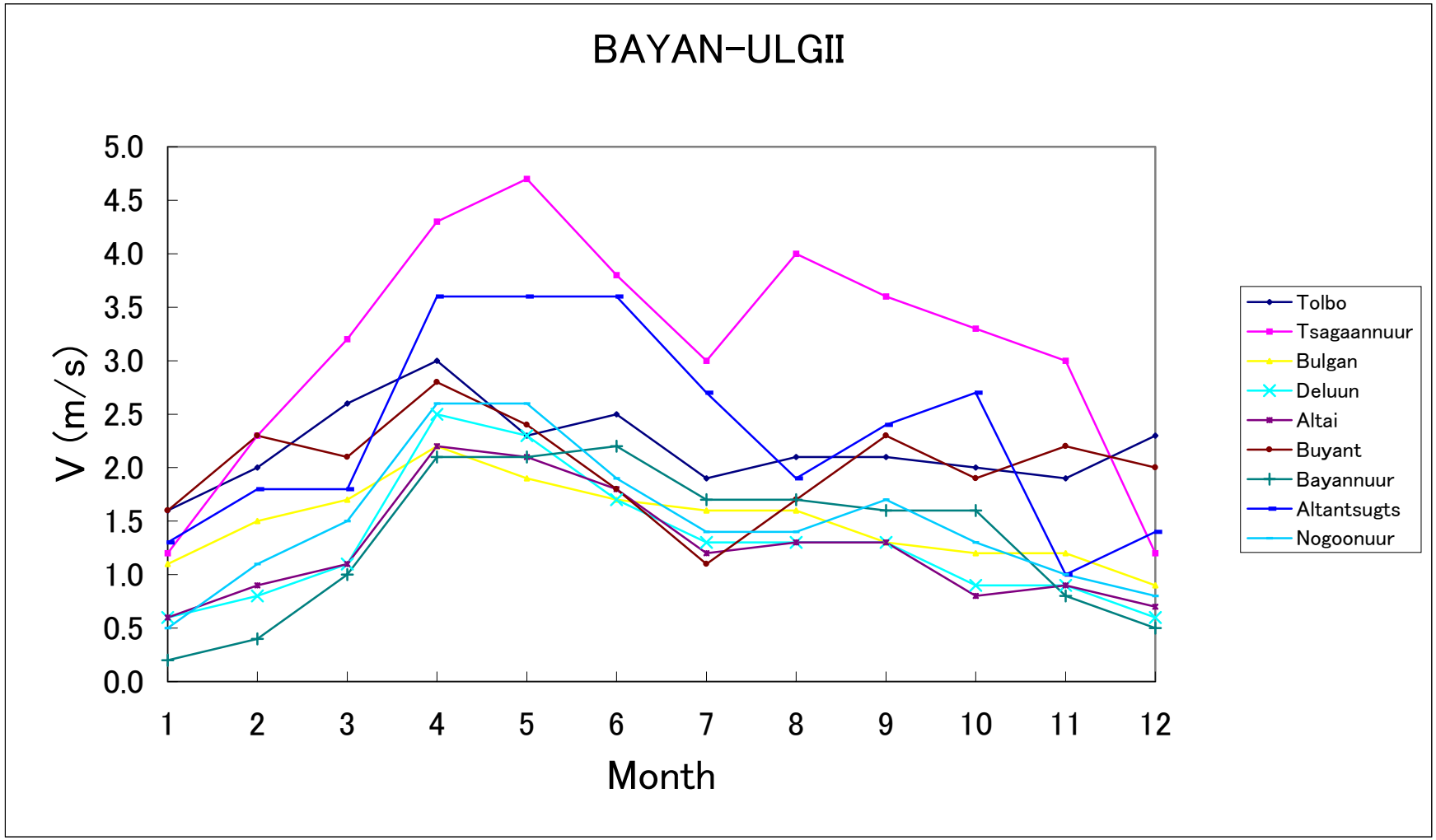

ZAVKHAN (1)
V (m/s)
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1
2
3
4
5
6
7
8
9
10
11
12
Month
Shiluustei
Durvuljin
Yaruu
Erdenekhairkhan
Zavkhanmandal
Urgamal
Santmargats
Tsetsen-Uul
Ider
Ikh-Uul
Tes
Tsagaanchuluut
Tsagaankhairkhan


ZAVKHAN (2)
V (m/s)
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1
2
3
4
5
6
7
8
9
10
11
12
Month
Tudevtei
Songino
Otgon
Numrug
Asgat
Bayankhairkhan
Tsontsengel
Bayantes
Aldarkhaan


BULGAN
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
V (m/s)
1
2
3
4
5
6
7
8
9
10
11
12
Month
Teshig


UVS
V (m/s)
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1
2
3
4
5
6
7
8
9
10
11
12
Month
Undurkhangai
Tsagaankhairkhan
Zuunkhangai
Khyargas
Baruuntruun
Malchin
Zuungovi
Bukhmurun
Zavkhan
Tes


KHOVD
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
V (m/s)
1
2
3
4
5
6
7
8
9
10
11
12
Month
Zereg
Darvi
Altai
Uyench
Bulgan
Tsetseg
Must
Munkhkhairkhan
Mankhan
Chandmani
Durgun
Duut


BAYAN-ULGII
V (m/s)
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1
2
3
4
5
6
7
8
9
10
11
12
Month
Tolbo
Tsagaannuur
Bulgan
Deluun
Altai
Buyant
Bayannuur
Altantsugts
Nogoonuur

3.2 Monthly Average Temperature（1988－1997）

UMNUGOVI

No.	Sum	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ave.
1	Bayandalai	−15.7	−10.3	−3.1	7.2	15.4	20.1	22.8	21.2	13.4	5.3	−7.3	−12.8	4.7
2	Bayan-Ovoo	−12.1	−7.8	−0.4	8.8	17.8	23.0	25.6	22.9	16.1	6.9	−3.3	−9.6	7.3
3	Bulgan	−12.9	−9.1	−1.7	7.2	15.0	20.4	22.9	21.4	14.0	6.0	−2.8	−10.1	5.9
4	Gurvantes	−12.0	−8.9	−2.6	5.8	13.3	19.0	21.3	19.5	12.8	4.8	−3.3	−9.3	5.0
5	Mandal-Ovoo	−15.9	−10.7	−1.4	8.9	17.2	22.9	25.2	23.1	13.9	6.4	−4.4	−13.7	6.0
6	Manlai	−13.9	−9.9	−2.9	6.4	14.5	20.2	22.9	21.2	13.6	5.7	−4.2	−10.7	5.2
7	Noyon	−11.6	−8.5	−2.9	5.9	13.7	19.2	21.1	19.5	12.1	5.1	−4.4	−9.7	5.0
8	Nomgon	−12.2	−9.5	−2.4	6.6	14.6	20.5	23.4	20.7	13.6	6.6	−3.7	−9.2	5.8
9	Sevrei	−12.8	−8.5	−1.8	6.6	14.6	20.1	22.2	20.0	13.3	6.0	−4.2	−10.4	5.4
10	Khanbogd	−11.1	−7.0	−0.4	8.5	16.2	21.8	24.6	22.9	15.6	7.8	−1.3	−8.5	7.4
11	Tsogt-Ovoo	−15.6	−11.1	−3.0	5.8	13.8	19.5	22.2	20.8	12.9	4.8	−4.7	−12.7	4.4
12	Khurmen	−12.7	−9.1	−2.5	5.8	13.5	19.8	21.2	19.6	12.9	5.0	−4.4	−10.2	4.9
13	Tsogttsetsii	−13.8	−9.9	−3.2	6.4	14.6	20.2	22.6	20.4	13.5	5.3	−5.6	−10.9	5.0

GOVI-ALTAI

No.	Sum	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ave.
14	Erdene	−16.6	−14.8	−9.3	−2.1	7.1	11.8	14.7	13.0	5.9	−1.5	−9.0	−13.8	−1.2
15	Tsogt	−16.5	−11.4	−0.8	8.6	16.6	22.2	24.0	22.3	15.1	6.2	−4.7	−14.7	5.6
16	Chandmani	−16.4	−15.0	−7.4	−1.0	9.1	14.3	16.7	14.8	8.3	1.0	−7.0	−12.4	0.4
17	Altai	−12.1	−9.0	−1.3	7.2	14.4	20.0	21.5	20.0	13.9	5.8	−3.0	−8.8	5.7
19	Taishir	−21.6	−16.4	−7.1	3.7	12.3	17.1	19.1	17.3	10.0	2.3	−10.8	−17.7	0.7
20	Bugat	−16.0	−13.1	−7.2	0.9	8.4	13.7	15.7	14.1	8.0	0.6	−7.8	−12.6	0.4
21	Tseel	−16.7	−13.5	−6.9	1.6	9.8	15.6	17.4	15.6	8.5	0.8	−8.3	−13.5	0.9
22	Tugrug	−14.6	−10.8	−3.2	5.5	14.0	17.9	21.1	18.3	12.1	4.7	−5.3	−10.7	4.1
23	Sharga	−21.0	−15.9	−2.3	9.3	18.3	23.2	25.6	23.9	15.9	7.3	−6.1	−14.7	5.3
24	Tonkhil	−14.8	−13.5	−7.7	0.1	7.4	11.9	14.0	12.5	6.9	0.0	−7.2	−11.5	−0.2
25	Darvi	−18.3	−13.9	−4.6	3.8	12.6	17.9	19.5	18.3	11.8	3.5	−7.0	−12.4	2.6
26	Khaliun	−18.1	−13.2	−3.5	6.3	14.3	19.6	21.8	19.4	12.4	4.5	−5.3	−13.0	3.8
27	Biger	−18.2	−13.1	−3.0	6.3	15.8	21.2	23.0	20.7	13.1	3.5	−6.6	−14.8	4.0
28	Khukhmorit	−21.5	−17.5	−6.1	4.0	13.6	18.5	21.5	18.3	12.4	4.4	−8.1	−13.1	2.2
29	Bayan-Uul	−15.6	−12.9	−5.9	3.1	10.5	16.3	18.2	16.2	9.9	2.4	−6.9	−12.3	1.9
30	Jargalan	−22.3	−18.1	−7.8	3.2	11.6	17.3	18.7	17.4	11.4	2.6	−9.9	−16.9	0.6

BAYANKHONGOR

No.	Sum	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ave.
32	Shinejinst	−11.6	−6.7	2.1	11.2	18.8	24.8	26.7	24.8	17.8	8.9	−1.1	−8.9	8.9
33	Bayan-Undur	−12.5	−11.6	−7.8	−0.6	7.2	13.4	14.9	12.9	6.7	−0.2	−8.0	−10.3	0.3
34	Bayanlig	−16.0	−11.2	−3.4	6.8	16.1	21.3	22.3	20.9	14.0	4.7	−5.3	−13.1	4.8
35	Bayangovi	−16.3	−10.8	−3.3	6.2	14.8	20.6	22.0	20.8	13.9	6.0	−5.1	−12.6	4.7
36	Bogd	−15.2	−11.3	−4.2	5.3	13.1	18.2	20.4	18.8	12.2	4.3	−5.4	−11.7	3.7
37	Jinst	−15.0	−13.0	−7.3	0.9	8.5	14.0	16.0	14.8	7.9	0.3	−7.2	−12.3	0.6
38	Baatsagaan	−17.1	−12.0	−3.2	6.7	15.2	21.1	22.8	20.9	13.1	4.7	−6.2	−13.7	4.4
39	Bayantsagaan	−13.3	−11.6	−6.4	1.5	11.3	16.4	18.2	16.0	10.5	2.9	−5.5	−10.5	2.5
40	Khureemaral	−15.1	−12.5	−6.7	1.8	9.5	15.7	17.3	15.7	8.8	0.9	−8.1	−12.0	1.3
41	Gurvanbulag	−28.4	−23.2	−15.1	−4.6	3.9	9.4	11.3	9.4	2.6	−5.6	−16.3	−22.6	−6.6
42	Jargalant	−28.1	−22.4	−12.6	−1.5	7.8	12.9	14.8	12.6	5.2	−3.8	−15.7	−23.2	−4.5
43	Galuut	−25.6	−21.1	−12.5	−2.1	6.2	11.5	13.5	11.5	4.5	−2.9	−14.3	−20.6	−4.3
44	Erdenetsogt	−18.8	−16.0	−9.7	0.5	8.3	14.0	16.0	14.4	8.7	1.7	−9.9	−16.1	−0.6
46	Bayanbulag	−21.9	−19.4	−12.0	−2.4	5.4	10.8	12.2	10.4	3.3	−3.8	−12.7	−19.3	−4.1
47	Buutsagaan	−17.3	−13.9	−7.3	2.6	10.9	16.2	17.5	15.9	9.3	1.1	−9.1	−14.5	1.0
48	Bumbugur	−16.3	−13.7	−7.6	0.3	9.2	15.3	17.4	16.4	10.4	3.6	−7.7	−13.0	1.2
50	Zag	−25.2	−20.9	−10.8	−0.3	9.2	14.4	16.1	13.6	7.3	−0.4	−14.3	−18.4	−2.5

DORNOGOVI

No.	Sum	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ave.
51	Erdene	−17.3	−11.2	−2.1	5.8	16.1	22.1	24.5	22.8	14.4	6.1	−5.2	−13.2	5.2
52	Delgerekh	−17.8	−13.0	−5.0	6.7	14.9	20.0	22.4	21.5	13.1	4.0	−7.4	−11.4	4.0
53	Zamiin-Uud	−18.0	−12.0	−3.5	6.3	14.4	20.4	23.4	21.7	13.7	5.2	−5.2	−15.7	4.2
54	Mandakh	−15.0	−10.9	−3.8	5.0	13.0	18.6	21.5	19.9	12.3	4.4	−4.7	−12.6	4.0
55	Saikhandulaan	−14.4	−10.4	−2.8	6.2	14.6	21.5	23.3	20.9	14.7	5.7	−5.7	−12.6	5.1
56	Khatanbulag	−13.5	−9.5	−1.8	8.0	16.4	22.0	24.8	22.6	16.3	8.2	−3.1	−10.0	6.7
57	Khuvsgul	−14.2	−9.2	−1.8	7.4	15.4	21.3	24.4	22.6	14.9	6.5	−3.4	−11.6	6.0
9041	Ulaanbadrakh	−16.6	−10.7	−2.9	5.7	14.7	21.9	25.2	22.6	15.0	8.7	−4.4	−12.3	5.6

SUKHUBAATAR

No.	Sum	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ave.
58	Ongon	−20.9	−15.2	−6.9	4.7	13.3	19.2	21.9	20.6	12.9	4.9	−7.4	−16.3	2.6
59	Dariganga	−22.0	−17.1	−7.8	3.3	11.7	17.8	20.0	19.5	11.1	3.0	−9.4	−17.4	1.1
60	Naran	−21.0	−16.7	−7.4	4.3	12.6	18.6	20.5	19.4	11.8	3.7	−9.2	−17.5	1.6
61	Bayandelger	−19.0	−14.2	−6.1	4.0	12.0	17.8	20.4	19.1	11.3	3.6	−7.1	−16.0	2.2
62	Erdenetsagaan	−17.8	−14.2	−7.2	2.9	10.4	16.2	19.2	18.1	10.2	2.8	−6.9	−15.3	1.5
63	Sukhbaatar	−20.7	−16.2	−6.0	5.2	13.5	18.1	21.2	20.0	12.0	4.2	−10.7	−17.2	2.0
64	Tumentsogt	−17.0	−13.4	−5.5	4.9	12.8	17.7	20.0	18.2	10.7	2.7	−8.8	−14.7	2.3
65	Tuvshinshiree	−19.8	−15.5	−6.3	4.2	12.8	18.9	21.1	19.6	11.8	3.7	−9.3	−16.1	2.1
66	Uulbayan	−21.7	−16.9	−6.6	4.3	13.9	19.2	21.1	19.3	11.6	3.3	−7.9	−17.4	1.9
67	Munkhkhaan	−17.1	−13.1	−6.1	3.2	11.4	16.8	19.5	18.3	9.3	3.4	−7.8	−14.4	2.0
68	Burentsogt	−19.2	−14.8	−5.8	4.1	12.0	16.6	18.8	17.7	9.7	4.2	−8.0	−15.6	1.6

DORNOD

No.	Sum	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ave.
69	Matad	−18.0	−13.8	−6.5	3.3	11.1	16.9	19.9	18.8	10.3	3.1	−7.2	−15.9	1.8
71	Khalkh gol	−22.7	−18.5	−8.8	3.1	11.1	17.2	19.8	18.6	10.2	2.3	−8.7	−19.8	0.3
72	Khulunbuir	−19.1	−13.9	−5.6	4.5	13.0	13.5	20.3	18.4	11.4	3.1	−7.2	−14.9	2.0
73	Tsagaan-Ovoo	−18.1	−13.7	−5.0	4.5	13.3	18.3	20.6	18.9	10.8	3.0	−8.4	−15.6	2.4
74	Chuluunkhoroot	−21.9	−17.0	−7.4	3.5	12.7	19.3	21.5	19.2	11.1	2.9	−7.9	−18.3	1.5
75	Bayan-Uul	−18.9	−15.2	−7.2	2.3	11.1	15.9	18.1	16.4	8.9	0.6	−9.9	−16.7	0.5
76	Bayandun	−15.0	−10.8	−4.3	3.9	12.4	17.3	19.3	17.9	9.5	2.2	−7.5	−13.5	2.6

KHENTII

No.	Sum	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ave.
78	Bayan-Adraga	−20.1	−15.7	−6.9	3.1	12.1	17.3	19.2	16.4	9.0	2.3	−9.5	−18.7	0.7
79	Binder	−20.6	−15.8	−7.0	2.0	9.9	15.1	17.2	15.6	8.2	0.8	−10.0	−18.7	−0.3
80	Batshireet	−19.9	−16.4	−7.2	2.7	11.4	14.8	18.2	16.2	9.3	1.8	−9.7	−20.3	0.1
81	Norovlin	−19.3	−15.1	−5.6	2.9	12.4	16.7	18.7	17.4	9.9	1.7	−10.3	−16.4	1.1
83	Dadal	−18.3	−14.1	−6.4	2.1	9.9	14.9	16.9	15.2	8.1	1.4	−8.8	−17.2	0.3
9071	Galshar	−19.8	−12.4	−5.0	3.5	12.8	18.3	20.2	17.7	11.5	3.2	−8.6	−18.3	1.9
9072	Bayan-Ovoo	−20.7	−15.6	−6.5	2.5	11.3	16.4	18.8	17.1	10.0	1.7	−9.5	−17.3	0.7

DUNDGOVI

No.	Sum	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ave.
84	Ulziit	−16.4	−11.2	−2.8	6.9	15.5	20.3	22.9	19.5	14.3	6.4	−7.2	−13.3	4.6
85	Undurshil	−17.4	−12.5	−3.4	6.5	15.0	20.4	23.0	20.6	13.6	4.8	−7.8	−14.7	4.0
86	Bayanjargalan	−16.4	−12.0	−3.7	5.4	14.0	19.5	21.6	18.3	12.2	4.8	−6.4	−13.4	3.7
87	Adaatsag	−18.0	−14.0	−5.8	4.1	10.9	16.7	19.2	17.8	9.6	2.5	−8.8	−14.5	1.6
88	Erdenedalai	−18.5	−12.9	−3.9	3.8	12.2	17.5	19.8	17.2	9.8	2.4	−5.3	−15.8	2.2
9081	Saikhan-Ovoo	−20.1	−14.8	−5.2	4.6	12.7	18.0	20.6	19.0	11.7	3.5	−7.9	−15.9	2.2
9082	Khuld	−15.7	−11.5	−3.3	4.8	14.3	19.6	22.8	20.8	12.6	3.9	−5.8	−13.3	4.1
9083	Delgerkhangai	−14.4	−10.4	−3.3	4.8	13.6	19.1	21.1	19.8	12.7	6.8	−5.1	−10.9	4.5

UVRUKHANGAI

No.	Sum	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ave.
89	Bogd	−15.0	−11.3	−3.9	5.3	13.0	18.3	20.6	19.1	11.9	4.3	−4.5	−11.7	3.8
90	Baruunbayan-Ulaan	−18.3	−13.9	−4.1	5.8	13.9	19.9	21.7	20.3	14.2	5.2	−6.2	−14.7	3.7
91	Guchin-Us	−16.5	−13.2	−4.9	4.6	12.6	18.3	20.9	19.6	10.5	3.0	−6.7	−12.0	3.0
92	Bayan-Undur	−17.7	−15.6	−5.1	2.5	10.1	15.3	17.8	15.3	9.1	0.8	−6.3	−15.1	0.9
93	Khairhandulaan	−16.3	−13.2	−6.8	2.3	10.3	15.9	17.9	16.5	9.7	1.5	−7.5	−13.8	1.4
94	Nariinteel	−17.5	−14.6	−7.3	1.4	11.1	15.6	18.1	16.6	10.4	2.5	−8.8	−14.1	1.1
95	Bayanteeg	−17.4	−14.3	−6.9	1.3	11.7	15.9	18.3	16.9	10.4	2.5	−8.2	−14.2	1.3

KHUVSGUL

No.	Sum	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ave.
96	Jargalant	−24.5	−20.0	−9.9	2.1	9.8	14.7	16.5	14.4	8.1	0.2	−11.6	−18.5	−1.6
97	Galt	−22.2	−16.3	−6.5	3.1	11.2	15.9	18.0	15.5	8.1	1.0	−9.9	−16.5	0.1
98	Shine-Ider	−20.0	−14.4	−6.9	1.6	9.6	14.3	16.5	13.9	8.1	1.0	−9.1	−15.8	−0.1
99	Tumurbulag	−17.6	−13.7	−5.0	3.4	10.7	16.0	18.0	15.7	9.5	2.8	−7.3	−13.6	1.6
100	Burentogtokh	−19.2	−14.0	−4.3	4.2	12.0	16.7	18.8	16.1	10.1	3.1	−5.8	−16.1	1.8
101	Tsetserleg	−26.9	−23.9	−14.4	−1.7	6.4	11.4	13.6	11.5	4.7	−2.4	−14.9	−22.7	−4.9
102	Arbulag	−23.2	−19.5	−11.9	−2.4	6.3	11.9	14.0	11.3	5.4	−2.2	−12.6	−18.9	−3.5
103	Bayanzurkh	−27.6	−21.5	−11.8	−1.0	7.6	12.8	15.3	12.4	6.0	−1.1	−13.3	−22.2	−3.7
104	Chandmani-Undur	−24.0	−18.5	−6.9	1.7	10.4	15.3	16.9	14.2	7.1	−0.3	−12.8	−20.9	−1.5
105	Tsagaan-Uur	−28.0	−22.2	−10.1	1.5	9.3	14.2	16.1	13.7	6.1	−0.9	−14.4	−24.1	−3.2
106	Tsagaan-Uul	−20.5	−17.8	−10.2	−0.4	7.6	12.5	14.7	12.4	5.3	−1.4	−11.2	−16.8	−2.2
107	Ulaan-Uul	−29.6	−23.3	−13.6	−0.5	6.7	11.7	14.3	11.9	6.3	−3.2	−14.1	−25.4	−4.9
108	Renchinlkhunbe	−31.6	−26.9	−15.4	−2.6	5.8	11.0	13.4	11.0	3.9	−3.7	−18.2	−29.2	−6.9
109	Tunel	−20.7	−16.7	−8.4	0.7	7.1	12.7	15.1	14.1	5.8	0.0	−10.3	−16.4	−1.4
110	Tosontsengel	−20.0	−15.1	−5.8	2.9	11.0	15.9	17.4	15.1	8.4	1.7	−8.5	−15.4	0.6
111	Alag-Erdene	−22.8	−18.5	−8.4	1.1	8.4	13.8	15.2	11.1	7.1	−0.5	−11.3	−18.2	−1.9
112	Khatgal	−22.5	−20.3	−11.2	−2.1	5.0	9.5	12.0	10.5	4.0	−2.2	−11.4	−19.3	−4.0
113	Tsagaannuur	−32.1	−27.4	−15.5	−2.0	7.0	12.6	15.6	12.4	5.5	−3.2	−17.4	−27.6	−6.0
114	Erdenebulgan	−25.3	−19.1	−6.5	3.3	11.0	15.6	17.5	14.5	7.8	0.9	−10.5	−20.8	−1.0
9101	Khankh	−21.1	−18.6	−11.9	−3.7	3.5	8.2	11.8	11.0	5.4	−0.5	−7.6	−13.0	−3.0

ARKHANGAI

No.	Sum	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ave.
115	Khangai	−22.3	−18.4	−11.5	−1.4	5.8	11.2	13.1	11.2	5.1	−1.6	−11.6	−18.3	−3.2
116	Tariat	−21.7	−19.4	−10.7	−2.1	5.4	10.3	12.4	10.8	4.9	−1.6	−10.6	−17.3	−3.3
117	Tsakhir	−20.6	−17.3	−12.8	−1.4	7.2	11.5	14.6	13.1	7.2	−2.1	−11.8	−19.0	−2.6
9111	Chuluut	−20.6	−17.3	−12.8	−1.4	7.2	11.5	14.6	13.1	7.2	−2.1	−11.8	−19.0	−2.6

ZAVKHAN

No.	Sum	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ave.
118	Shiluustei	−20.0	−16.8	−10.4	−1.2	7.5	13.6	15.6	13.4	6.0	−2.3	−11.1	−17.0	−1.9
119	Durvuljin	−22.9	−19.2	−6.1	4.2	12.3	17.4	19.4	17.4	10.7	2.8	−8.7	−17.5	0.8
120	Yaruu	−26.4	−22.5	−14.0	−2.3	7.3	11.7	13.3	11.6	5.0	−2.6	−14.8	−21.8	−4.6
121	Erdenekhairkhan	−19.0	−17.0	−10.9	2.0	9.6	14.9	16.6	14.8	8.1	1.2	−7.6	−13.1	0.0
122	Zavkhanmandal	−22.9	−18.8	−6.6	3.9	11.4	17.0	19.4	16.7	10.2	2.6	−9.5	−15.4	0.7
123	Urgamal	−24.6	−19.0	−5.8	5.2	13.3	19.1	21.2	18.2	11.6	3.7	−8.3	−18.0	1.4
124	Santmargats	−23.2	−20.4	−11.5	3.0	10.8	15.4	16.7	15.5	8.6	1.4	−12.3	−15.3	−0.9
125	Tsetsen-Uul	−25.1	−23.1	−14.4	−2.6	5.6	10.6	12.7	10.7	3.8	−2.9	−14.4	−20.7	−5.0
126	Ider	−22.9	−20.2	−12.4	−1.7	6.4	12.2	14.6	12.5	5.7	−0.9	−11.3	−19.5	−3.1
127	Ikh-Uul	−28.5	−23.6	−14.1	−1.2	8.4	12.7	15.0	14.7	8.3	0.6	−13.2	−23.1	−3.7
128	Tes	−28.8	−26.5	−16.3	−0.7	7.9	15.1	16.5	15.7	8.4	0.7	−13.5	−23.8	−3.8
129	Tsagaanchuluut	−18.1	−15.0	−9.9	−0.1	8.3	12.8	14.9	12.7	6.9	0.3	−7.8	−13.7	−0.7
130	Tsagaankhairkhan	−17.7	−14.3	−8.1	1.6	8.8	15.5	17.6	15.1	8.7	2.2	−9.9	−15.0	0.4
131	Telmen	−29.2	−24.9	−15.6	−2.9	8.3	13.7	15.8	12.5	6.5	−0.4	−13.7	−22.7	−4.4
132	Tudevtei	−28.2	−24.9	−14.2	−0.3	7.0	11.4	15.1	14.3	5.5	0.0	−13.5	−22.7	−4.2
133	Songino	−25.6	−20.4	−12.0	0.5	7.9	12.9	16.1	13.2	7.0	−0.5	−12.4	−21.0	−2.9
134	Otgon	−30.6	−28.6	−17.3	−2.5	6.6	12.3	14.8	12.7	8.1	−1.9	−15.3	−24.7	−5.5
135	Numrug	−27.7	−24.0	−15.0	−2.8	6.8	11.9	13.8	11.7	5.3	−1.1	−13.9	−21.7	−4.7
136	Asgat	−24.2	−20.7	−10.1	−2.4	9.7	14.0	15.6	14.6	7.4	1.0	−13.5	−18.0	−2.2
137	Bayankhairkhan	−23.6	−20.6	−12.9	−1.1	8.3	12.9	15.0	12.1	6.4	−1.0	−12.7	−18.9	−3.0
138	Tsontsengel	−30.4	−27.1	−15.7	−1.5	7.3	12.2	14.2	12.2	5.5	−2.0	−15.8	−25.2	−5.5
9121	Bayantes	−30.0	−27.7	−17.0	−0.7	8.6	13.7	16.1	13.4	6.3	−1.7	−15.8	−24.9	−5.0
9122	Aldarkhaan	−20.5	−16.5	−7.0	3.6	11.8	16.5	17.4	16.5	9.7	1.7	−11.2	−17.5	0.4

BULGAN

No.	Sum	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ave.
139	Teshig	−24.8	−19.9	−6.7	4.1	11.9	16.4	18.2	16.1	7.8	0.7	−11.6	−22.3	−0.8

UVS

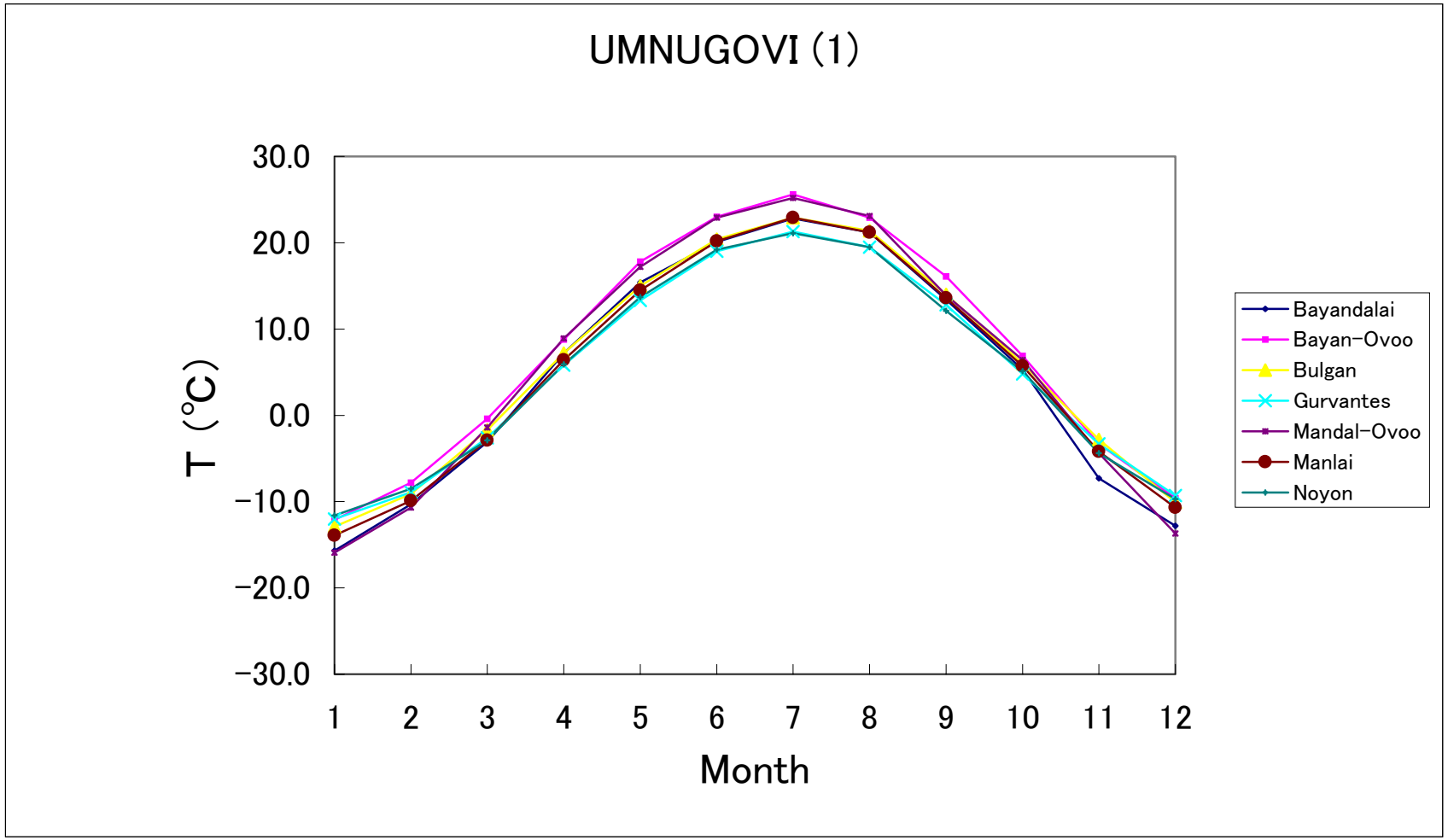
No.	Sum	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ave.
140	Undurkhangai	−19.8	−16.7	−9.4	−0.3	8.5	13.1	15.2	13.0	6.7	0.4	−11.0	−15.9	−1.4
141	Tsagaankhairkhan	−22.3	−18.6	−10.8	−1.0	8.2	13.3	14.6	13.7	6.7	0.8	−9.1	−17.8	−1.9
142	Zuunkhangai	−22.2	−18.5	−10.6	0.4	8.2	13.2	15.4	13.2	6.7	0.2	−11.7	−17.8	−2.0
143	Khyargas	−26.4	−23.3	−13.6	0.0	10.5	15.2	16.5	14.9	8.3	1.3	−10.7	−20.8	−2.3
144	Baruuntruun	−29.8	−26.9	−16.1	0.2	10.5	15.5	17.7	15.5	9.2	1.4	−11.7	−22.9	−3.1
145	Malchin	−28.8	−25.6	−16.2	−0.3	11.0	15.8	17.9	15.5	8.1	0.7	−11.6	−22.1	−3.0
146	Zuungovi	−33.2	−29.7	−17.6	1.2	12.9	18.3	20.0	17.8	10.5	2.1	−11.6	−24.5	−2.8
147	Bukhmurun	−20.5	−15.9	−5.3	3.5	11.0	15.8	17.6	15.5	9.7	1.7	−9.0	−16.6	0.6
148	Zavkhan	−25.1	−20.7	−6.5	4.7	13.4	19.1	21.5	18.6	11.7	3.3	−8.5	−19.1	1.0
149	Tes	−32.3	−29.8	−19.0	1.4	13.5	18.4	20.8	18.0	10.7	2.8	−11.2	−24.3	−2.6

KHOVD

No.	Sum	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ave.
151	Zereg	−22.3	−18.4	−3.6	7.0	14.9	19.4	21.1	19.4	13.4	5.3	−6.0	−16.1	2.8
152	Darvi	−22.0	−16.5	−5.8	4.3	13.1	19.1	19.6	18.3	12.7	5.1	−7.3	−16.7	2.0
153	Altai	−17.5	−12.7	−5.9	5.1	13.8	18.9	21.6	19.1	13.6	4.7	−6.4	−13.4	3.4
154	Uyench	−16.0	−15.0	−7.1	3.8	10.4	16.1	19.7	18.6	13.1	4.0	−5.2	−9.5	2.7
155	Bulgan	−20.1	−16.9	−4.0	7.2	14.5	19.5	21.1	18.8	12.8	4.7	−6.3	−13.0	3.2
156	Tsetseg	−20.6	−15.4	−5.1	3.4	11.6	15.5	18.2	16.0	11.0	2.8	−9.8	−17.3	0.9
157	Must	−18.0	−13.1	−5.2	2.6	10.3	14.4	17.0	15.0	9.2	1.4	−7.7	−14.8	0.9
158	Munkhkhairkhan	−14.7	−12.3	−6.8	0.3	8.0	12.9	15.0	13.1	8.3	0.8	−6.2	−11.2	0.6
159	Mankhan	−21.4	−15.7	−4.4	6.4	14.7	19.1	20.7	18.5	12.3	4.5	−8.0	−15.5	2.6
160	Chandmani	−19.2	−15.3	−5.8	4.1	12.3	16.6	18.0	15.8	10.1	1.8	−8.1	−13.7	1.4
163	Durgun	−23.0	−18.2	−6.2	5.4	13.9	19.6	21.5	19.7	12.8	4.8	−4.9	−16.1	2.4
9151	Duut	−16.5	−14.9	−9.6	−0.9	7.1	11.7	13.8	12.0	5.4	−2.1	−9.0	−13.5	−1.4
9152	Erdeneburen	−23.0	−19.1	−7.5	5.2	13.4	18.0	17.1	16.3	12.3	4.0	−9.2	−19.0	0.7

BAYAN-ULGII

No.	Sum	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ave.
164	Tolbo	−17.6	−14.6	−6.9	1.1	8.3	13.0	16.2	13.1	8.2	−0.5	−9.3	−13.7	−0.2
165	Tsagaannuur	−21.7	−16.8	−8.6	−1.6	8.0	12.1	14.4	10.5	8.3	−0.9	−12.1	−15.9	−2.0
166	Bulgan	−22.3	−19.3	−9.3	1.0	8.6	13.4	15.1	13.4	8.0	0.2	−11.4	−18.1	−1.7
167	Deluun	−20.9	−17.2	−8.8	−0.9	6.5	10.4	14.0	11.7	6.4	−1.2	−9.7	−17.0	−2.2
168	Altai	−20.7	−17.8	−10.4	−1.7	5.6	11.0	12.7	10.6	5.4	−2.6	−12.2	−16.2	−3.0
169	Buyant	−16.7	−13.3	−6.6	1.5	7.6	14.2	15.3	13.4	8.5	0.3	−7.6	−13.7	0.2
170	Bayannuur	−23.3	−15.7	−7.5	5.0	14.6	17.9	19.7	17.4	11.7	2.8	−9.2	−15.5	1.5
171	Altantsugts	−17.8	−14.6	−2.9	3.1	12.1	14.4	14.6	13.7	11.2	3.8	−8.5	−11.5	1.5
9161	Nogoonuur	−21.2	−15.0	−5.5	3.2	11.0	15.7	17.8	15.3	9.3	1.7	−9.4	−16.2	0.6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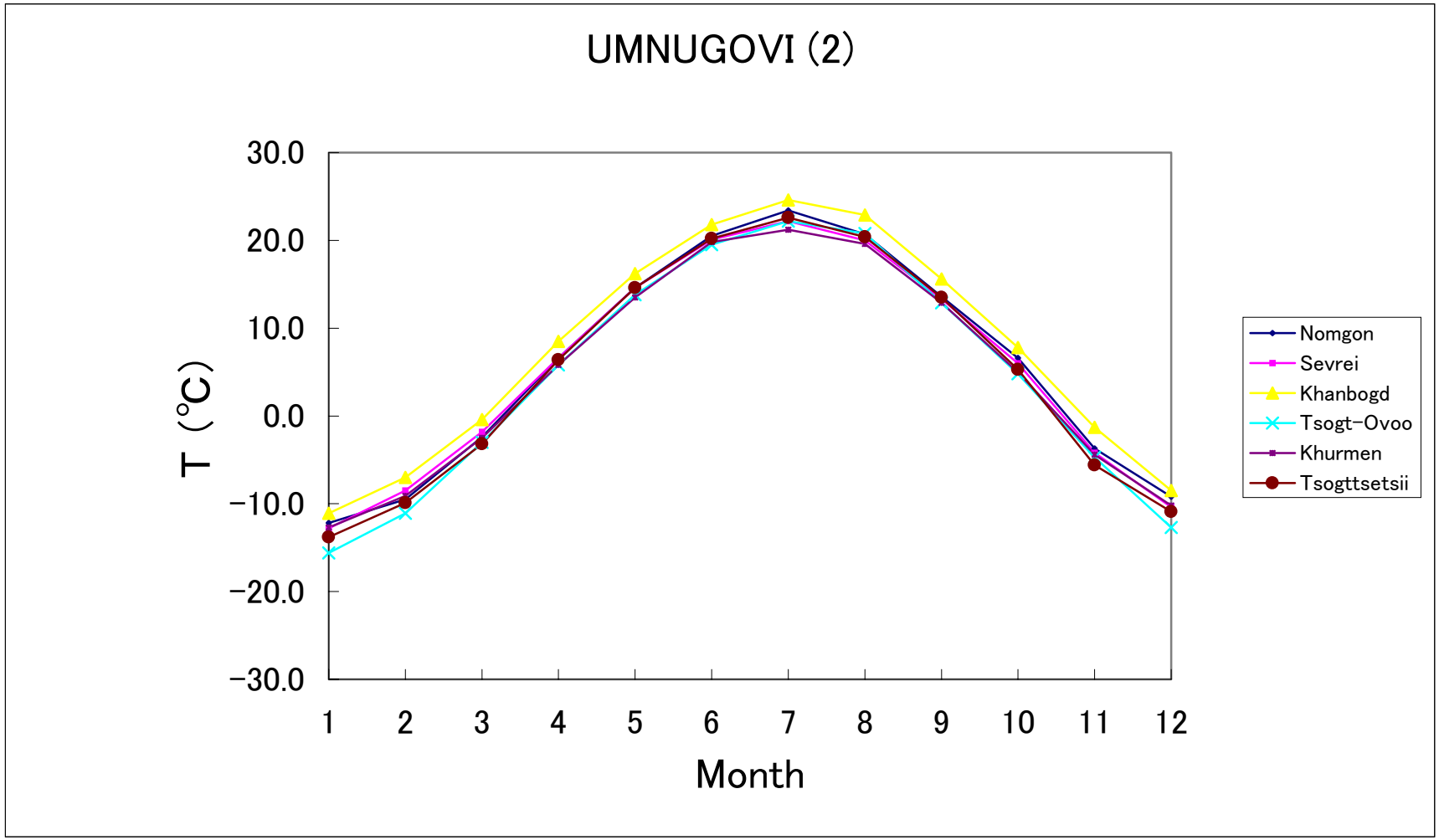
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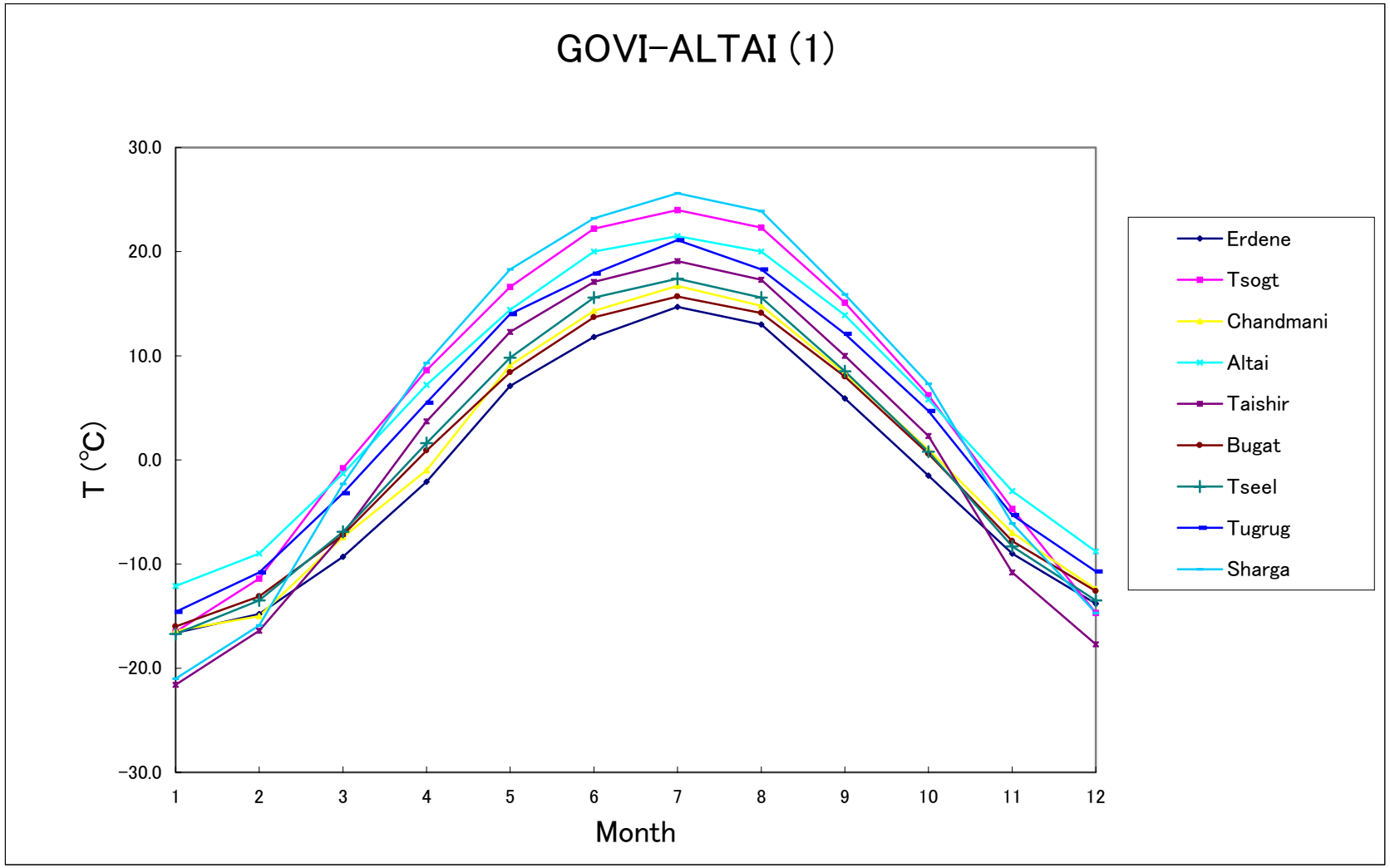
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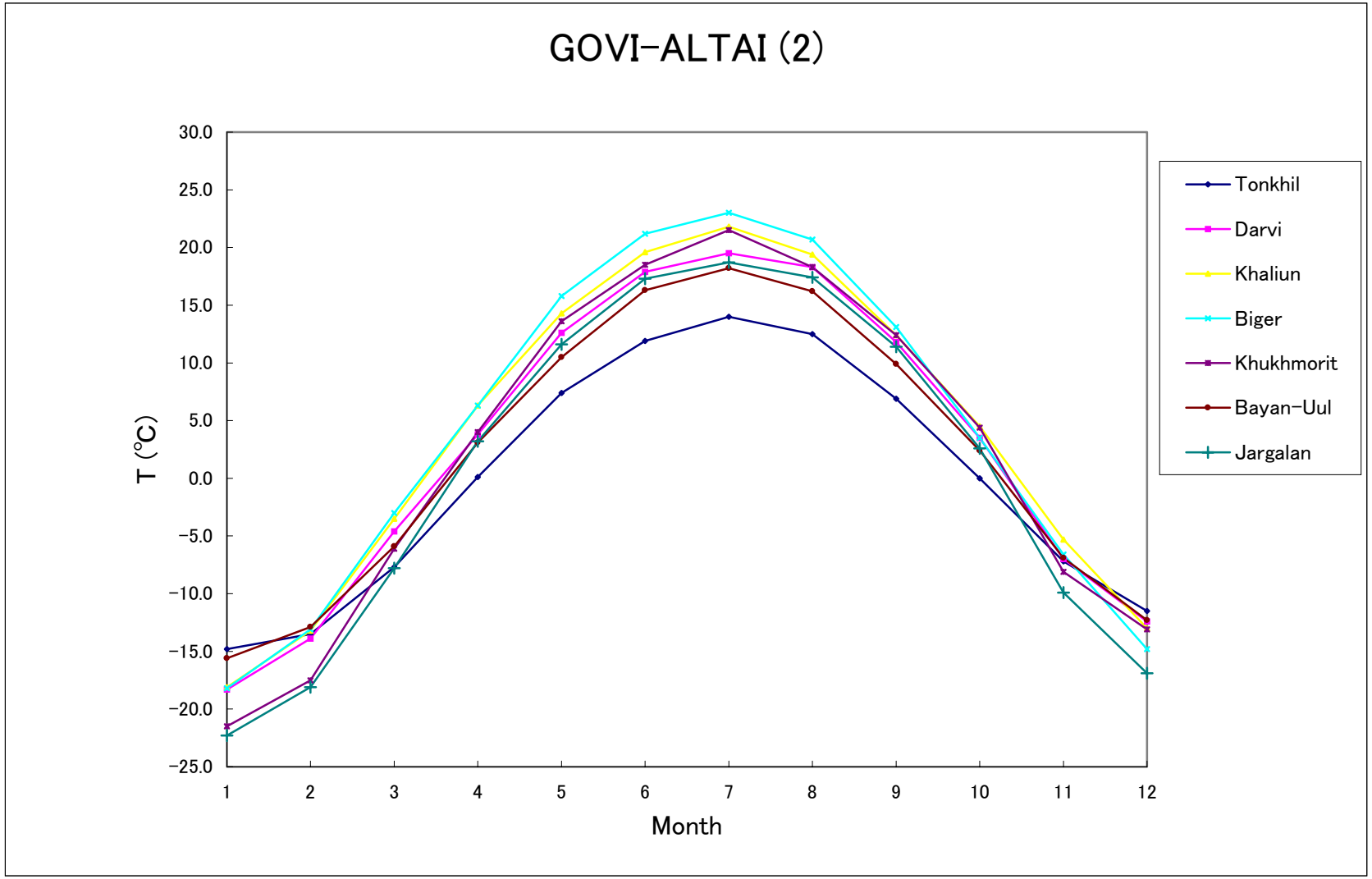
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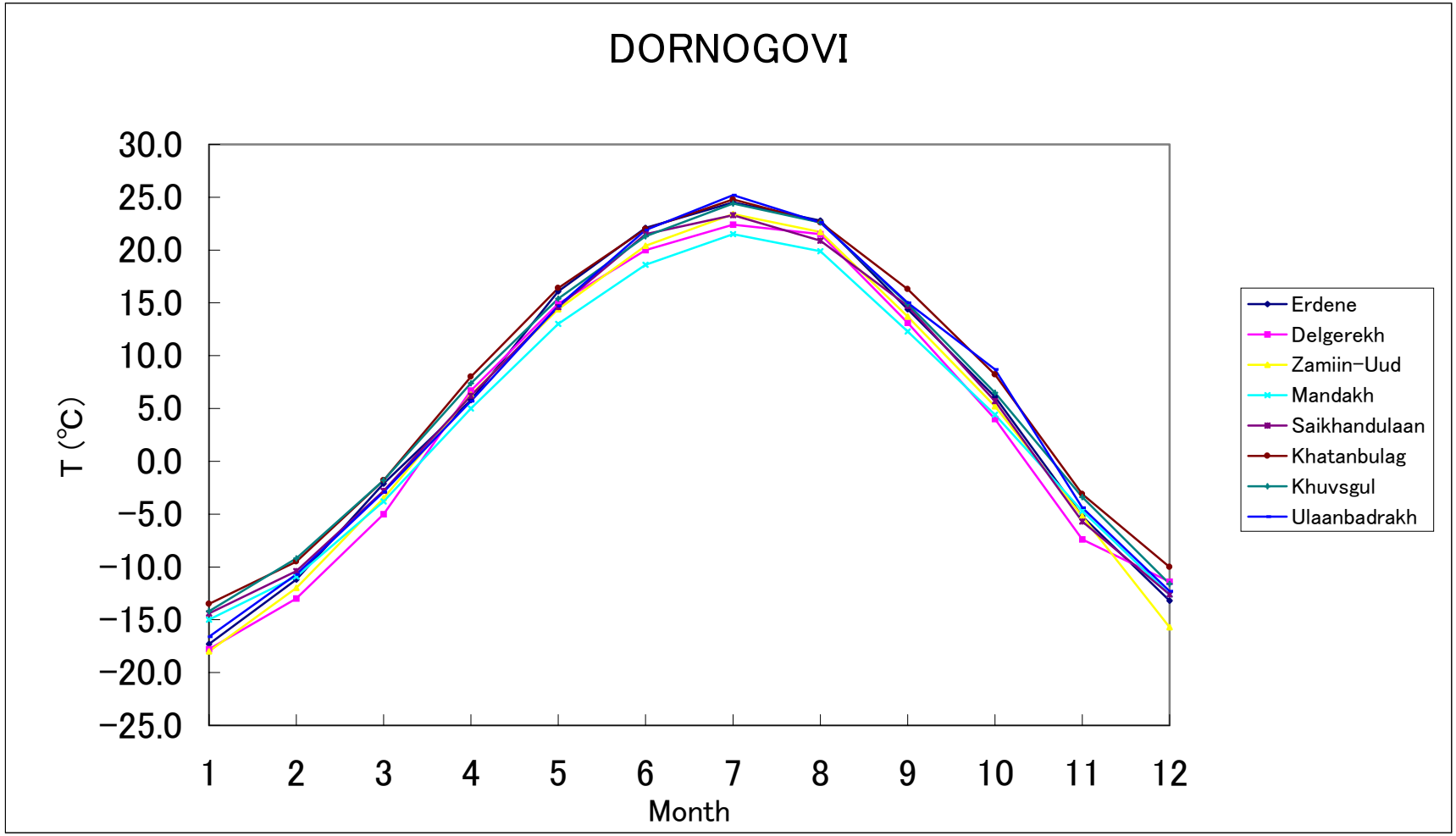
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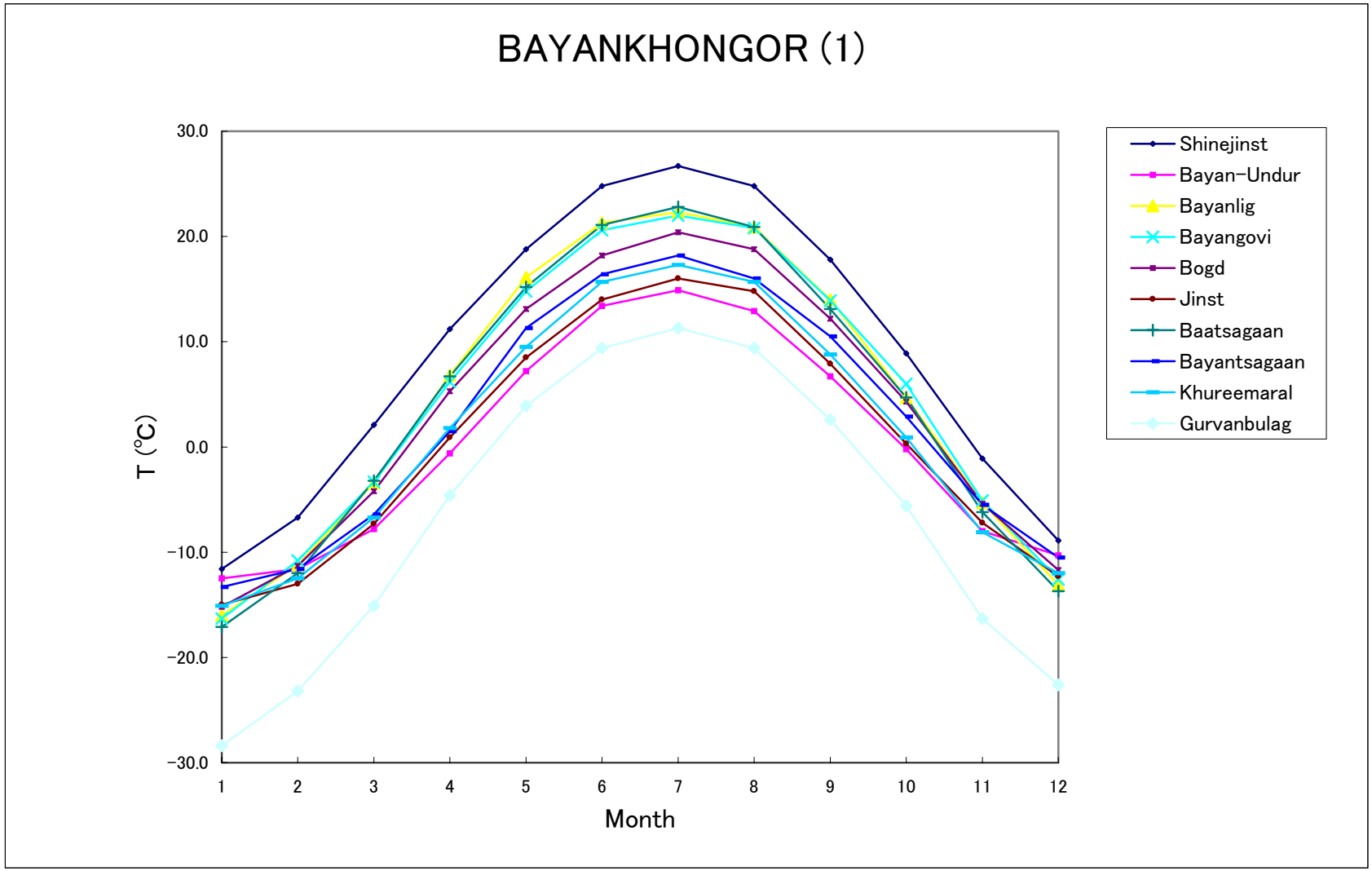
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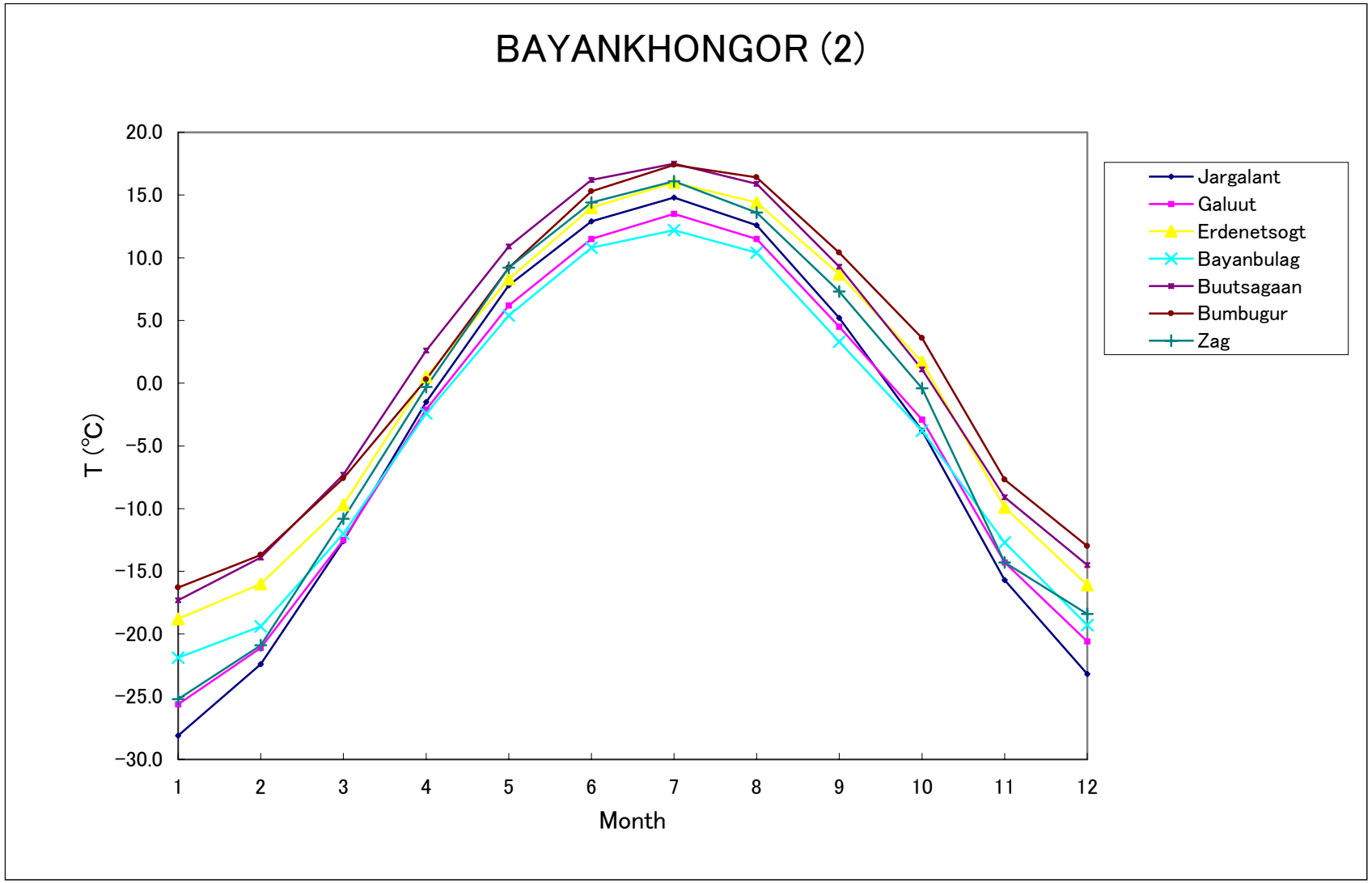
Gurvanbulag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Galuut
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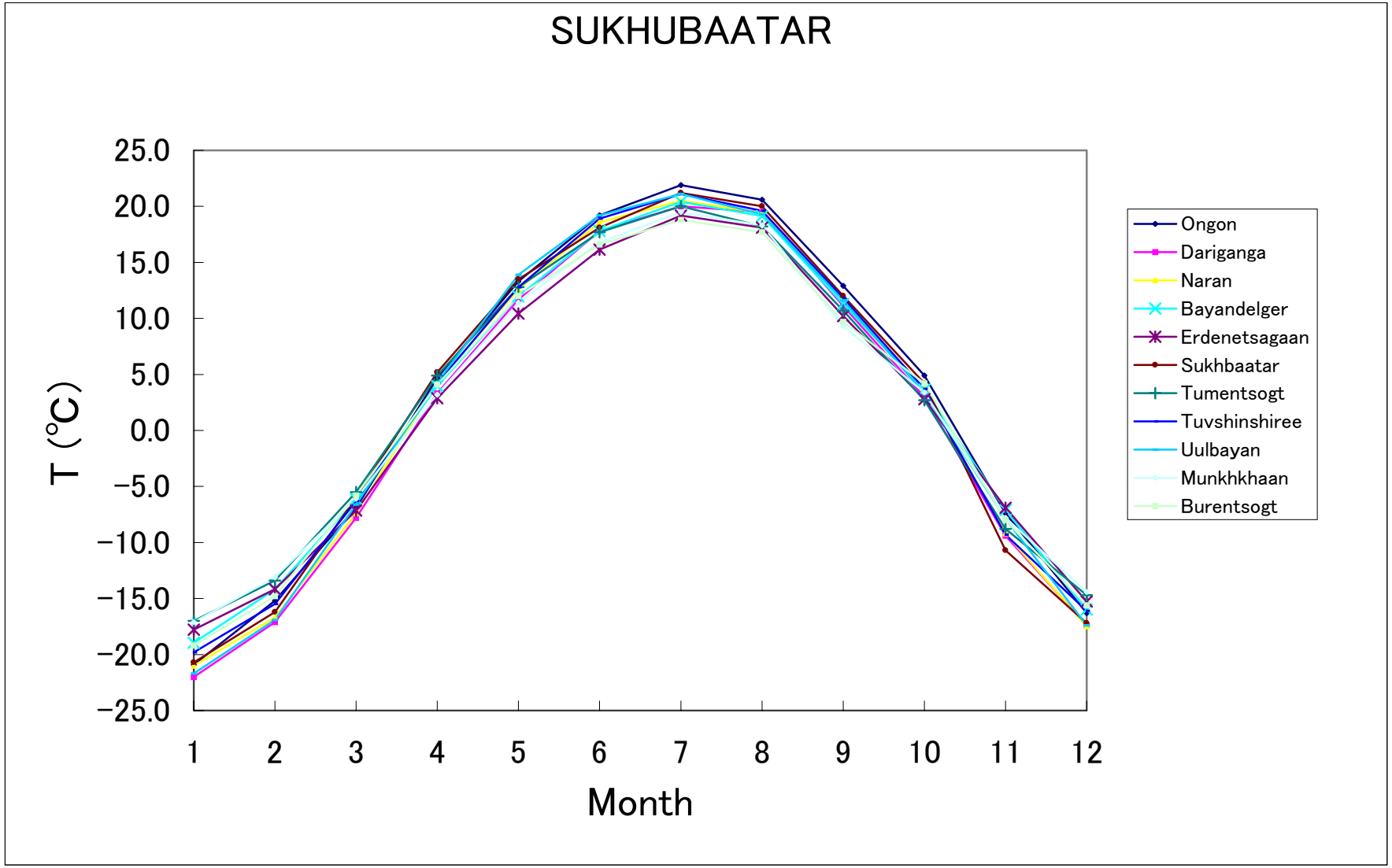
Bumbugur
Zag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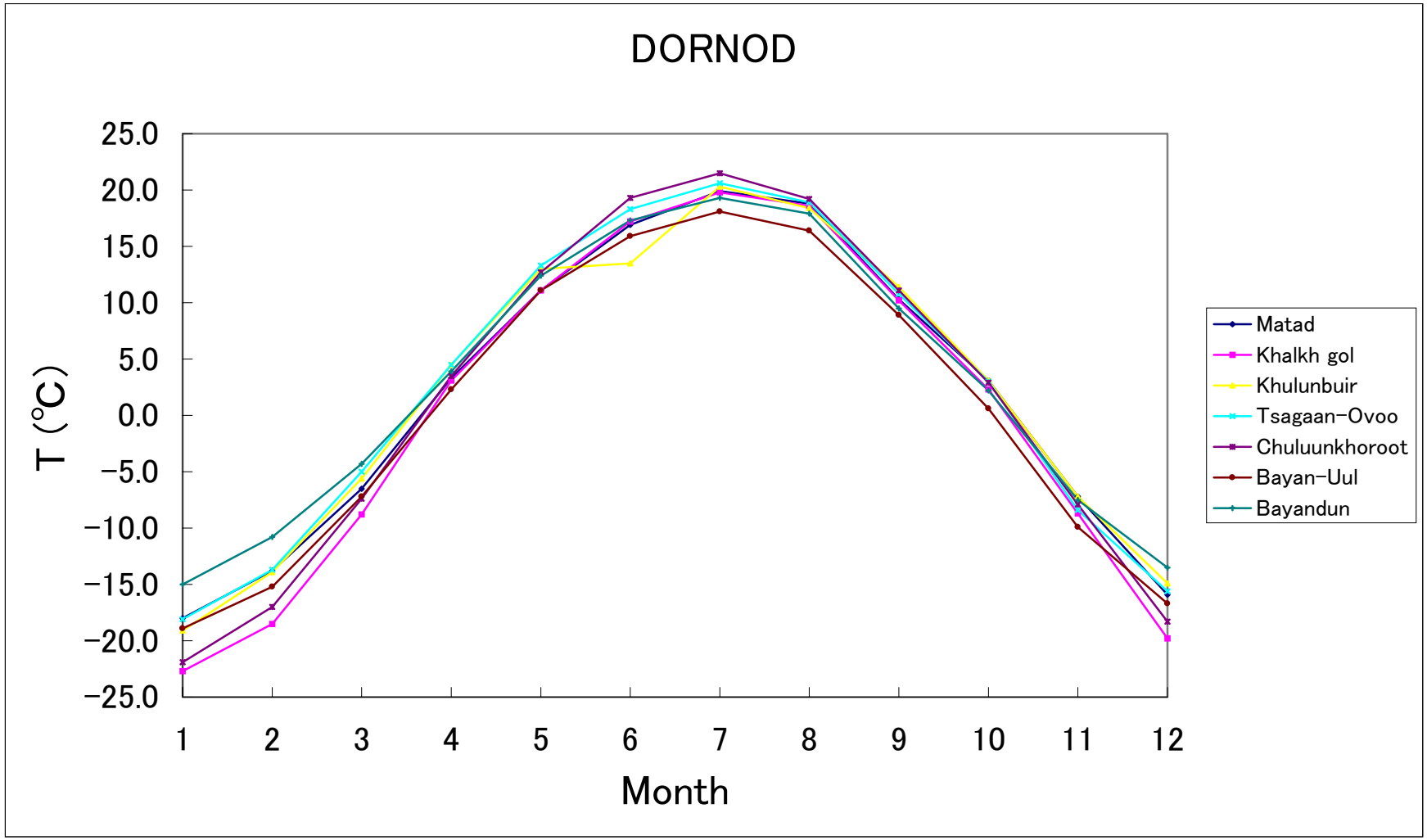
Sukhbaatar
Tumentsogt
Tuvshinshiree
Uulbayan
Munkhkhaan
Burentsogt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−10.0
−15.0
−20.0
−25.0
T (°C)
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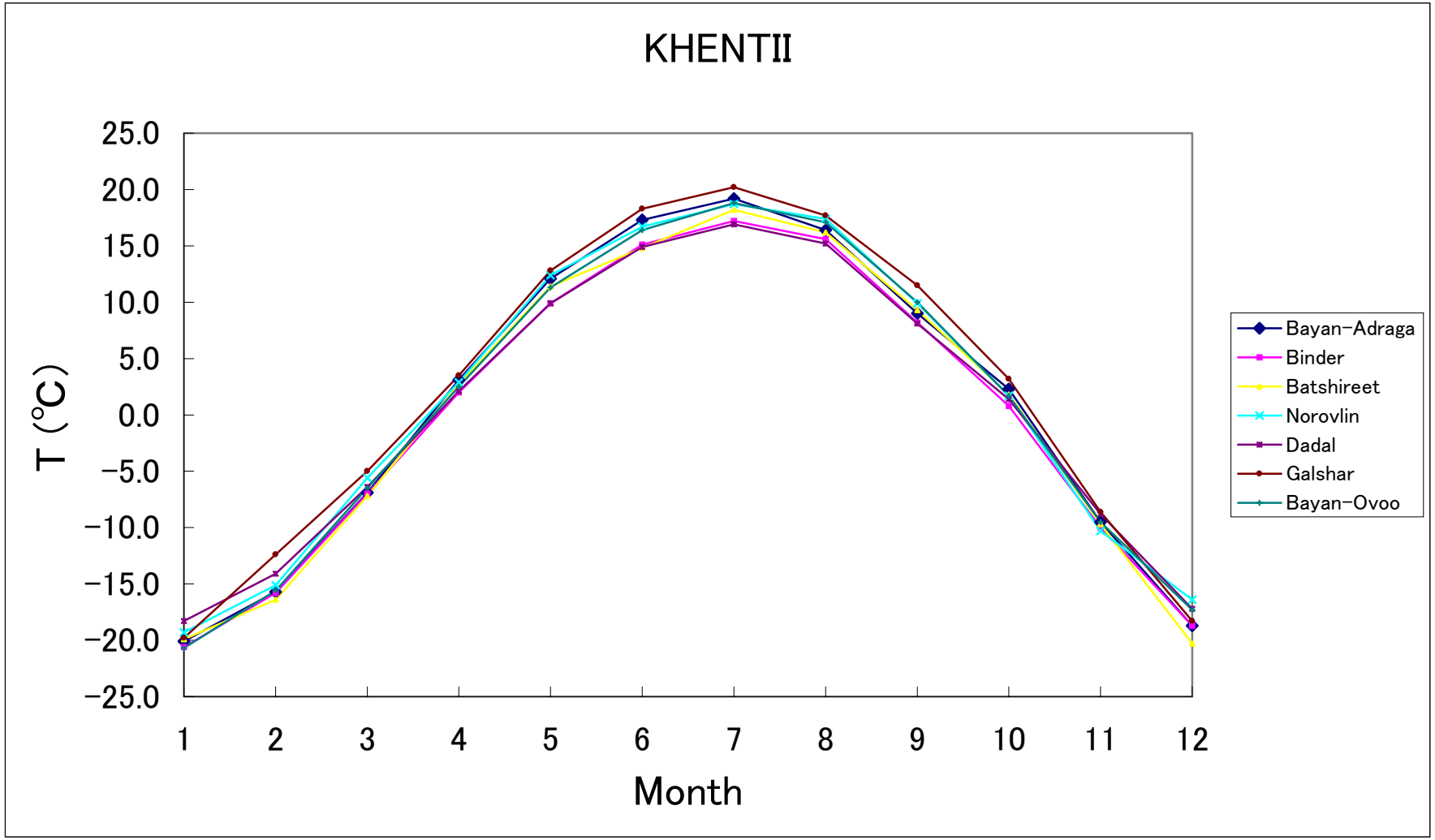
12
Month
Matad
Khalkh gol
Khulunbuir
Tsagaan-Ovoo
Chuluunkhoroot
Bayan-Uul
Bayandun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T (°C)
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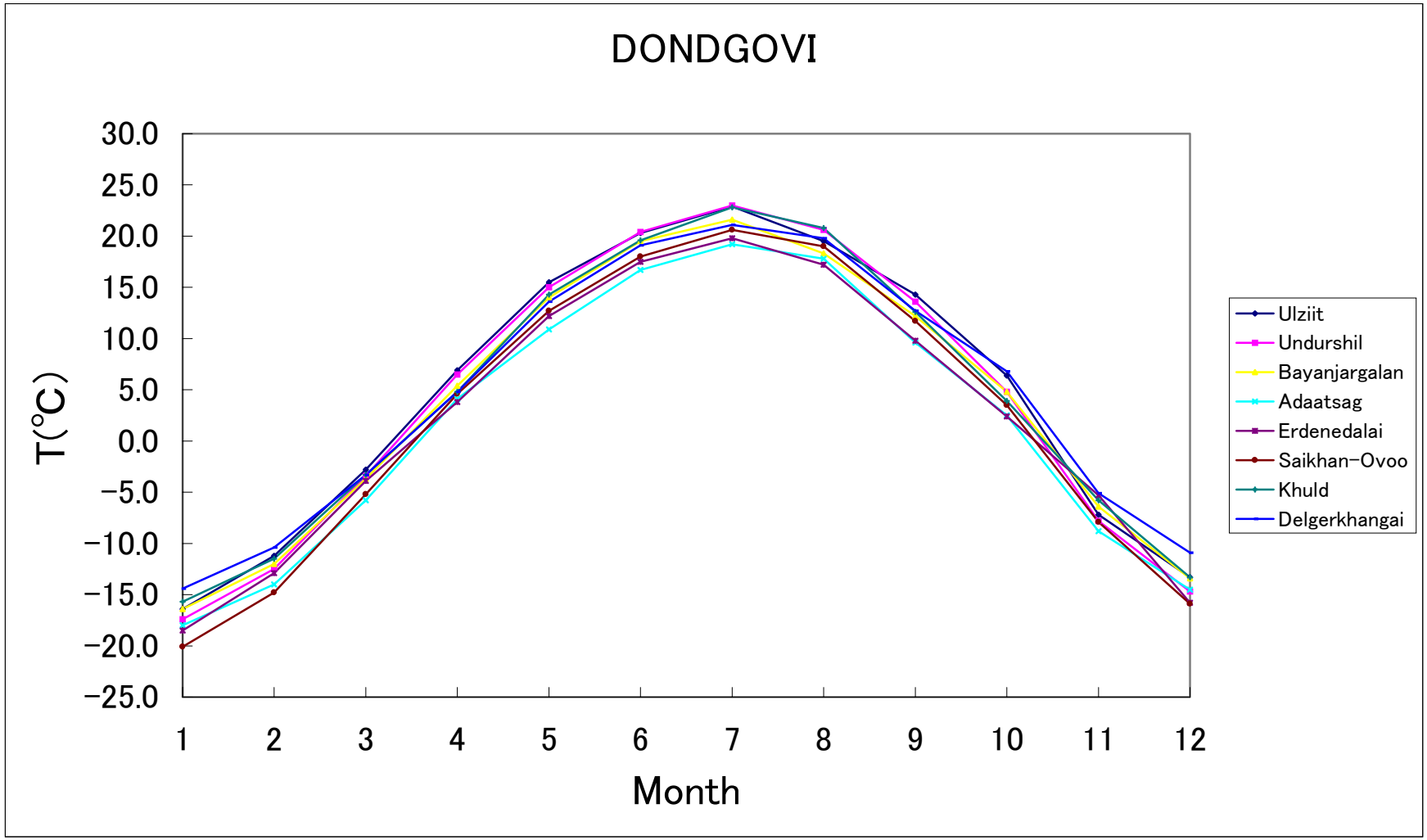
Month
Bayan-Adraga
Binder
Batshireet
Norovlin
Dadal
Galshar
Bayan-Ovoo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10.0
5.0
0.0
−5.0
−10.0
−15.0
−20.0
−25.0
T(°C)
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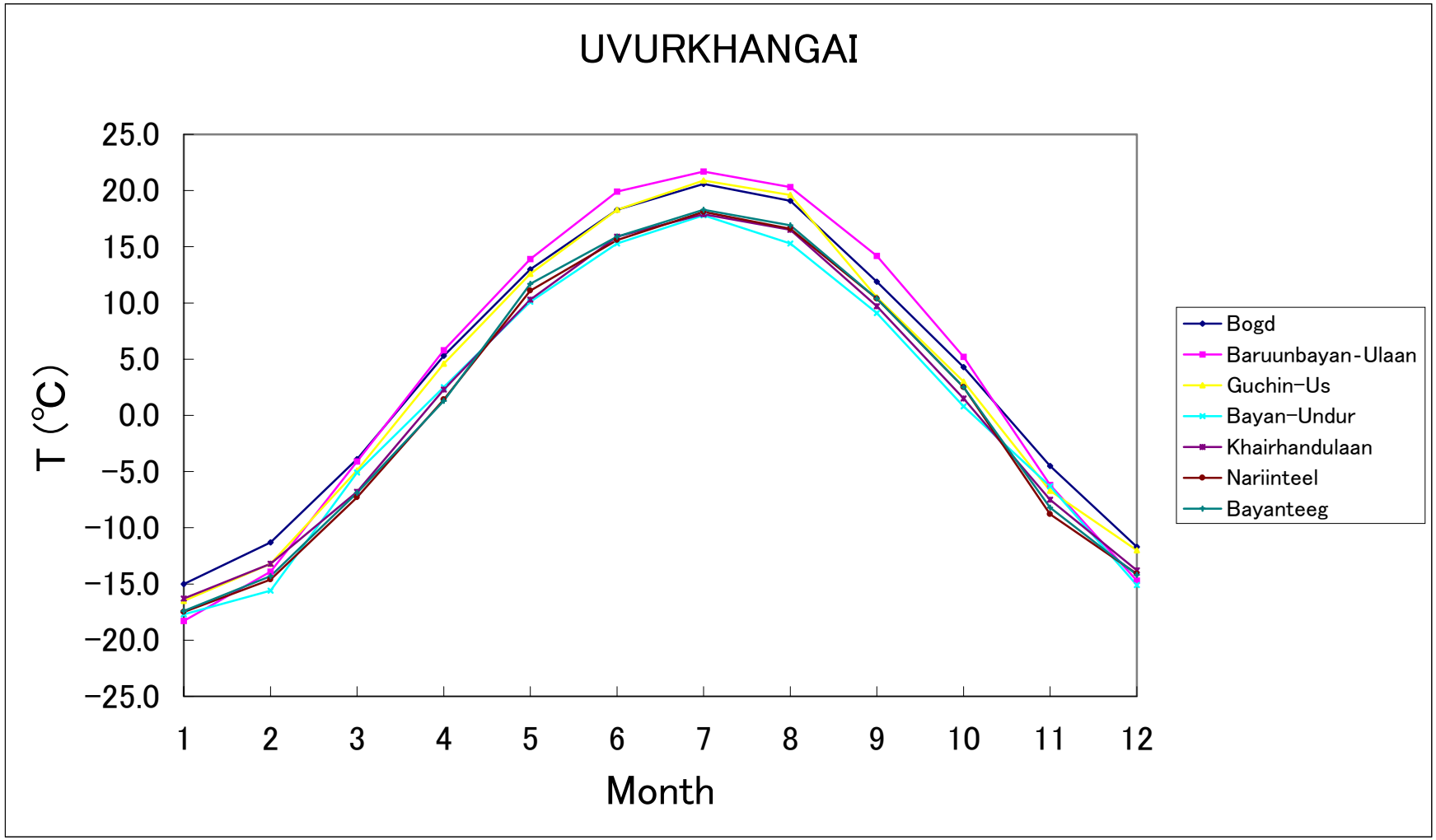
Month
Ulziit
Undurshil
Bayanjargalan
Adaatsag
Erdenedalai
Saikhan−Ovoo
Khuld
Delgerkhangai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−10.0
−15.0
−20.0
−25.0
T (°C)
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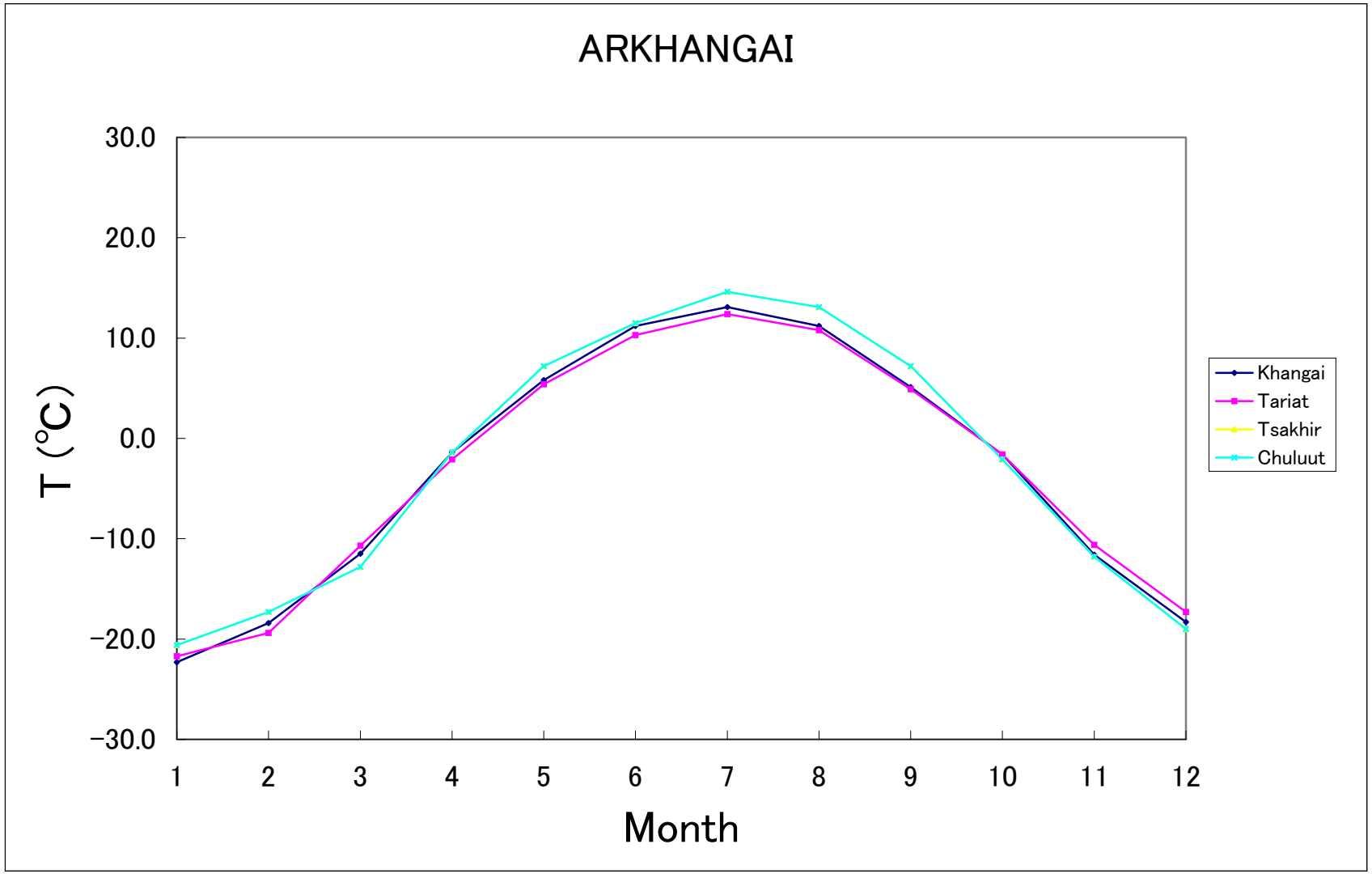
12
Month
Bogd
Baruunbayan-Ulaan
Guchin-Us
Bayan-Undur
Khairhandulaan
Nariinteel
Bayanteeg


ARKHANGAI
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−30.0
T (°C)
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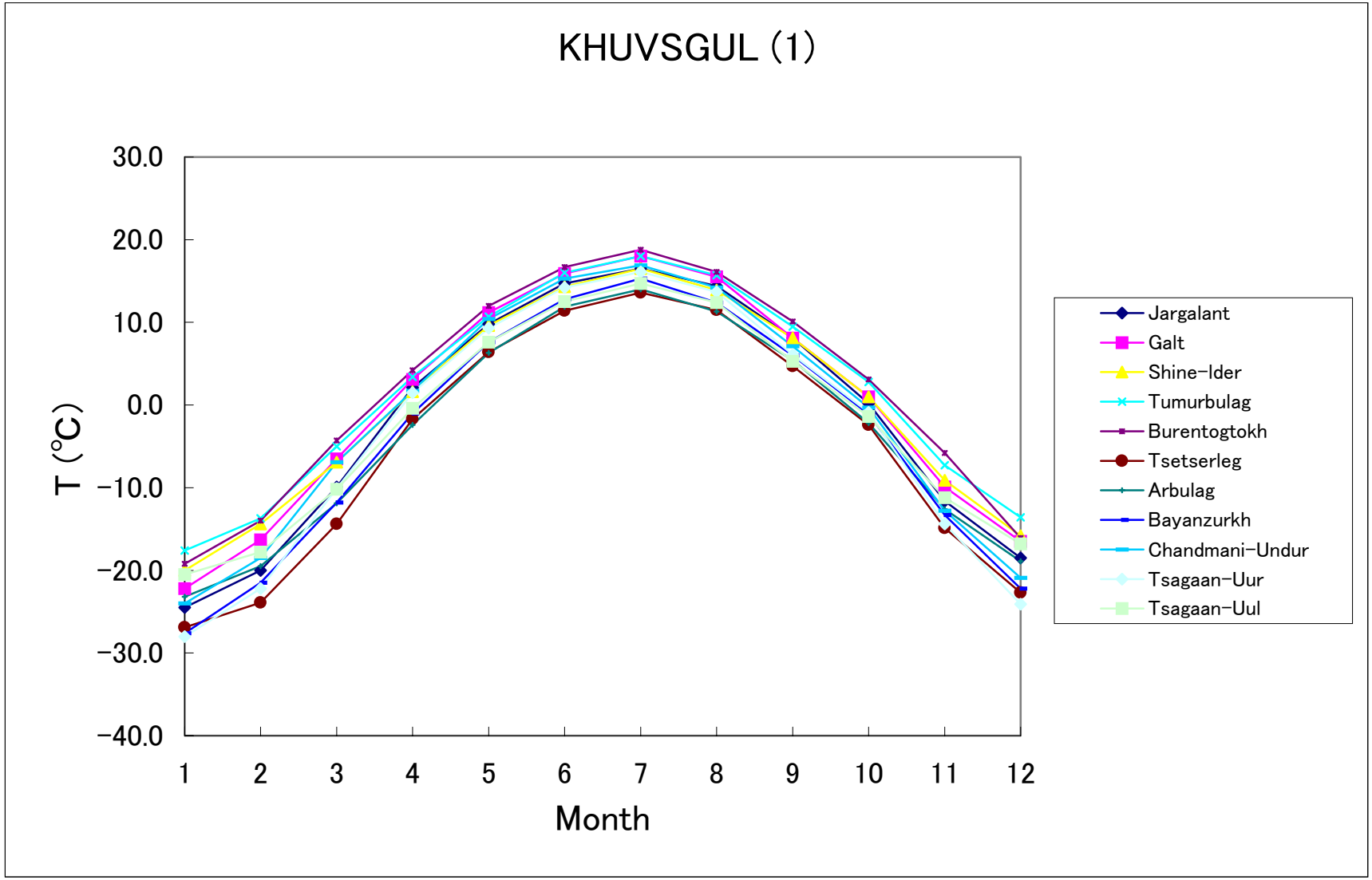
11
12
Month
Khangai
Tariat
Tsakhir
Chuluut


KHUVSGUL (1)
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−40.0
T (℃)
1
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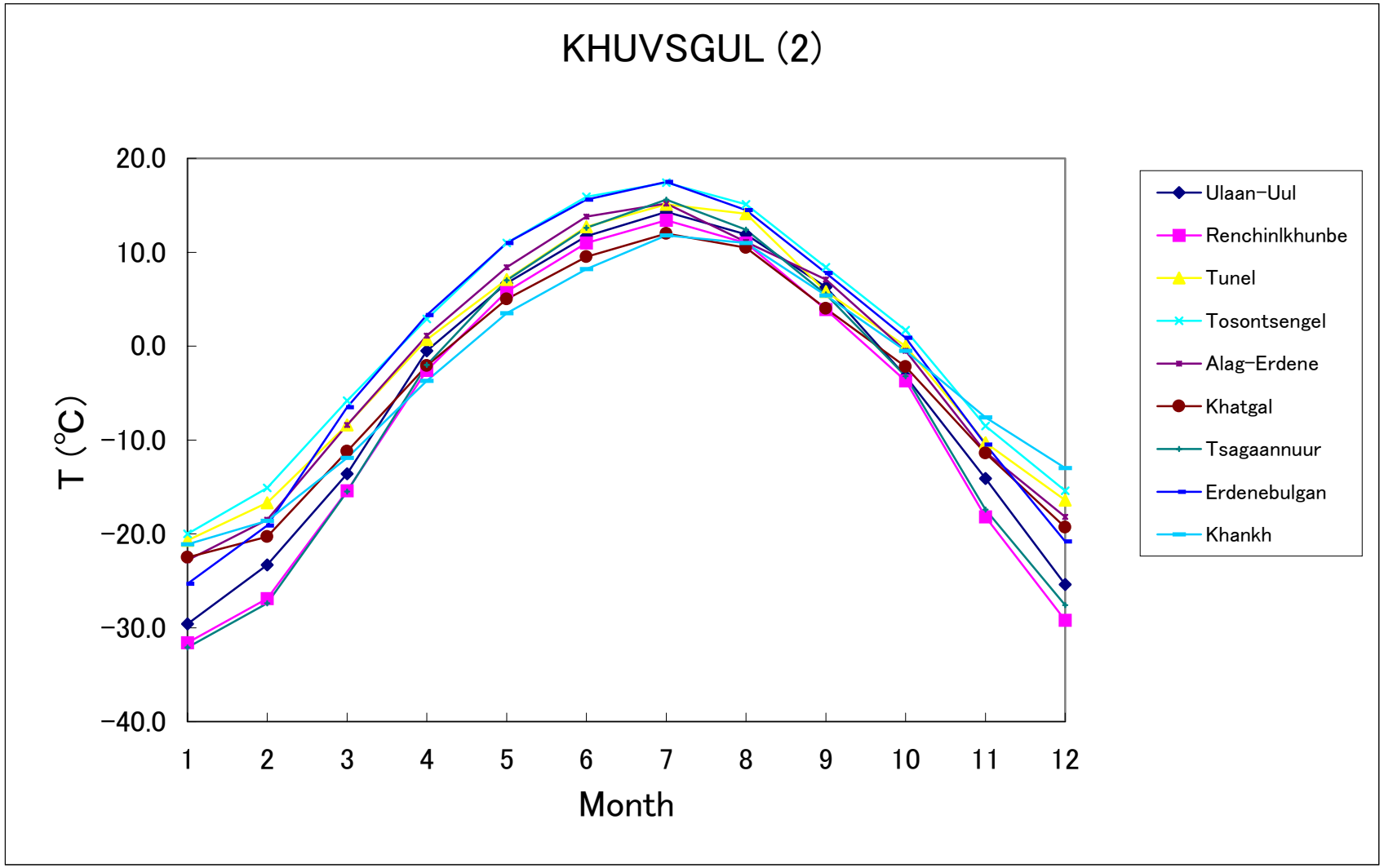
12
Month
Jargalant
Galt
Shine-Ider
Tumurbulag
Burentogtokh
Tsetserleg
Arbulag
Bayanzurkh
Chandmani-Undur
Tsagaan-Uur
Tsagaan-Uul


KHUVSGUL (2)
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T (°C)
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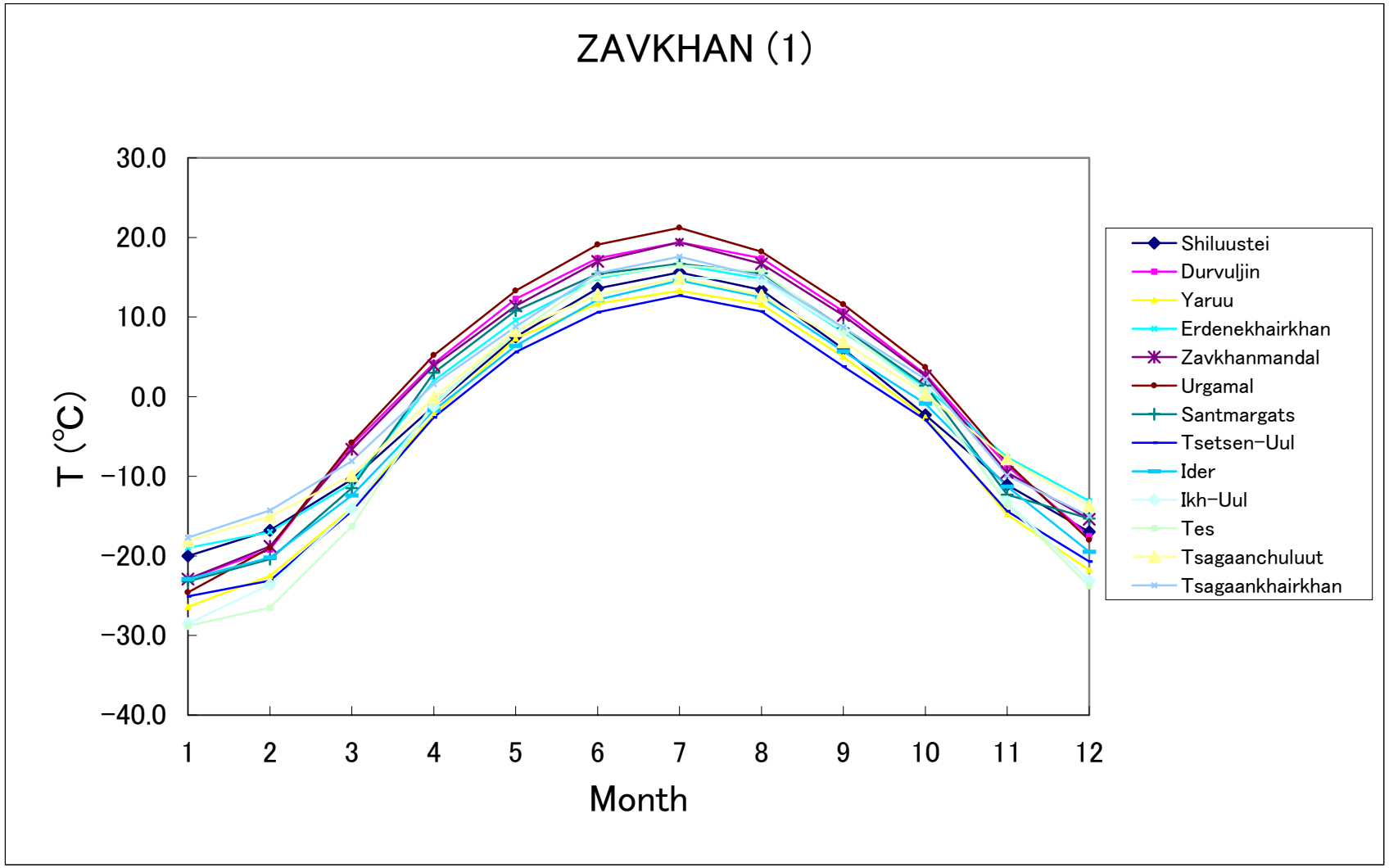
12
Month
Ulaan-Uul
Renchinlkhunbe
Tunel
Tosontsengel
Alag-Erdene
Khatgal
Tsagaannuur
Erdenebulgan
Khankh


ZAVKHAN (1)
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-10.0
-20.0
-30.0
-40.0
T (°C)
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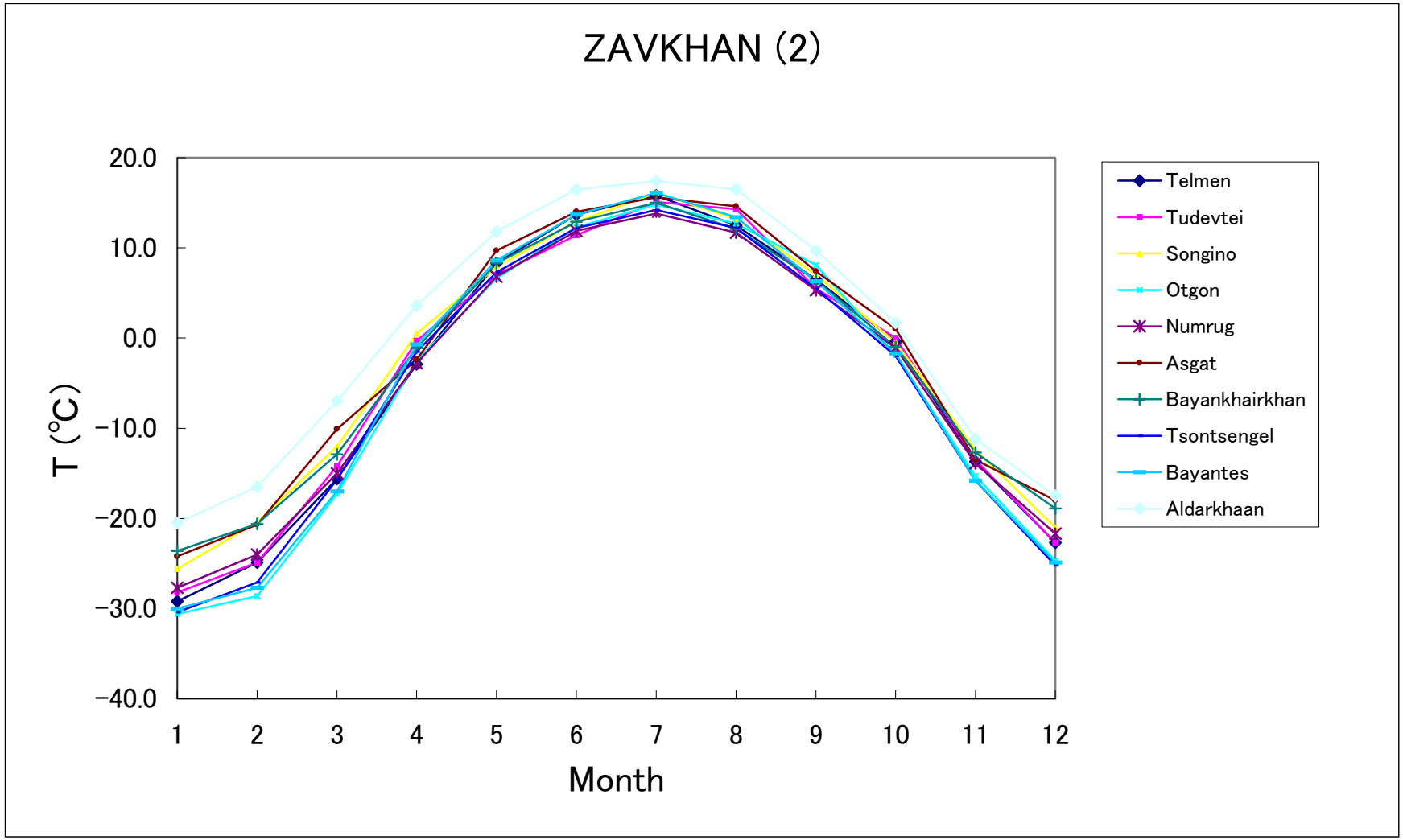
11
12
Month
Shiluustei
Durvuljin
Yaruu
Erdenekhairkhan
Zavkhanmandal
Urgamal
Santmargats
Tsetsen-Uul
Ider
Ikh-Uul
Tes
Tsagaanchuluut
Tsagaankhairkhan


ZAVKHAN (2)
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10.0
0.0
−10.0
−20.0
−30.0
−40.0
T (°C)
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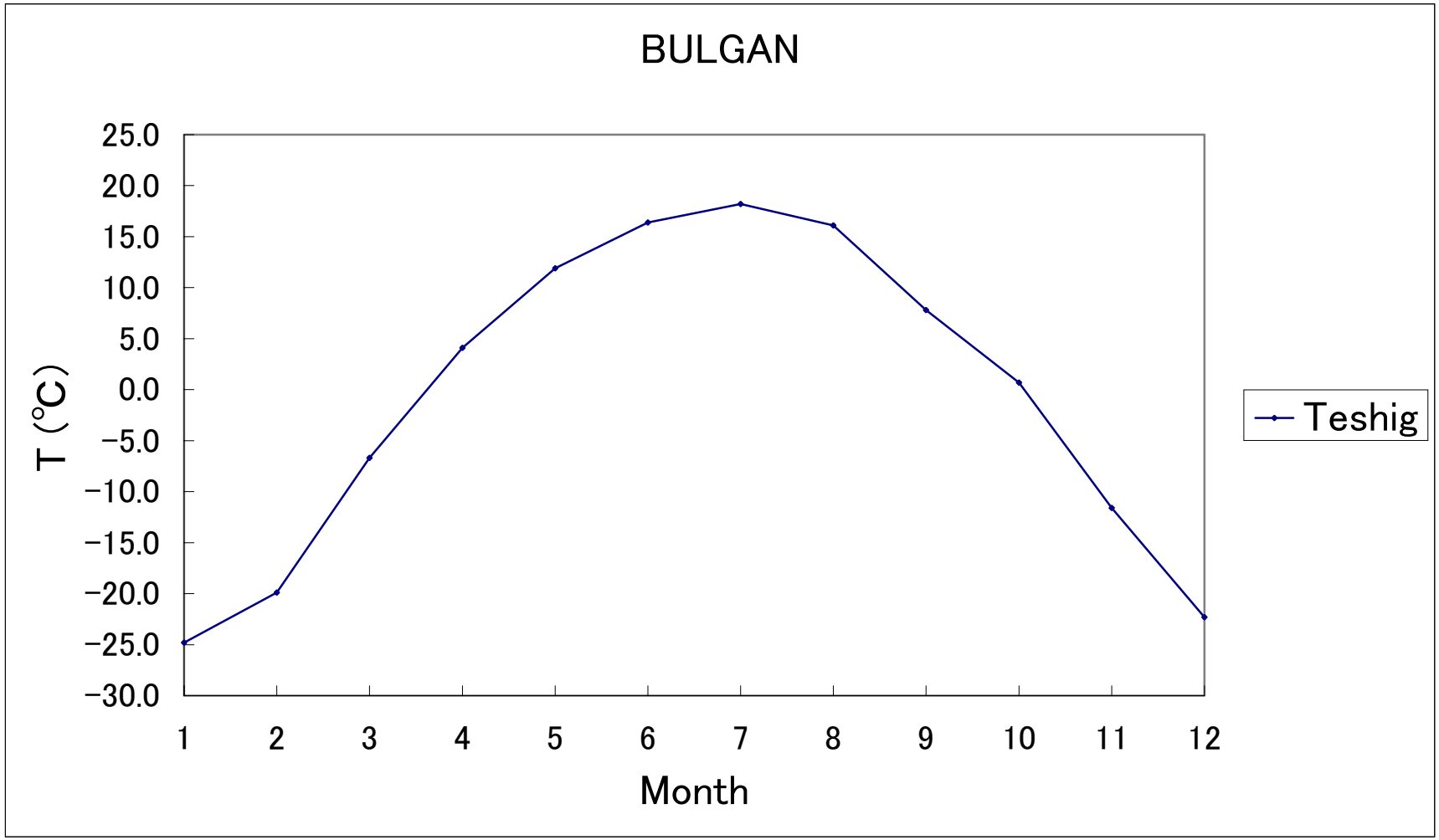
12
Month
Telmen
Tudevtei
Songino
Otgon
Numrug
Asgat
Bayankhairkhan
Tsontsengel
Bayantes
Aldarkhaan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15.0
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−5.0
−10.0
−15.0
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−25.0
−30.0
T (℃)
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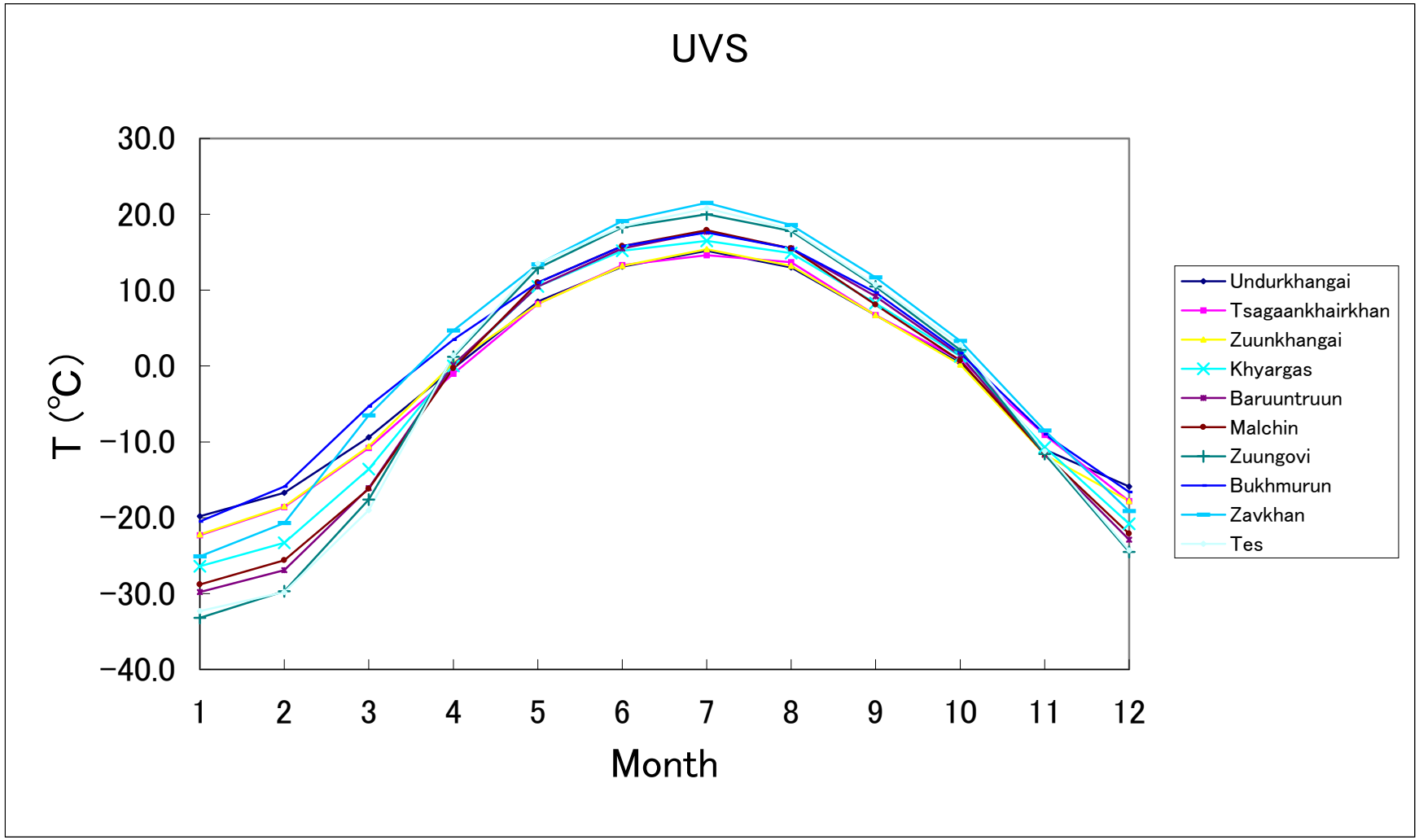
12
Month
Teshig


UVS
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10.0
0.0
−10.0
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−30.0
−40.0
T (°C)
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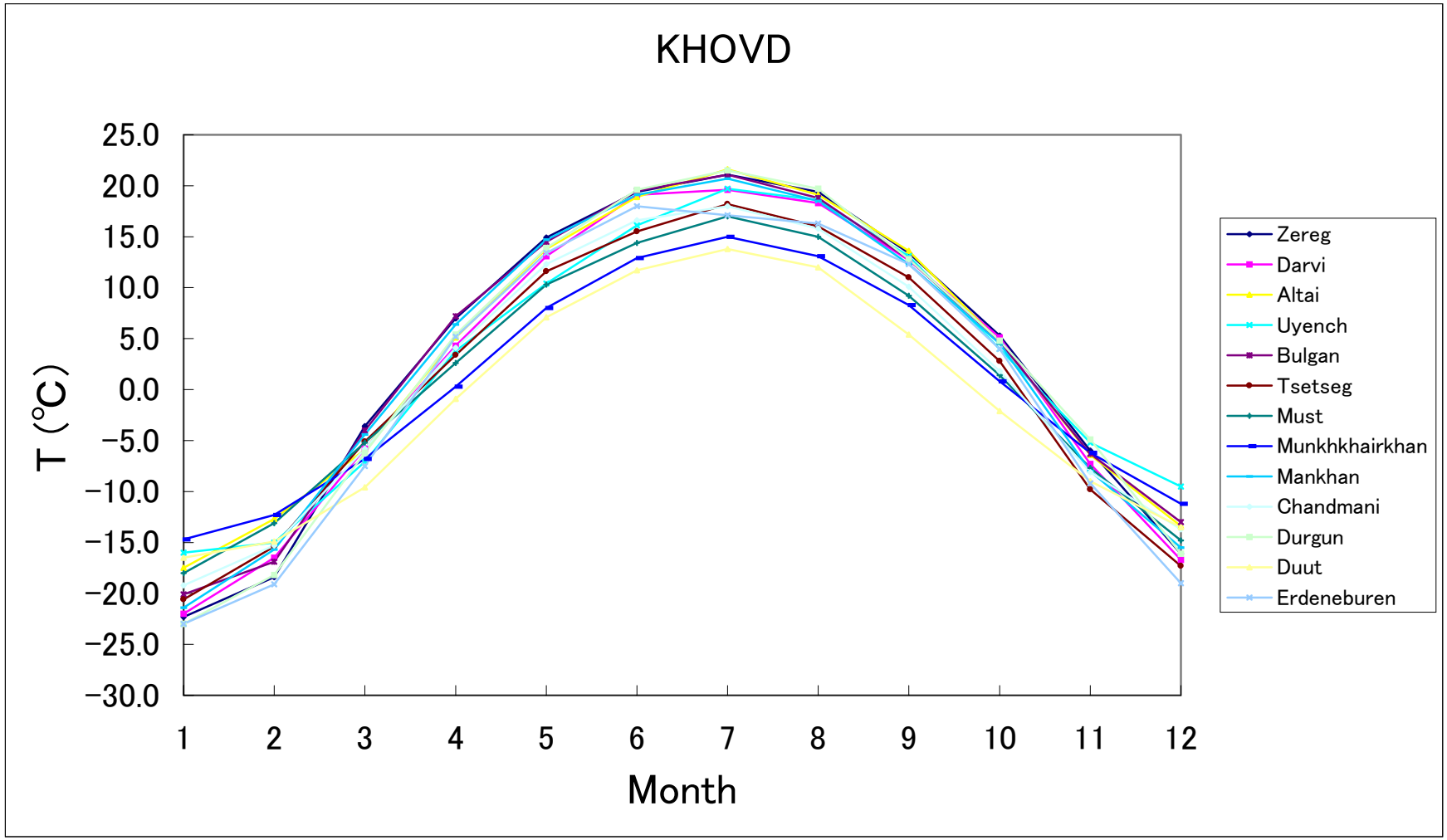
12
Month
Undurkhangai
Tsagaankhairkhan
Zuunkhangai
Khyargas
Baruuntruun
Malchin
Zuungovi
Bukhmurun
Zavkhan
Tes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5.0
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−5.0
−10.0
−15.0
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−25.0
−30.0
T (°C)
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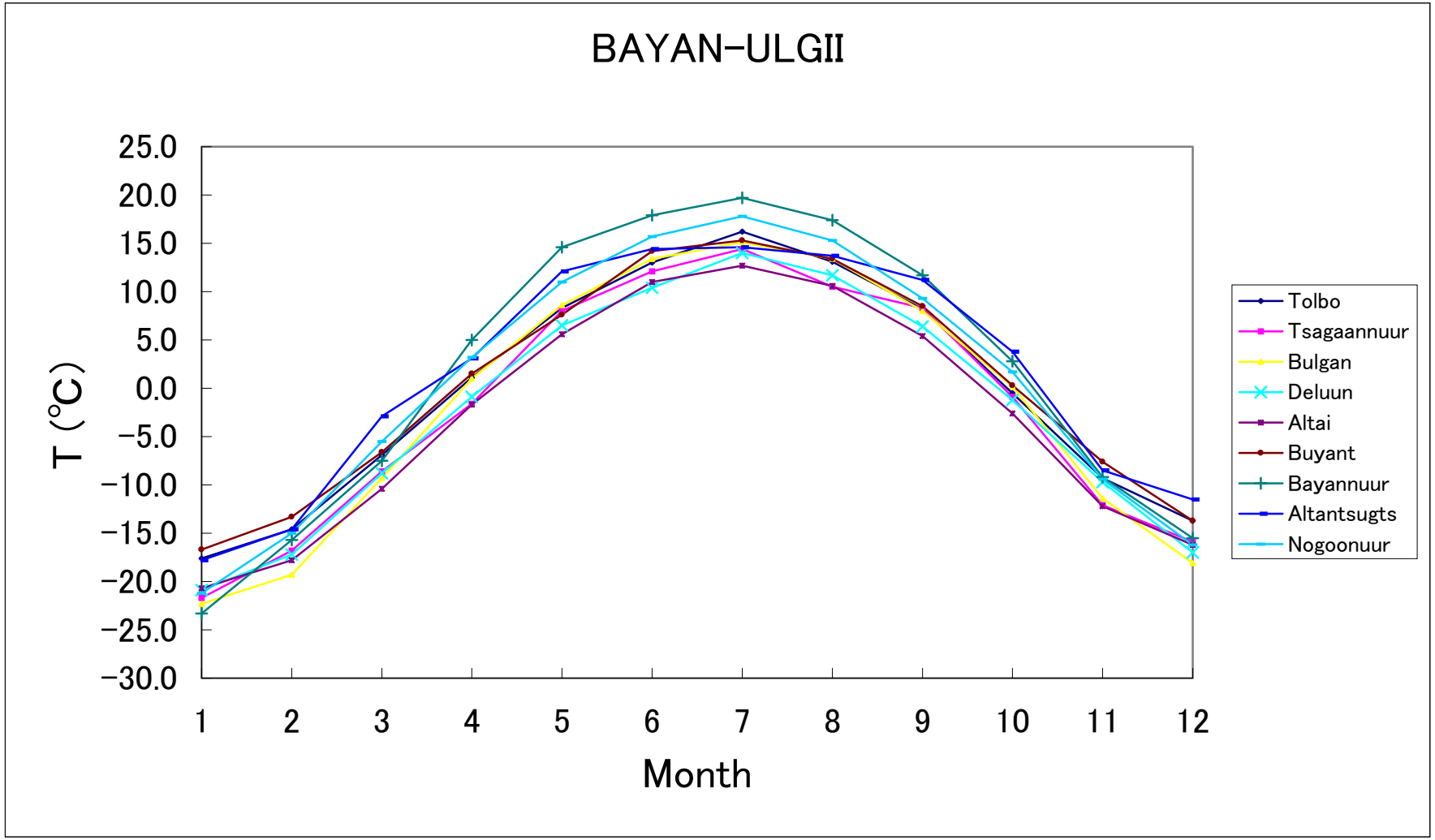
12
Month
Zereg
Darvi
Altai
Uyench
Bulgan
Tsetseg
Must
Munkhkhairkhan
Mankhan
Chandmani
Durgun
Duut
Erdeneburen


BAYAN-ULGII
25.0
20.0
15.0
10.0
5.0
0.0
−5.0
−10.0
−15.0
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T (°C)
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Month
Tolbo
Tsagaannuur
Bulgan
Deluun
Altai
Buyant
Bayannuur
Altantsugts
Nogoonuur

3.3 Monthly Precipitation（1988－1997）

UMNUGOVI														
ID No.	SUM	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
1	Bayandalai	1.83	2.98	3.6	2.7	9.37	19.93	43.4	26.45	8.72	5.25	2.17	0.66	127.06
2	Bayan-Ovoo	0.48	0.73	1.18	0.12	1.74	11.98	21.41	40.9	3.12	0.97	0.62	0	83.25
3	Bulgan	2.4	1.3	7.3	6.8	11.6	21.6	31.1	28.4	9.8	5.8	3.5	1.7	131.1
4	Gurvantes	0.3	1.4	4.9	5.7	7	11.5	19.1	33.4	9.6	5.2	1.4	0.6	99.9
5	Mandal-Ovoo	0.5	0.65	0.7	1.14	6.28	18.02	24.82	12.22	---	4.1	3.4	1.56	73.39
6	Manlai	2.97	2.54	3.97	1.76	2.91	20.71	32.67	29.9	6.97	4.53	1.74	0.5	111.17
7	Noyon	0.29	0.41	1.97	3.08	9.43	6.12	35.47	26.62	9.74	3.25	1.2	0.16	97.74
8	Nomgon	0	0	1.57	0.75	3.7	14.88	34.37	29.23	10.3	5.32	1.43	0	101.55
9	Sevrei	0.88	1.17	5.43	3.95	5.5	5.87	19.81	22.58	5.72	2.16	2.36	1.49	76.92
10	Khanbogd	1.4	0.9	5.4	1.9	5.2	14.2	23.1	23.6	5.5	2.6	2.5	0.5	86.7
11	Tsogt-Ovoo	1	1	1	3	8	17	23	21	8	3	1	1	88
12	Khurmen	0.92	0.61	1.96	0.45	3.82	19.5	30.68	20.92	2.24	4.02	2.67	0.6	88.39
13	Tsogttsetsii	1.76	1.39	2.5	1.86	5.03	25.63	36.71	34.93	7.98	2.92	1.16	0.89	122.76

GOVI-ALTI														
ID No.	SUM	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
14	Erdene	1.07	0.3	12.4	6.16	6.05	18.6	22.66	24.85	16.11	7.02	4.28	0.8	120.3
15	Tsogt	0.4	3	2.3	3.7	3.6	8.2	19.8	13.1	4.8	6.6	1.4	2.1	68.9
16	Chandmani	0.55	1.65	3.7	1.3	6.32	11.85	29.54	11.3	7.8	1.76	2.34	1.24	79.35
17	Altai	0.4	1	2.3	2.4	4.9	7	10.3	14.6	3.4	2.9	1.3	2.9	53.3
19	Taishir	0.65	0.53	3.02	1.51	9.62	19.73	47.38	25.9	6.86	2.96	2.84	2.3	123.3
20	Bugat	0.62	3.21	9.49	4.81	4.5	13.78	27.73	19.71	9.62	3.47	2.41	1.68	101.03
21	Tseel	1.83	1.76	3	3.73	10.62	20.45	29.5	22.1	---	0	4.95	0.6	98.54
22	Tugrug	0.95	1.5	3.72	3.58	7.71	24.17	26.03	16.48	3.9	3.7	2.52	1.77	96.03
23	Sharga	0.4	0.4	0.95	4.5	5.55	8.77	15.65	14.44	5.5	3.46	2.3	0	61.92
24	Tonkhil	0.4	0.4	1	3.8	6.1	21.3	30.4	24.9	8.6	1.3	1.1	0.6	99.7
25	Darvi	0.1	0.1	0.4	0.4	3.32	4.13	24.13	15	6.45	0.13	0	0.3	54.46
26	Khaliun	1.41	1.49	3.35	6.58	9.63	23.71	36.77	28.7	21.75	4.85	3.21	3.56	145.01
27	Biger	0.6	0.33	0.66	0.72	1.23	7.44	21.13	17.12	4.08	2.16	0.45	1.27	57.19
28	Khukhmorit	0.8	0.68	0.83	1.65	4.86	12.61	32.15	20.42	7.99	2.18	2.1	1.83	88.1
29	Bayan-Uul	0.86	2.14	3.79	6.98	16.91	33.26	57.36	52.46	13.02	9.13	3.16	2.13	201.2
30	Jargalan	0.68	1.62	1.94	1.88	5.37	16.79	50.54	27.38	6.88	3.6	2.07	1.44	120.19

BAYANKHONGOR														
ID No.	SUM	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
32	Shinejinst	0.1	0.5	2.3	0.8	2	7.2	12.5	17.4	5.6	2.3	0.2	0.4	51.2
33	Bayan-Undur	0.8	1.44	14.08	12.09	6.6	21.47	50.15	24.55	6.7	4.3	1.97	1.24	145.39
34	Bayanlig	8.85	2	2.72	7.42	18	21.35	34.03	13.05	3.3	3	4.35	1.27	119.34
35	Bayangovi	0.88	1.12	2.38	3.15	7.36	9.88	23.37	8.95	3.16	0.18	2.17	1.13	63.73
36	Bogd	0.71	1.39	2.44	2.19	5.98	16.02	20.01	23.92	4.61	2.1	0.85	2.47	82.69
37	Jinst	0.8	1.6	6.9	5.8	8.1	18.1	34.5	19.1	13.2	2.1	1.6	0.4	111.9
38	Baatsagaan	0	0	2.66	2.73	14.2	13	27.05	15.27	15.5	0.5	2.4	0.6	93.91
39	Bayantsagaan	0.42	1.29	4.19	2.24	4.74	25.18	21.91	15.84	5.84	2.53	1.1	0.63	85.91
40	Khureemaral	0.64	2.17	4.4	3.48	7.21	18.65	45.1	31.07	7.25	3.38	2.12	2.6	128.07
41	Gurvanbulag	0.45	1.85	4.26	4.96	10.59	23.28	71.25	39.73	9.4	4.36	2.04	1.42	173.59
42	Jargalant	1.2	3.5	4.3	4.5	17.2	33.5	76.8	62	16.5	5.3	2.8	1.8	229.1
43	Galuut	0.59	1.17	4.59	4.46	16.99	24.53	69.28	58.55	16.92	5.72	2.13	0.98	205.91
44	Erdenetsogt	0.75	2.94	3.76	7.01	23.64	42.41	75.03	59.23	22.6	5.26	4.5	3.66	250.79
46	Bayanbulag	0.5	1.5	2.5	4.9	6.6	20.8	57.3	36.9	14.3	6.9	1.7	1.1	154.8
47	Buutsagaan	3.27	5.45	3.37	3.27	14.32	14.37	55.05	18.6	8.65	3	4.46	0.13	133.94
48	Bumbugur	0.62	2.7	9.08	4.3	14.05	22.52	69.3	31.91	36.8	3.4	0.93	0.72	196.33
50	Zag	–	–	–	–	–	–	–	–	–	–	–	–	–

DORNOGOVI														
ID No.	SUM	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
51	Erdene	0.29	0.46	1.33	1.4	2.07	4.67	20.42	17.87	2.66	2.65	1.06	1.14	56.02
52	Delgerekh	0.26	0.46	0.32	3.7	6.73	12.93	30.26	20.06	4.94	3.73	1.91	0.47	85.77
53	Zamiin-Uud	0.1	0.9	1.7	2.1	5.9	19.1	38	40.5	9.5	9.1	1	2.8	130.7
54	Mandakh	1.1	0.5	2.6	1.6	5.1	15.9	20.4	27.5	4.3	2.9	1.8	1.1	84.6
55	Saikhandulaan	0.27	0.26	2.16	0.49	1.35	12.67	25.74	26.4	4.89	0.99	0.21	0.87	76.3
56	Khatanbulag	0	0.03	1.7	1.95	6.56	9.27	19.92	29.51	1.34	1.26	0.06	0.01	71.61
57	Khuvsgul	0.8	1.4	3.6	2.2	11.5	16.2	26	34.4	10.4	8.5	2.2	1	118.2
9041	Ulaanbadrakh	1.2	0.6	2.1	1.5	4.3	7.1	25.1	38.9	5.7	7	0.2	1.1	94.8

SUKHBAATAR

ID No.	SUM	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
58	Ongon	0.94	1.78	2.15	2.01	5.97	16.02	34.69	27.87	5.62	4.75	2.88	1.35	106.03
59	Dariganga	1.13	1.76	1.86	3.55	15.53	35.94	84.94	33.58	13.38	8.68	3.72	2.7	206.77
60	Naran	0.66	1.11	1.24	4.18	8.62	27.77	92.66	37.84	14.72	10.56	2.05	1.04	202.45
61	Bayandelger	1.1	1.4	2.3	4.4	9.2	31.8	56	61.9	11	6.5	2.5	2.3	190.2
62	Erdenetsagaan	2.2	3	6.8	8.6	23.4	54.6	83.6	54	23.2	8.8	4.6	2.3	275
63	Sukhbaatar	1.63	1.14	1.36	6.86	18.38	36.48	61.04	41.96	14.32	5.43	2.23	1.83	192.66
64	Tumentsogt	1.84	2.65	3.84	6	24.56	49.88	108.55	61.37	39.15	10.08	3.61	2.95	314.48
65	Tuvshinshiree	0.72	2.32	0.95	3.63	11	32.47	65.35	48.86	10.97	6.7	4.55	1.88	189.4
66	Uulbayan	1.11	1	1.35	3.13	12.19	28.42	44.7	45.65	13.93	4.66	2.86	1.06	160.06
67	Munkhkhaan	0.71	0.81	1.05	5.1	12.16	29.3	77.86	32.16	23.65	5.03	2.86	1.02	191.71

DORNOD

ID No.	SUM	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
69	Matad	2	1.3	3.8	10.1	24.6	48.5	59.9	62.1	22.6	5	4.5	3.1	247.5
71	Khalkh gol	2.4	1.2	3.3	11.3	21.1	68.1	96.6	64.1	36	10.8	3.7	5.8	324.3
72	Khulunbuir	0.74	0.22	1.67	3.15	7.14	35.07	69.04	30.38	18.81	5.04	0.64	0.75	172.65
73	Tsagaan-Ovoo	0.7	0.43	0.93	3.77	9.01	59.09	59.31	28.57	20.2	8.74	1.67	1.39	193.81
74	Chuluunkhoroot	0.92	1.47	1.31	9.38	12.71	50.01	64.48	71.03	43.22	9.39	2.61	2.19	268.72
75	Bayan-Uul	1.45	1.26	2.31	6.36	21.12	50.64	124.14	78.1	41.55	15.24	1.76	3.36	347.29
76	Bayandun	0.52	0.8	2.13	6.88	27.98	30.72	67.24	34.3	24.78	7.94	3.11	2.61	209.01

KHENTII

ID No.	SUM	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
78	Bayan-Adraga	0.64	2.17	2.22	6.5	10.91	52.71	99.21	63.35	30.03	8.85	0.7	1.6	278.89
79	Binder	1.8	1.9	2.2	12.2	14.8	68.4	111.7	80.8	45.9	11.8	2.4	1.4	355.2
80	Batshireet	1.35	2.82	2	6.92	16.78	61.33	102.47	76.12	41.18	19.1	0.95	1.75	332.77
81	Norovlin	1.81	1.18	0.35	11.55	15.37	57.41	114.3	57.9	20.6	7.67	1.2	2.01	291.35
83	Dadal	1.8	1.3	2.6	19.6	21.9	77.5	126.8	120.6	54.1	19.2	2.6	3.2	451
9071	Galshar	0.9	3.5	1.5	2.7	14.1	16.4	66.6	70.2	16	4.9	5.9	1.4	204.1
9072	Bayan-Ovoo	2.6	2.2	3.5	9.7	23.7	48.4	103.3	75.2	39.2	11.2	3.6	3.9	326.5

DUNDGOVI

ID No.	SUM	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
84	Ulziit	0.6	1	1.35	5.78	3.4	19.9	32.55	21.86	8.16	4.8	1.66	0.95	102.01
85	Undurshil	0.62	0.66	0.88	1.2	17.24	26.85	34.53	26.43	5.27	3.45	2.18	1.92	121.23
86	Bayanjargalan	0.3	1.73	0.68	2.16	5.8	27.87	48.32	27.2	10.48	5.08	2.55	1.03	133.2
87	Adaatsag	0.26	3.27	1.51	3.57	13.93	46.57	71.13	40.96	12.32	5.22	3.57	3.51	205.82
88	Erdenedalai	0.12	0.26	0.48	1.25	7.79	15.46	53.46	26.78	11.28	2.94	1.71	1.1	122.63
9081	Saikhan-Ovoo	0.8	1.8	2.1	3.5	9.2	19.1	44.5	27.8	8.3	2.7	2.5	1.8	124.1
9082	Khuld	0.2	1.8	0.7	5.7	14.7	15.1	38.1	19.2	4.2	2.7	1.9	0.7	105
9083	Delgerkhangai	0.9	0.6	1.5	2.3	8.3	23.5	25.1	20.1	9.8	3.4	2.3	2.7	100.5

UVURKHANGAI

ID No.	SUM	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
89	Bogd	2.2	3.5	5	8.7	9.1	25.1	29.8	28.9	9.3	3.3	2.2	1.9	129
90	Baruunbayan-Ulaan	0.9	2.48	5.06	6.13	6	17.6	25.44	20.06	12.5	0.76	1.96	2.43	101.32
91	Guchin-Us	0.42	1.63	2.08	3.2	8.34	24.92	32.52	20.6	9.9	1.9	2.17	1.46	109.14
92	Bayan-Undur	0.15	0.67	1.74	0.94	10.8	35.13	37.87	62.33	10.03	3.13	0.38	0.93	164.1
93	Khairhandulaan	0.33	0.85	1.67	2.4	8.03	23.65	35.08	33.53	6.17	0.45	0.86	0.71	113.73
94	Nariinteel	2.72	4.41	4.85	5.95	17.61	31.42	58.2	45.56	13	3.15	4.66	2.98	194.51
95	Bayanteeg	2	2.9	4.3	4.7	13.8	31.8	60.2	50.4	12.8	3.2	4	2.5	192.6

KHUVSGUL

ID No.	SUM	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
96	Jargalant	0.6	0.62	1.58	2.9	14.91	27.22	52.76	37.9	13.4	4.67	2.38	1.73	160.67
97	Galt	0.34	1.32	3.69	8.62	30.83	50.97	77.22	50.92	8.7	4.82	2.17	2.31	241.91
98	Shine-Ider	0.54	0.13	0.73	4.11	12.74	39.48	62.38	46.53	8.72	1.47	0.59	0.68	178.1
99	Tumurbulag	0.23	1	0.46	2.77	15.08	31.56	54.2	48.82	10.05	2.81	1.16	2.13	170.27
100	Burentogtokh	1.35	0.6	1.24	3.31	13.87	33.9	67.13	50.43	13.99	4.76	2.32	2.45	195.35
101	Tsetserleg	1.6	1.5	3.1	4.1	17.1	30.8	75.3	53.1	20.6	8.7	5.7	4.1	225.5
102	Arbulag	1.11	1.94	1.79	3.36	12.09	44.55	61.72	48.13	13.41	2.87	1.91	1.93	194.81
103	Bayanzurkh	0.72	0.79	0.94	3.28	8.57	29.93	62.67	41.52	13.77	2.13	0.97	0.91	166.2
104	Chandmani-Undur	2.02	2.18	0.85	12.9	25.92	33.4	83.88	87.88	25.72	2.81	3.16	2.06	282.78
105	Tsagaan-Uur	2.77	2.91	3.6	16.55	24.86	72.6	105.78	111.97	54.12	7.92	4.53	3.76	411.37
106	Tsagaan-Uul	1.43	2.09	1.76	4.7	15.48	43.6	68.06	55.03	14.18	4.25	3.32	3.72	217.62
107	Ulaan-Uul	1.32	1.81	3.54	7.68	22.09	55.11	70.9	65	28.25	8.32	5.71	4.95	274.68
108	Renchinlkhunbe	2.7	1.6	1.8	4.5	21	53.2	71.5	67.4	29	7.1	3.6	4	267.2
109	Tunel	0.4	1.73	1.12	2.31	10.2	24.7	43.81	48.75	15.5	2.65	0.88	0.76	152.81
110	Tosontsengel	1.67	2.14	1.14	3.05	17.63	73.22	103.28	93.12	22.15	4.28	4.35	2.97	329
111	Alag-Erdene	2.14	2.14	1.03	2.28	16.82	57.96	73.27	70.7	22.08	2.05	1.23	2.53	254.23
112	Khatgal	1.8	1.9	1.6	9	25.5	65.4	76.6	88	46	5.6	4.2	2.5	327.9
113	Tsagaannuur	3.4	2.97	1.3	3.03	10.95	27.55	45.03	51.9	13.88	4.51	3.85	4.44	172.81
114	Erdenebulgan	1.23	4.85	1.26	8.3	19	47.6	119.2	62.96	15.26	0.75	0.13	2.4	282.94
9101	Khankh	2.2	1.8	2.4	6.4	19.5	54.4	79.5	70.1	30.9	3.1	3.3	2	275.6

ARKHANGAI

ID No.	SUM	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
115	Khangai	0.59	0.86	3.97	4.01	23.01	23.72	53.57	40.37	10.6	2.41	1.71	0.75	165.57
116	Tariat	1.3	1	2.4	5.9	12.3	36.7	70.5	50.2	15.1	3.5	3.5	1.7	203.9
117	Tsakhir	0.9	0	0.6	1.6	23.7	31.5	54.2	25.7	0.4	1.2	1.3	0.2	141.3
9111	Chuluut	1.7	2.1	6.6	7.4	24	46.5	70.9	72.5	21	9.1	6.1	2.6	270.5

ZAVKHAN

ID No.	SUM	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
118	Shiluustei	0.57	1.55	5.76	4.36	8.16	21.34	47.57	38.84	17.78	6.5	2.06	0.61	155.1
119	Durvuljin	1.2	3.1	1.1	4.6	5.6	23.9	44.9	25.7	9.9	3.9	1.8	2.2	127.9
120	Yaruu	2.06	1.88	6.96	6.79	19.63	37.12	66.22	59.64	19.87	10.3	5.27	2.7	238.44
121	Erdenekhairkhan	0.32	0.82	2.27	1.65	7.61	23.05	33.03	15.21	5.03	2.86	2.58	2.3	96.73
122	Zavkhanmandal	2.32	1.42	2.07	4.5	11.66	24.19	34.56	26.05	11.36	5.46	2.62	3.04	129.25
123	Urgamal	0.87	0.54	0.79	2.16	6.3	18.33	18.72	22.78	8.25	2.38	0.58	1.11	82.81
124	Santmargats	1.26	1.5	2.15	2.87	12.9	25.56	37.84	25.35	13.38	1.98	1.72	1.77	128.28
125	Tsetsen-Uul	1.9	2.1	6.1	8	25.1	38.3	66.4	59.8	24.7	9.1	8.8	5.1	255.3
126	Ider	2.07	1.36	3.7	6.3	16.14	35.55	64.43	39.32	21.22	7.35	3.4	1.8	202.64
127	Ikh-Uul	2.88	3.45	2.85	4.13	7.83	22.55	33.1	25.85	8.62	3	2.24	4.06	120.56
128	Tes	1.54	1.12	2.6	2.15	5.61	20.52	49.96	39.3	16.84	1.53	6.45	4.35	151.97
129	Tsagaanchuluut	3.1	4.78	8.07	9.66	11.67	17.57	45.84	36.3	25.34	8.14	8.76	3.13	182.36
130	Tsagaankhairkhan	2.74	4.71	7.36	7.32	15.06	28.38	67.27	56.02	30.63	7.93	8.3	4.96	240.68
131	Telmen	1.15	1.02	3.67	4.58	14.01	36.33	52.91	31.95	12.36	4.01	3.05	2.24	167.28
132	Tudevtei	0.87	0.83	2.74	2.12	14.13	40.41	48.83	36.84	12.14	4.4	4.09	2.58	169.98
133	Songino	1.86	2.14	3.56	3.5	8.32	19.7	39.95	21.2	17.15	7.98	8.37	8.38	142.11
134	Otgon	3.53	0.36	1.93	5.57	13.05	20.93	78.67	63.5	23.67	4.16	1.31	1.52	218.2
135	Numrug	1.84	1.36	3.41	3.6	7.64	22.55	35.56	28.1	12.71	3.48	4.62	2.08	126.95
136	Asgat	1.73	1.43	1.13	4.25	5.66	50.6	56.16	16.15	17.46	4.6	4.4	7.63	171.2
137	Bayankhairkhan	3.08	1.32	3.35	7.3	11.62	31.86	53.86	28.4	19.48	5.85	8.92	7.77	182.81
138	Tsontsengel	2.3	1.2	6.1	7.3	21.5	43.6	77.1	53.2	31.9	9.9	5.5	7.9	267.5
9121	Bayantes	2.5	1.8	1.9	3	11.7	32.3	63.1	49.9	20.2	3.4	6.4	4.6	200.8
9122	Aldarkhaan	0.6	1.9	5.7	3.8	8.5	28.3	63.6	41.8	26.2	4.7	3.1	2	190.2

BULGAN

ID No.	SUM	1	2	3	4	5	6	7	8	9	10	11	12	Year
139	Teshig	2.07	2.5	2.36	5.08	19.97	75.85	91.06	97.6	32.28	5.24	1.41	2.9	338.32

UVS

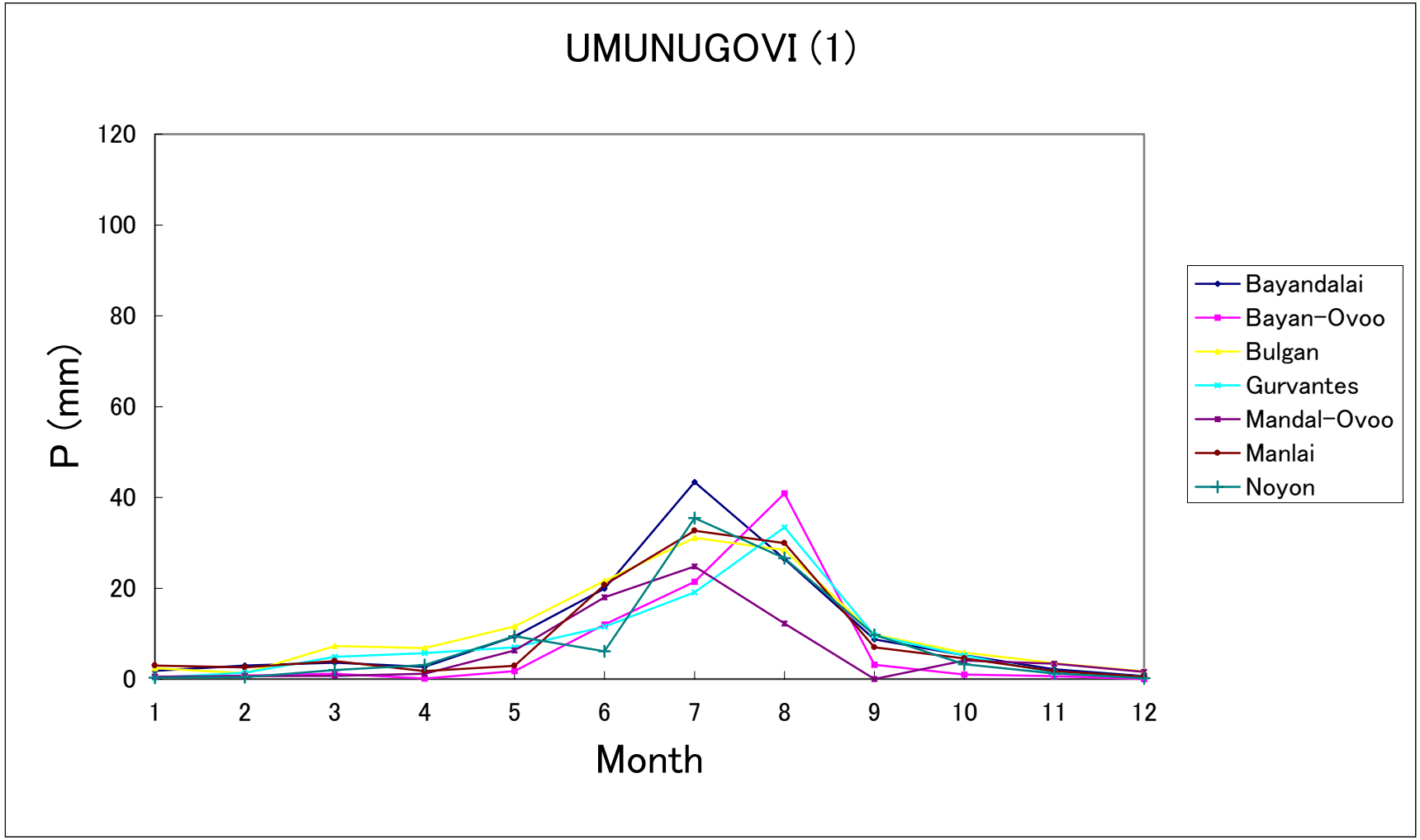
ID No.	SUM	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
140	Undurkhangai	2.66	1.74	4.42	4.96	7.55	44.37	81.92	40.71	14.03	4.71	7.2	3.7	217.97
141	Tsagaankhairkhan	3.39	2.66	7.9	10.91	21.98	43.34	87.02	46.82	26.08	9.51	8.02	4.99	272.62
142	Zuunkhangai	2.57	1.13	2.83	5.78	11.68	39.18	59.58	42.06	17.6	3.75	5.41	3.01	194.58
143	Khyargas	4.29	3.88	7.19	9.21	23.67	49.92	79.16	29.02	31.66	15.28	12.86	8.16	274.3
144	Baruuntruun	3.6	2.3	5.1	8.2	20.6	37.6	75	53.2	29	9.8	10.5	7.5	262.4
145	Malchin	2.13	1.97	6.69	9.48	26.47	56.99	97.26	42.93	43.73	11.58	9.93	4.35	313.51
146	Zuungovi	1.95	1.73	5.03	5.34	16.07	39.83	60.5	51.48	23.27	4.79	8.32	4.49	222.8
147	Bukhmurun	0.2	0	1.2	0.7	6.9	19.7	27.9	23.6	2.9	0.3	0.3	0.6	84.2
148	Zavkhan	0.67	0.53	0.72	0.5	2.92	13.43	26.18	16.45	6.81	0.9	0.68	0.88	70.67
149	Tes	2.88	3.44	4.13	1.65	6.15	21.56	39.97	31.37	12.5	3.52	4.02	3.91	135.1

KHOVD

ID No.	SUM	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
151	Zereg	0.9	1.2	1.1	4.9	6.5	13.9	28.5	19.1	7.2	2.8	1.2	2.3	89.5
152	Darvi	2.7	2.91	5.35	9.31	8.21	10.85	18.54	17.73	9.25	11.66	5.16	3.72	105.39
153	Altai	2.31	1.16	2.84	1.8	1.58	10.76	9.02	12.77	3.8	3.73	3.72	2.91	56.4
154	Uyench	2.36	2.55	4.53	3.1	2.61	8.31	8.21	11.03	6.38	3.98	7.02	5.46	65.54
155	Bulgan	2.9	3.7	4.1	3.9	3.4	13.7	11.8	10.7	12.1	2.2	6.6	3.4	78.5
156	Tsetseg	0.12	0	0.33	1.77	2.51	7.01	25.81	7.88	3.6	0.04	0.67	0.83	50.57
157	Must	0	0	0.15	3.72	6.44	13.86	33.56	34.2	3.4	1.2	0	2.05	98.58
158	Munkhkhairkhan	0	0.1	0.76	5.08	10.19	35.62	49.5	35.57	12.28	2.32	0.52	0.3	152.24
159	Mankhan	0.6	0.26	3.7	2.26	4.66	14.77	23.44	13.95	---	1.45	0.9	2.1	68.09
160	Chandmani	0.51	0.61	1.49	3.42	9.87	14.88	62.47	51.13	11.99	3.13	12.31	11.48	183.29
163	Durgun	0.42	0.47	0.23	0.39	2.55	9.08	28.92	13.52	4.61	0.83	0.31	1.2	62.53
9151	Duut	0.4	0.6	1.5	4.9	8	24.4	43.9	65.4	7	3.4	0.5	0.4	160.4
9152	Erdeneburen	0.4	0.2	1.3	1.5	9.8	12	10.9	10.4	6	0	0	0.9	53.4

BAYAN-ULGII

ID No.	SUM	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
164	Tolbo	0.97	0.35	0.46	1.68	2.9	7.5	13.14	12.52	1.86	1.27	0.76	0.4	43.81
165	Tsagaannuur	2.5	1.15	1.95	2.1	3.45	27.9	33.85	67.1	21.6	0	0.66	1.25	163.51
166	Bulgan	1.5	1.5	2.8	4.7	9	21.9	40.5	21.7	19.2	8.5	6.4	2.7	140.3
167	Deluun	0.79	1.38	2.41	4.32	6.31	25.27	49.87	22.2	7.56	3.39	1.72	1.95	127.17
168	Altai	1.12	0.47	2.52	2.93	10.98	22.06	45.92	24.06	13	6.3	1.9	1.2	132.46
169	Buyant	0.43	0.37	0.85	2.34	5.9	23.41	59.18	22.69	5.95	1.3	0.26	0.96	123.64
170	Bayannuur	3.15	---	---	11	3.65	20.38	40.72	40.6	6.8	---	8.1	0.3	134.7
171	Altantsugts	1.22	0.92	2.8	1.77	2.85	18.65	62.2	24.4	6.93	5.35	6	3.6	136.69
9161	Nogoonuur	0.1	0	1.5	1.2	8.9	20.2	29.8	24.4	2.4	0.2	0.4	0.4	89.5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Month
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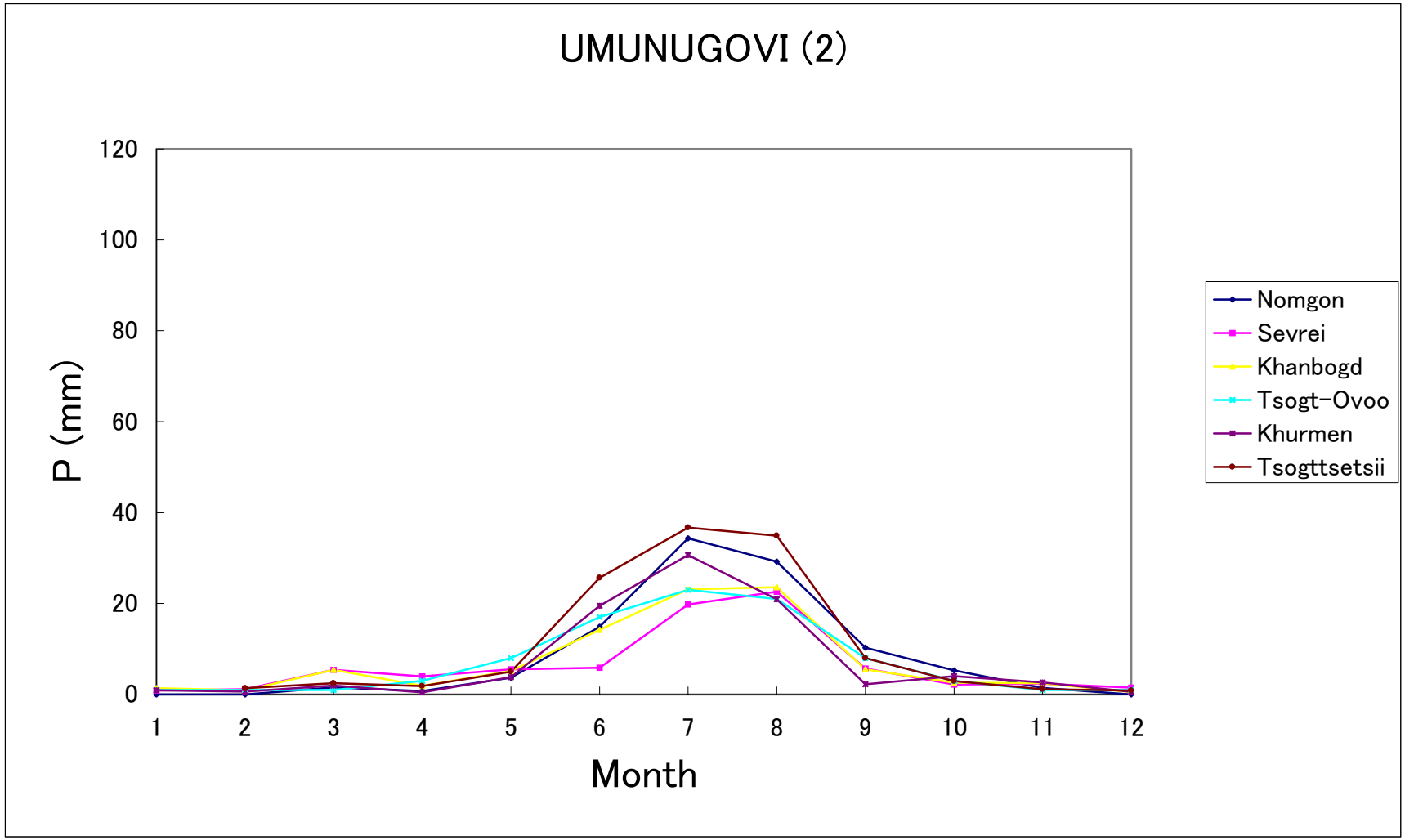
Bayan-Ovoo
Bulgan
Gurvantes
Mandal-Ovoo
Manlai
Noyon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Khanbogd
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Khurmen
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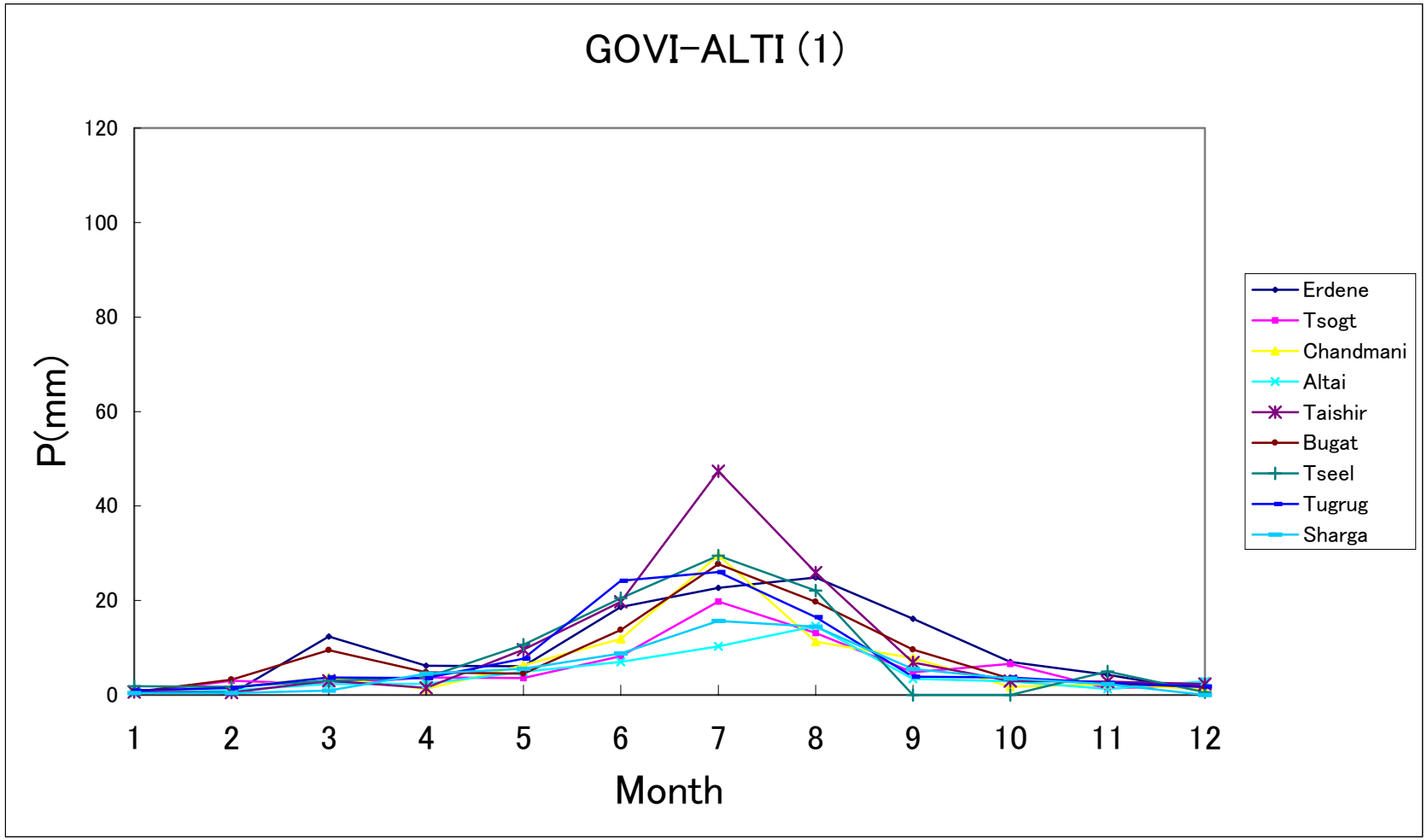
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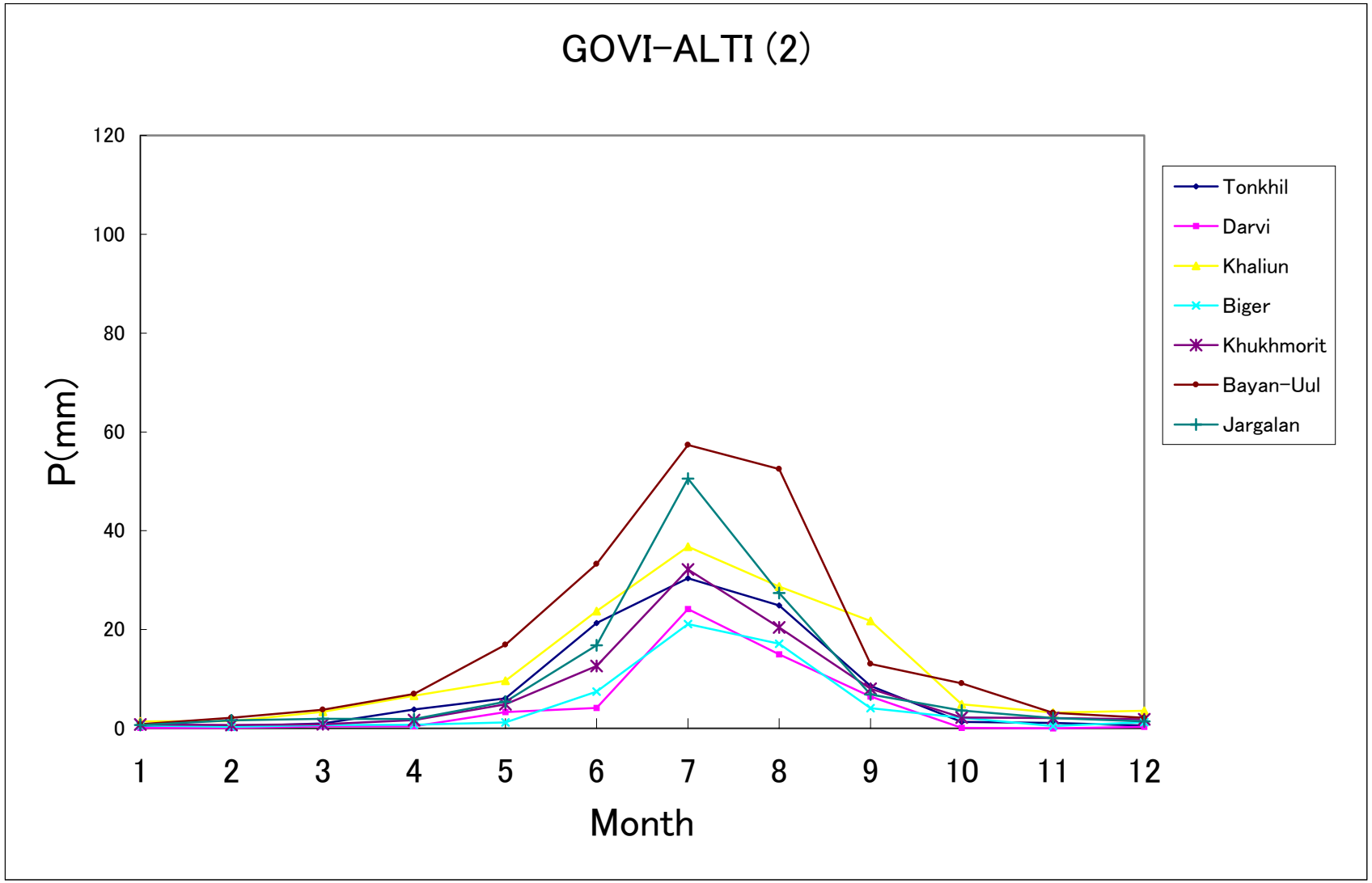
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Darvi
Khaliun
Biger
Khukhmorit
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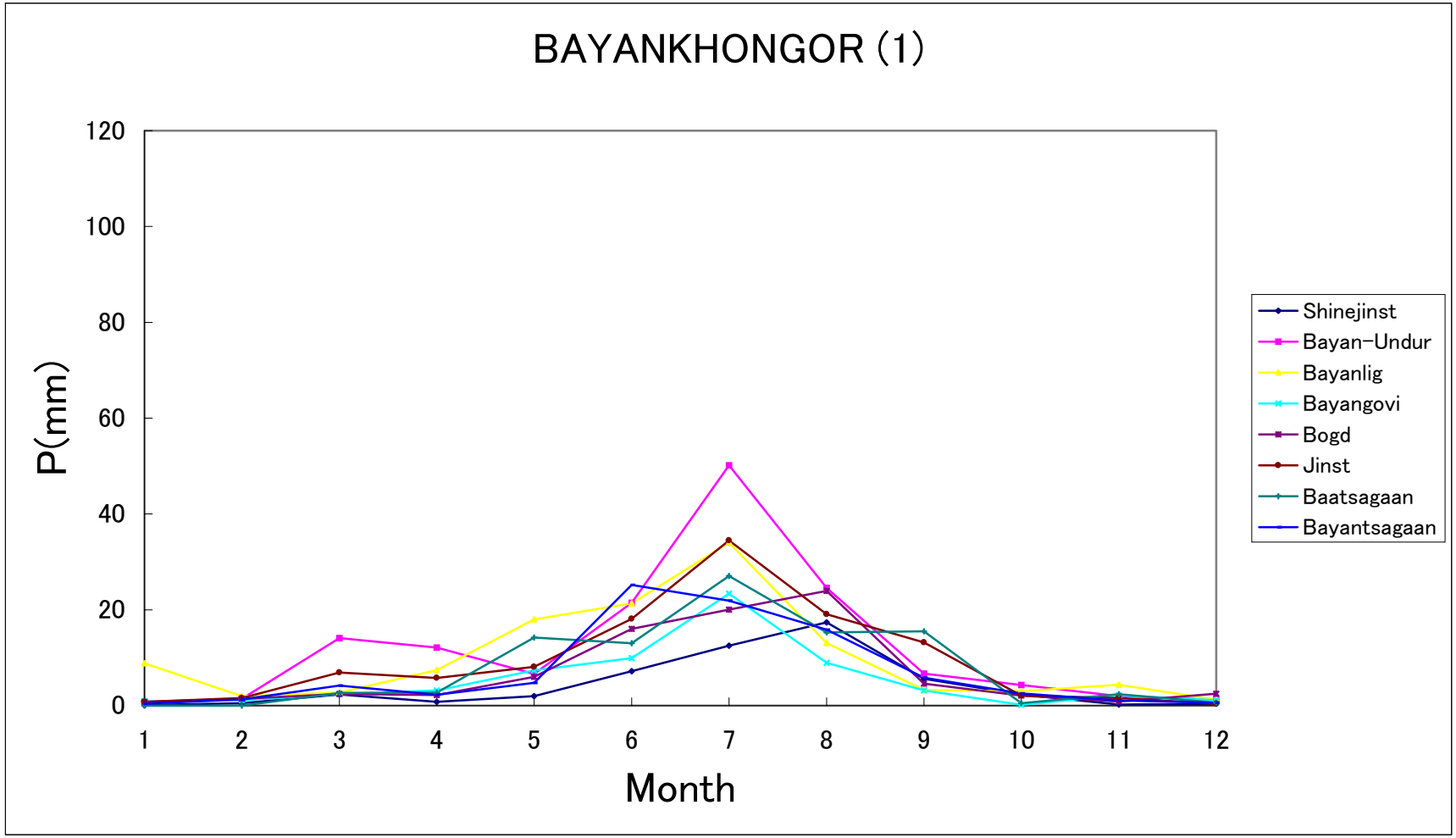
Jargalan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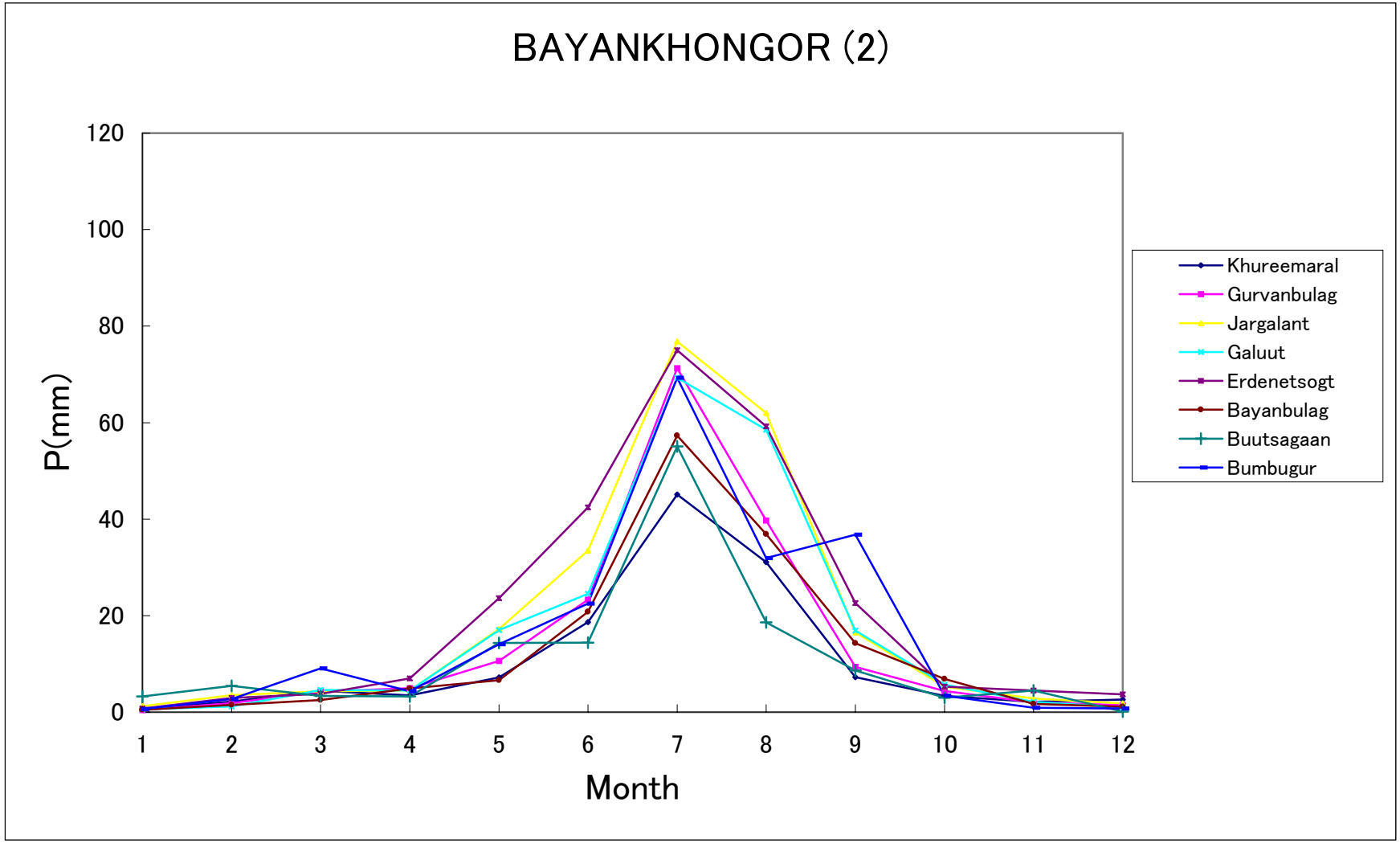
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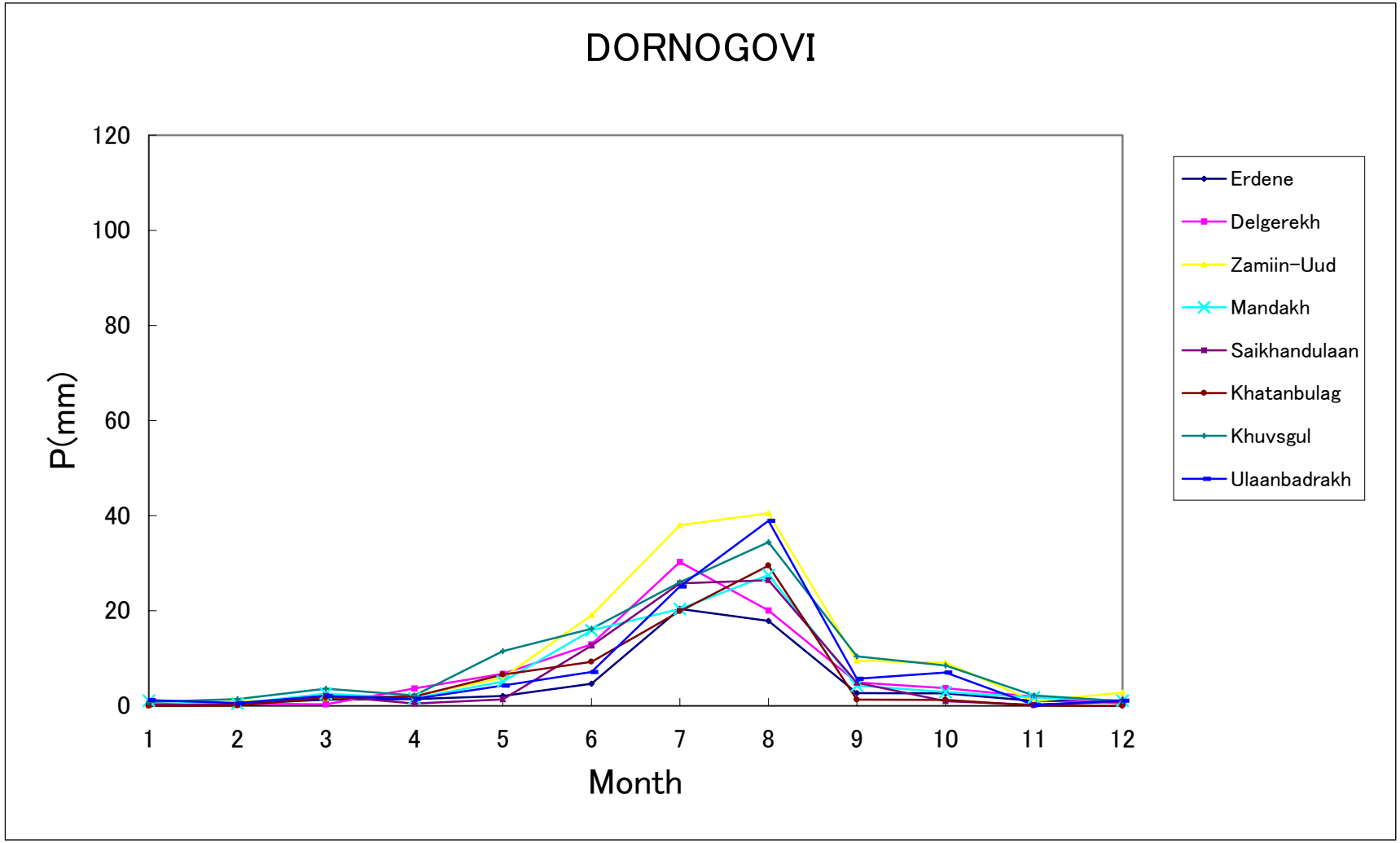
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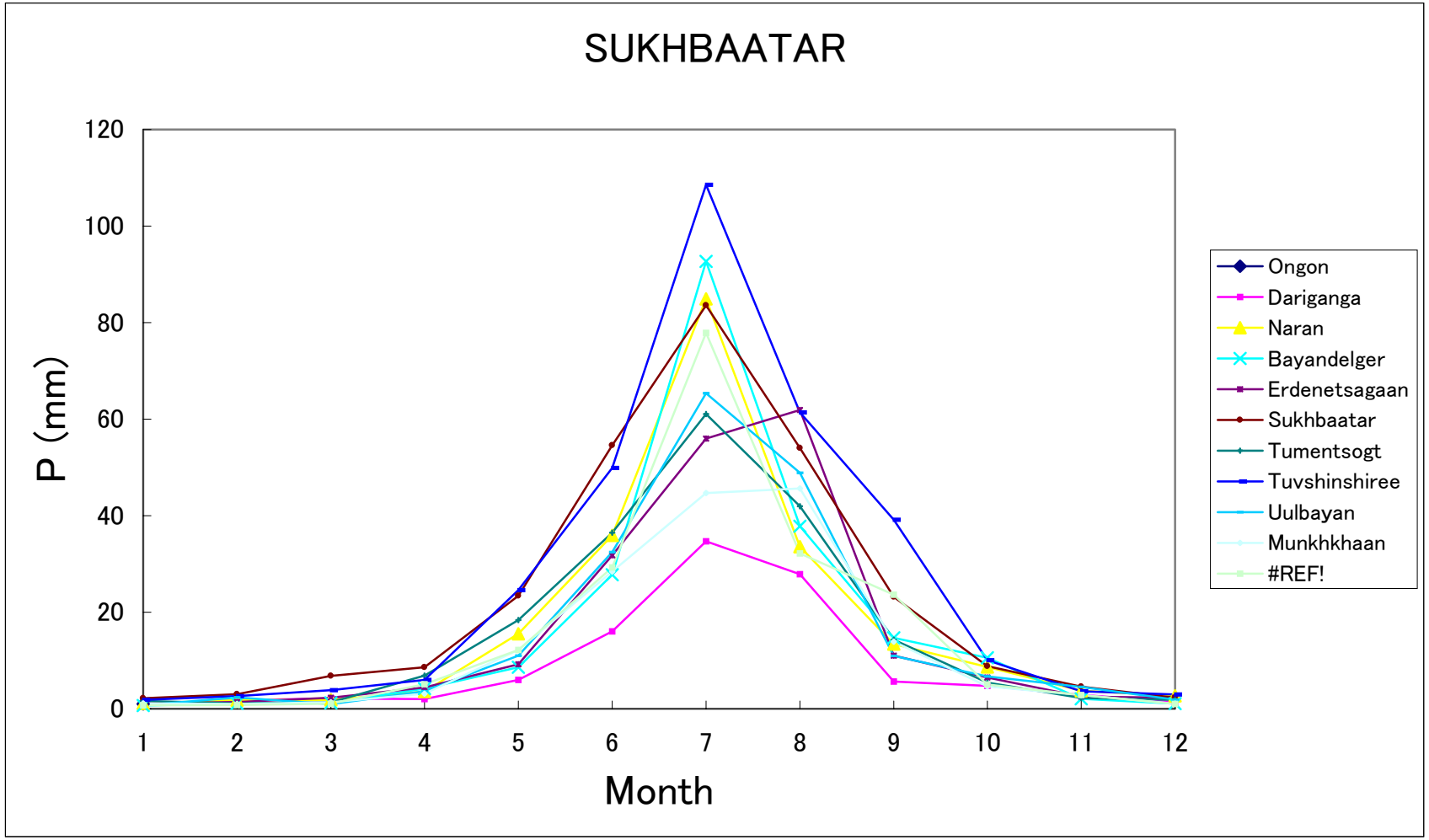
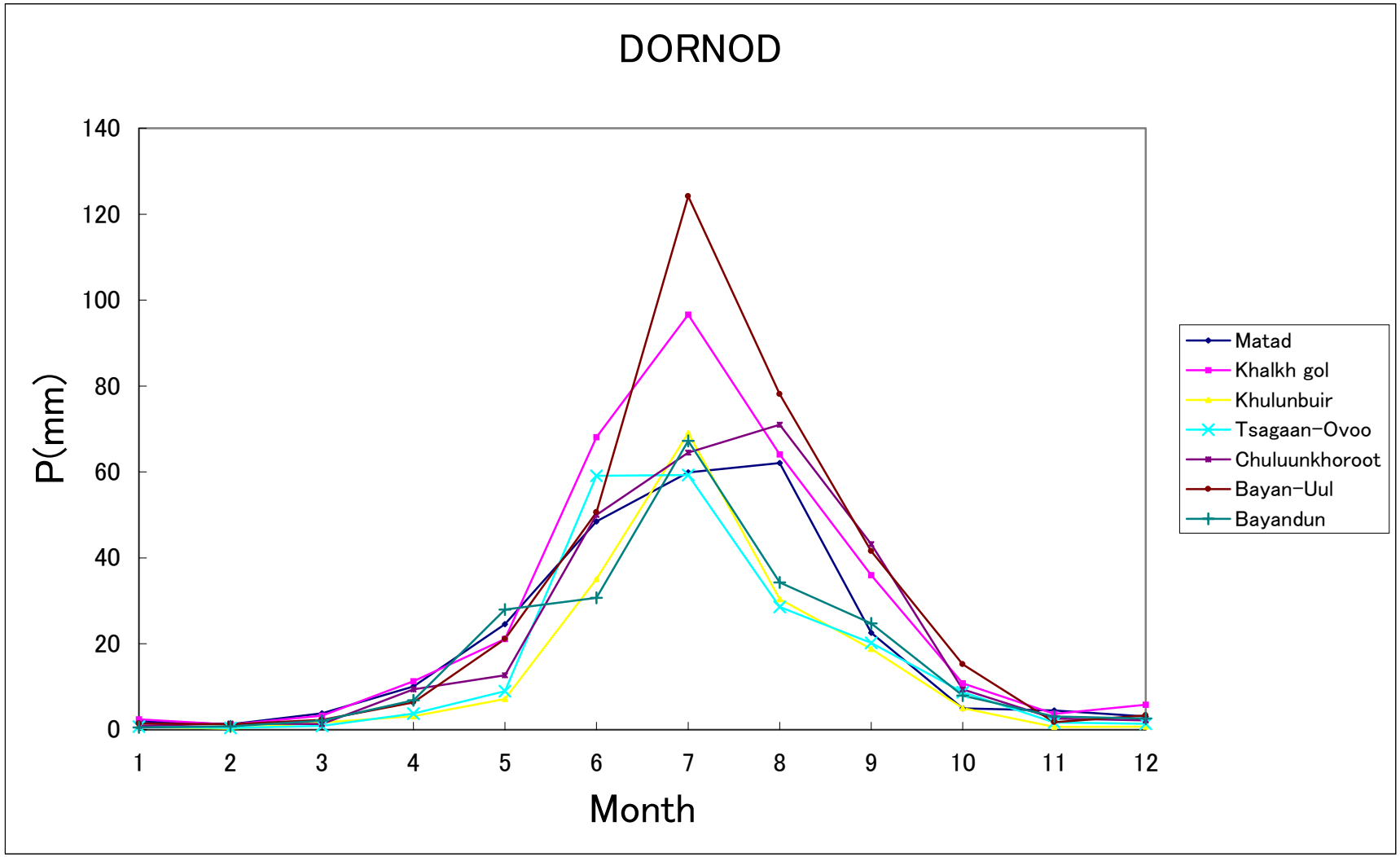
Month
Erdene
Delgerekh
Zamiin-Uud
Mandakh
Saikhandulaan
Khatanbulag
Khuvsgul
Ulaanbadrakh


SUKHBAATAR
P (mm)
120
100
80
60
40
20
0
1
2
3
4
5
6
7
8
9
10
11
12
Month
Ongon
Dariganga
Naran
Bayandelger
Erdenetsagaan
Sukhbaatar
Tumentsogt
Tuvshinshiree
Uulbayan
Munkhkhaan
#REF!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P(mm)
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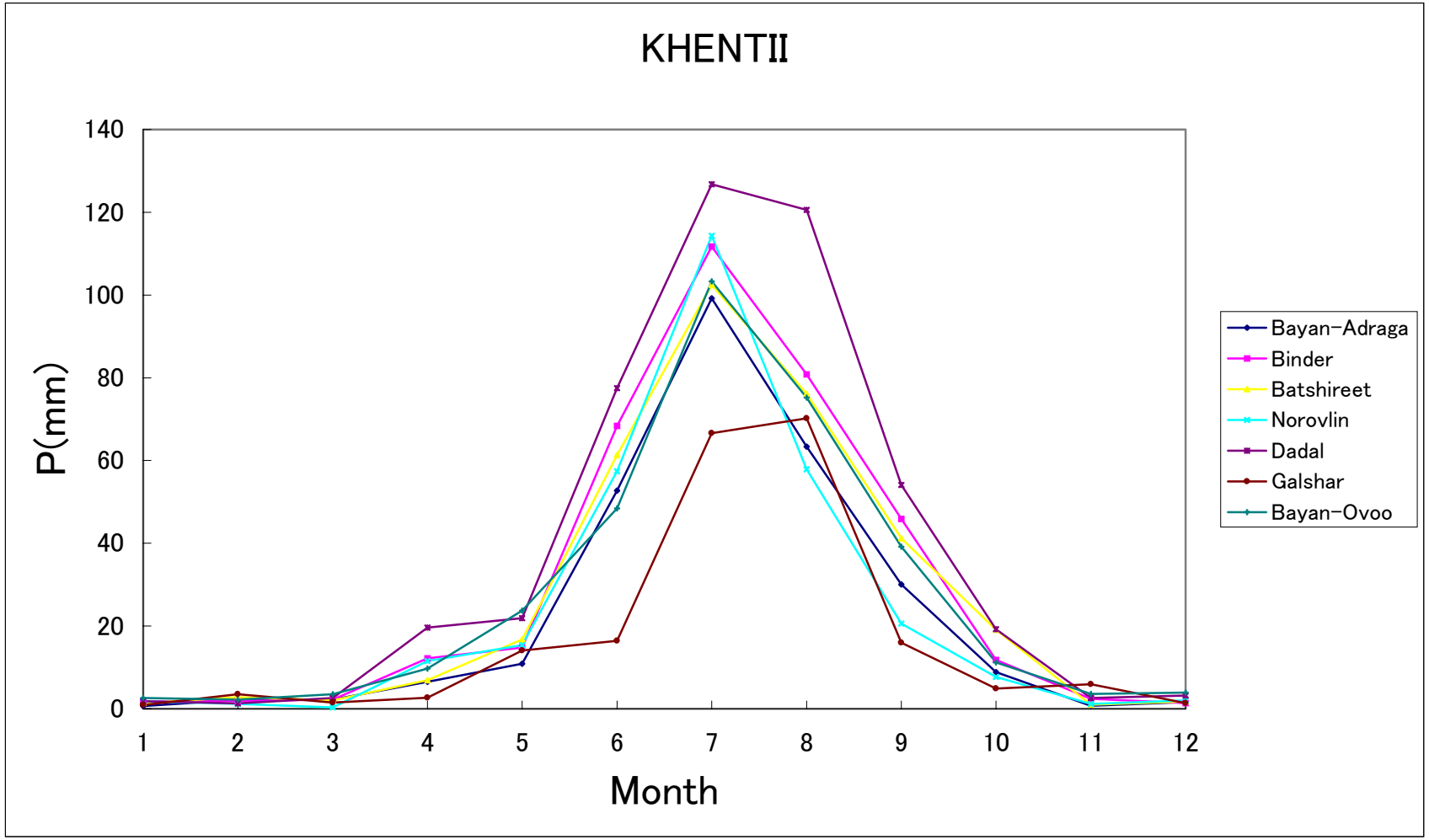
120
100
80
60
40
20
0
1
2
3
4
5
6
7
8
9
10
11
12
Month
Matad
Khalkh gol
Khulunbuir
Tsagaan-Ovoo
Chuluunkhoroot
Bayan-Uul
Bayandun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P(mm)
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120
100
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60
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0
1
2
3
4
5
6
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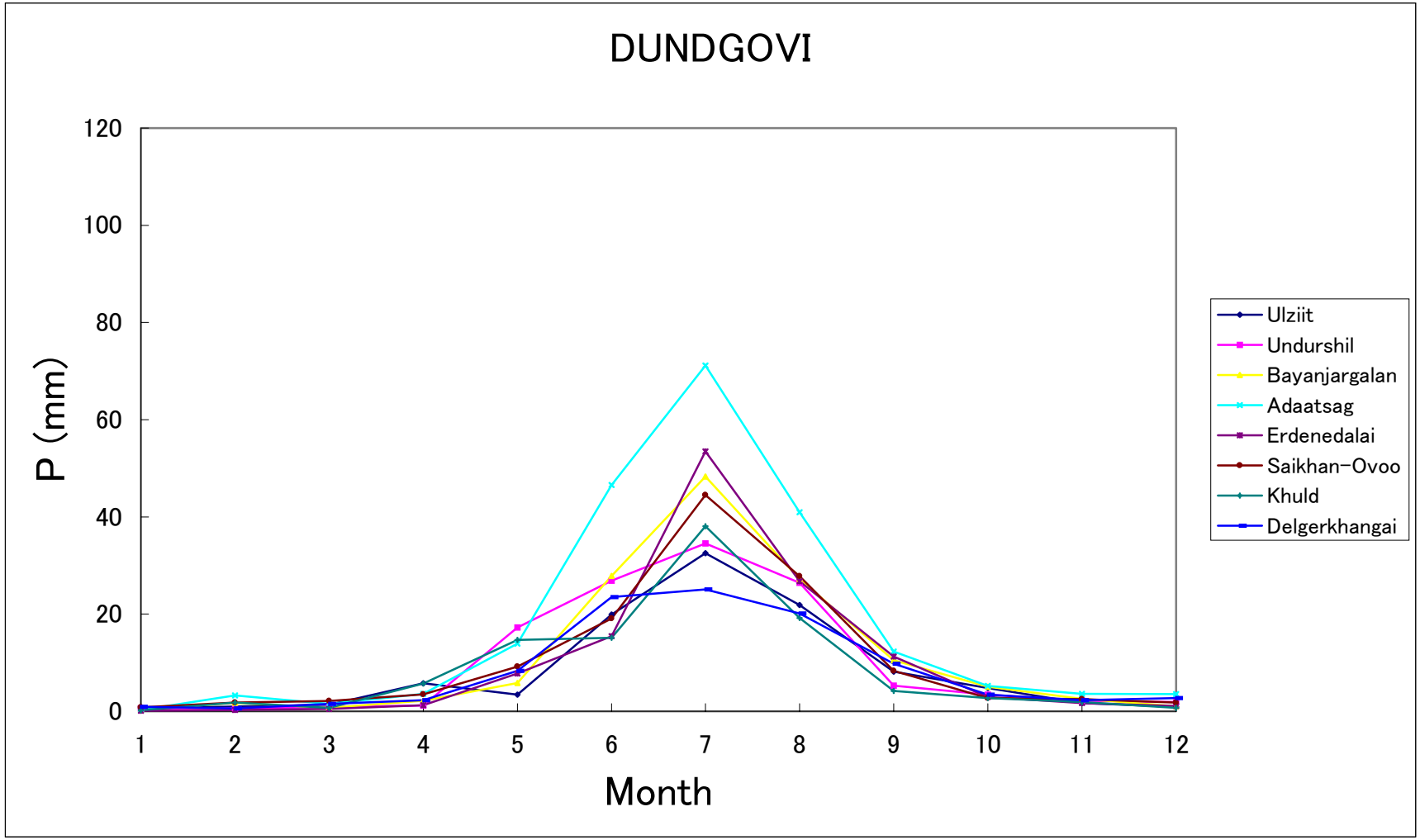
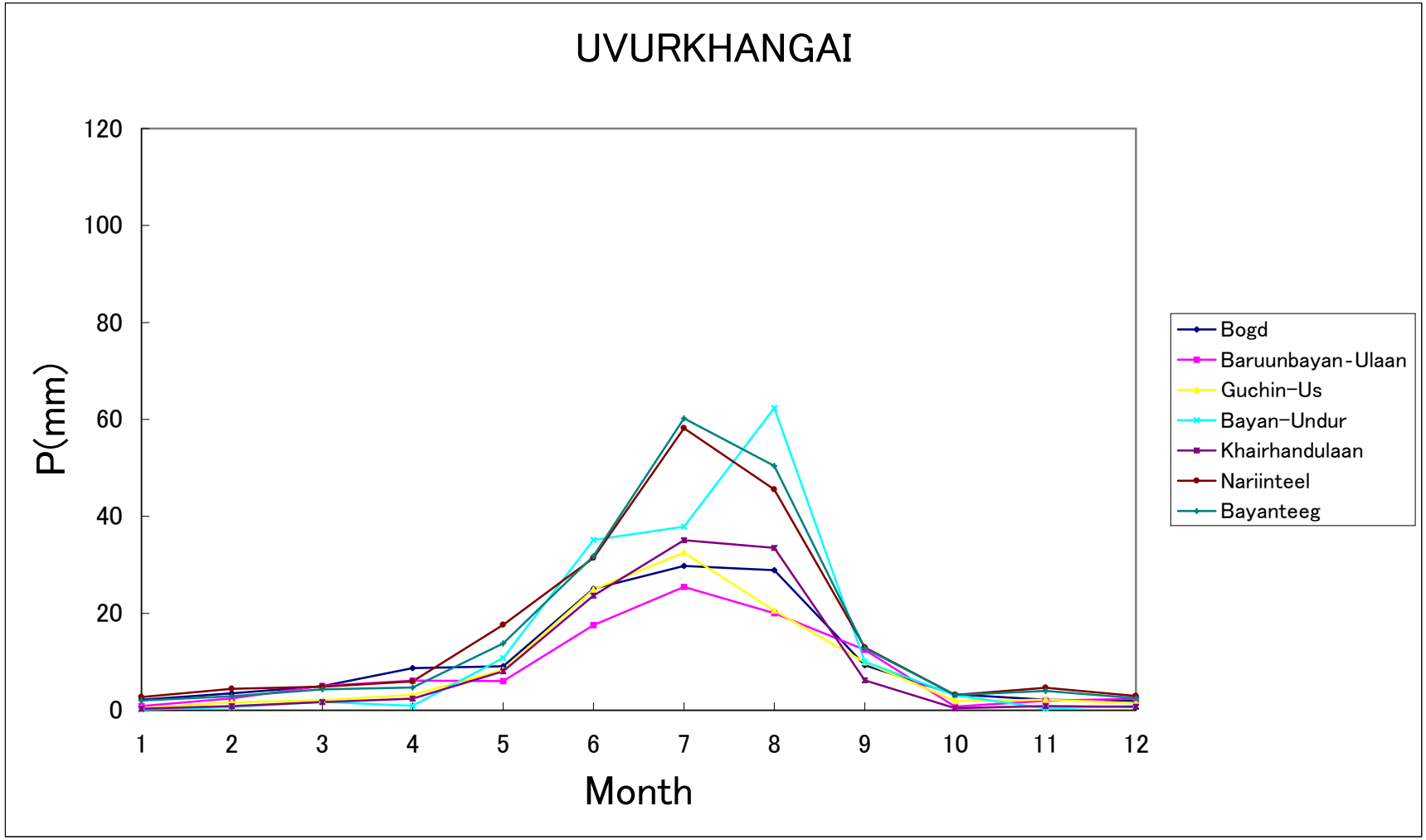
8
9
10
11
12
Month
Bayan-Adraga
Binder
Batshireet
Norovlin
Dadal
Galshar
Bayan-Ovoo


DUNDGOVI
P (mm)
120
100
80
60
40
20
0
1
2
3
4
5
6
7
8
9
10
11
12
Month
Ulziit
Undurshil
Bayanjargalan
Adaatsag
Erdenedalai
Saikhan-Ovoo
Khuld
Delgerkhangai


UVURKHANGAI
P(mm)
120
100
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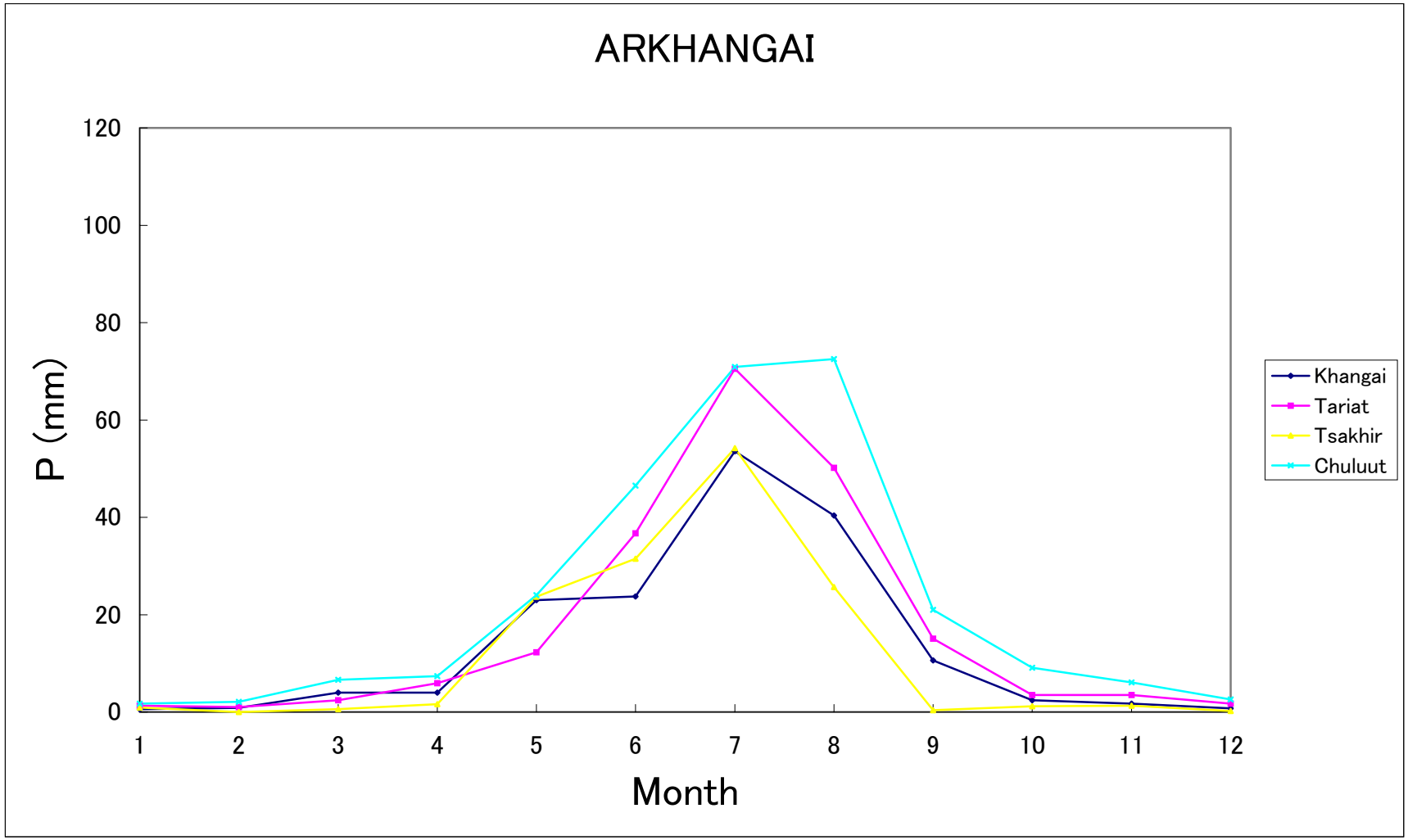
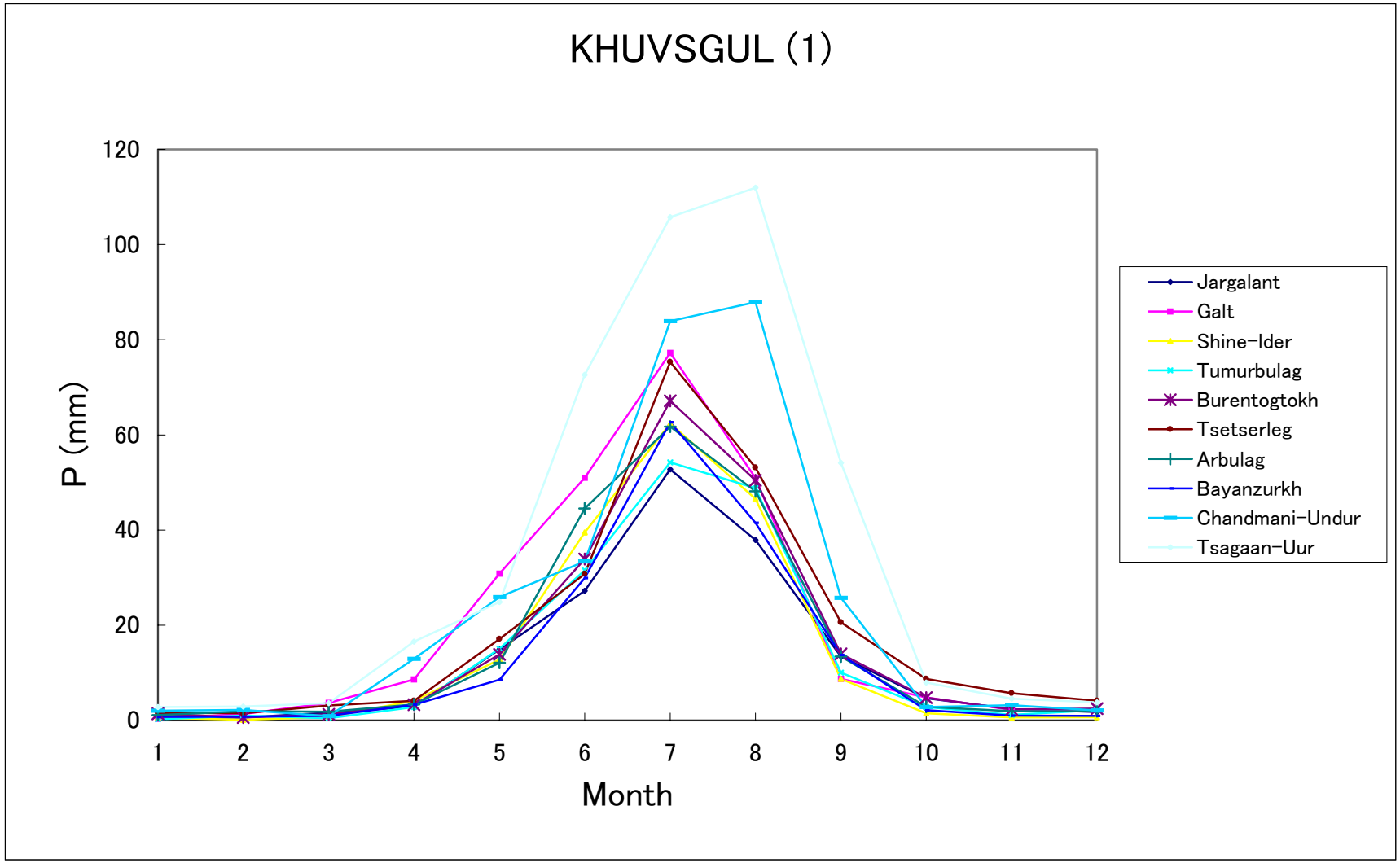
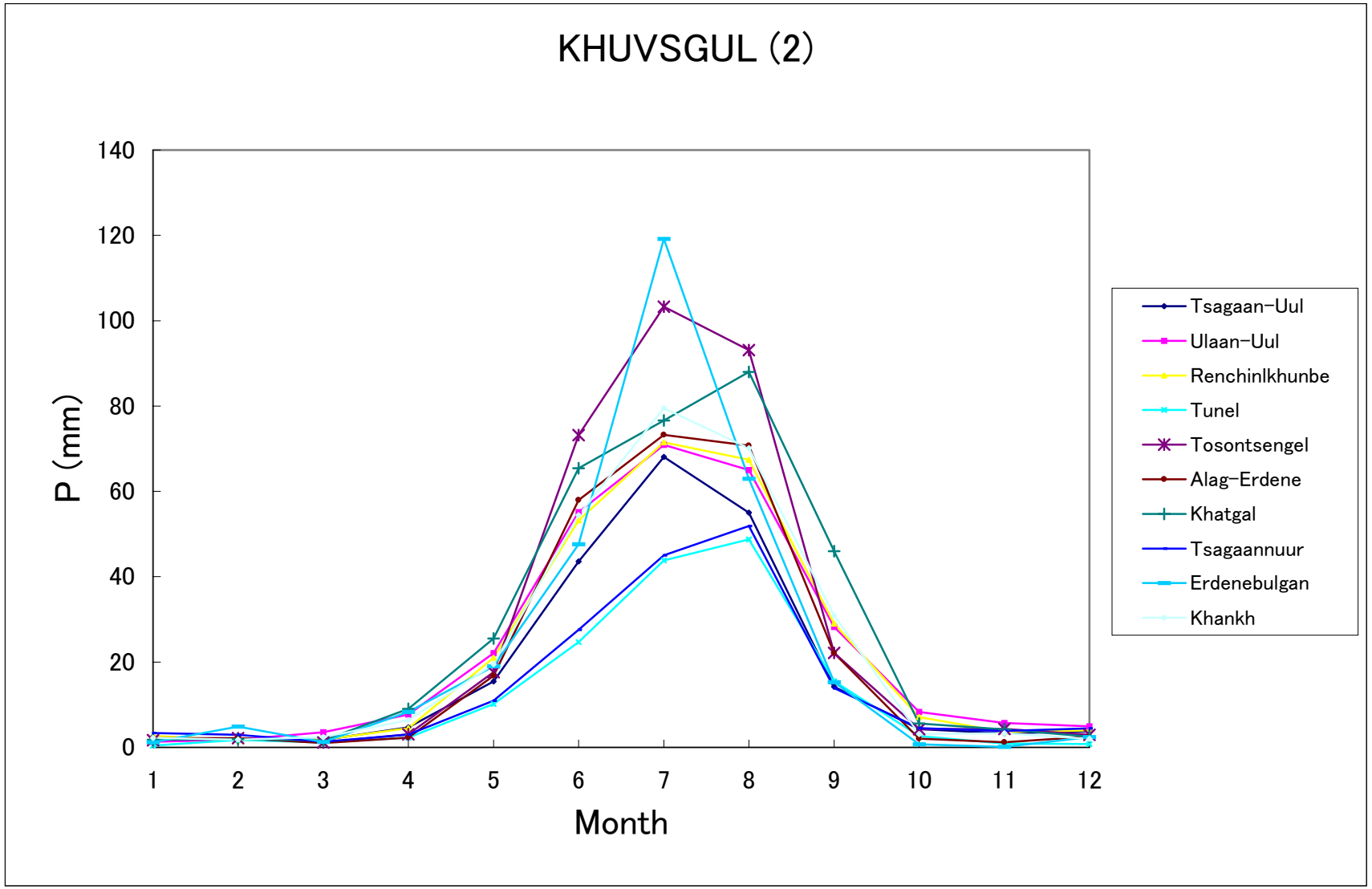
60
40
20
0
1
2
3
4
5
6
7
8
9
10
11
12
Month
Bogd
Baruunbayan-Ulaan
Guchin-Us
Bayan-Undur
Khairhandulaan
Nariinteel
Bayanteeg


ARKHANGAI
P (mm)
120
100
80
60
40
20
0
1
2
3
4
5
6
7
8
9
10
11
12
Month
Khangai
Tariat
Tsakhir
Chuluut


KHUVSGUL (1)
P (mm)
120
100
80
60
40
20
0
1
2
3
4
5
6
7
8
9
10
11
12
Month
Jargalant
Galt
Shine-Ider
Tumurbulag
Burentogtokh
Tsetserleg
Arbulag
Bayanzurkh
Chandmani-Undur
Tsagaan-Uur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P (mm)
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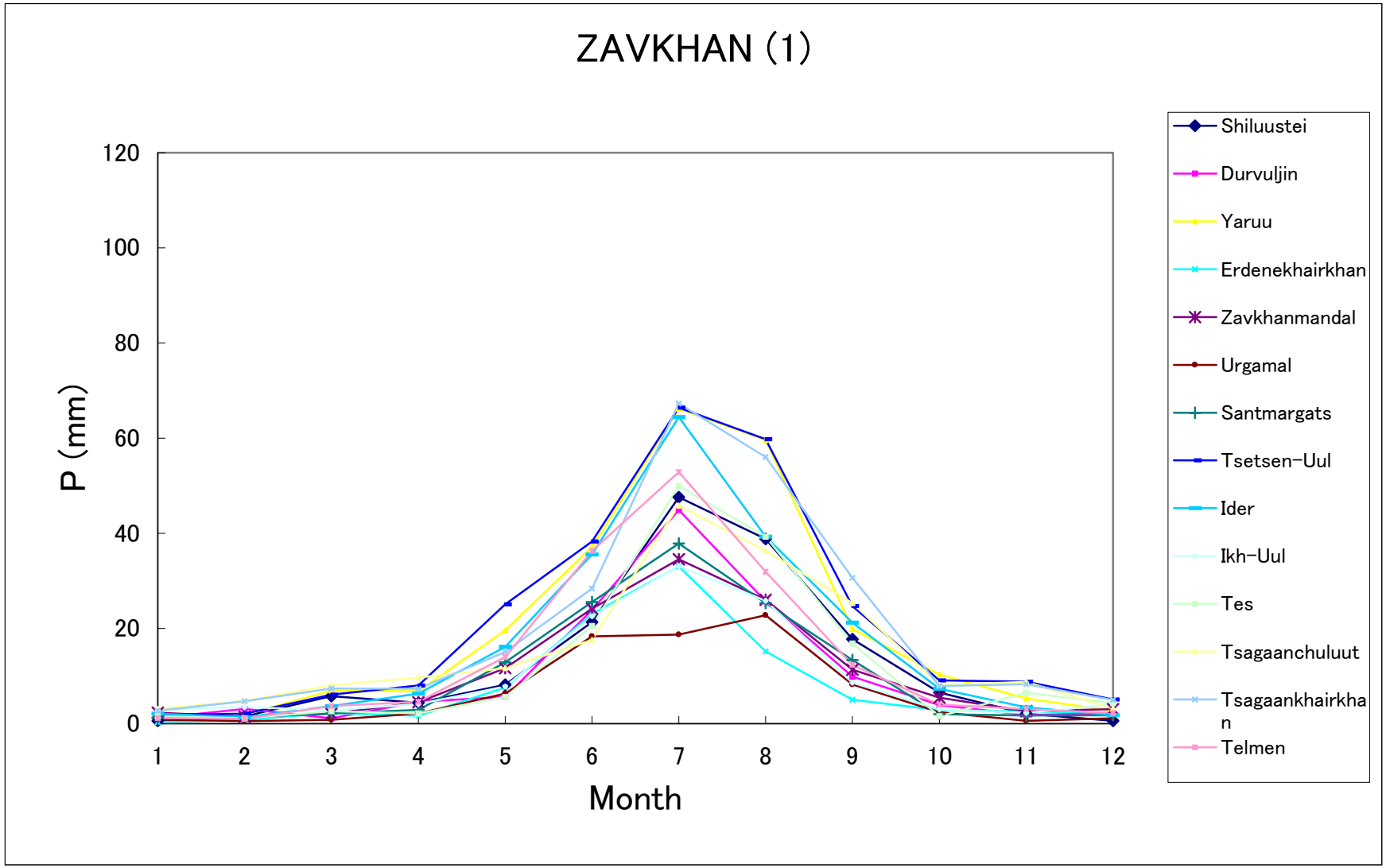
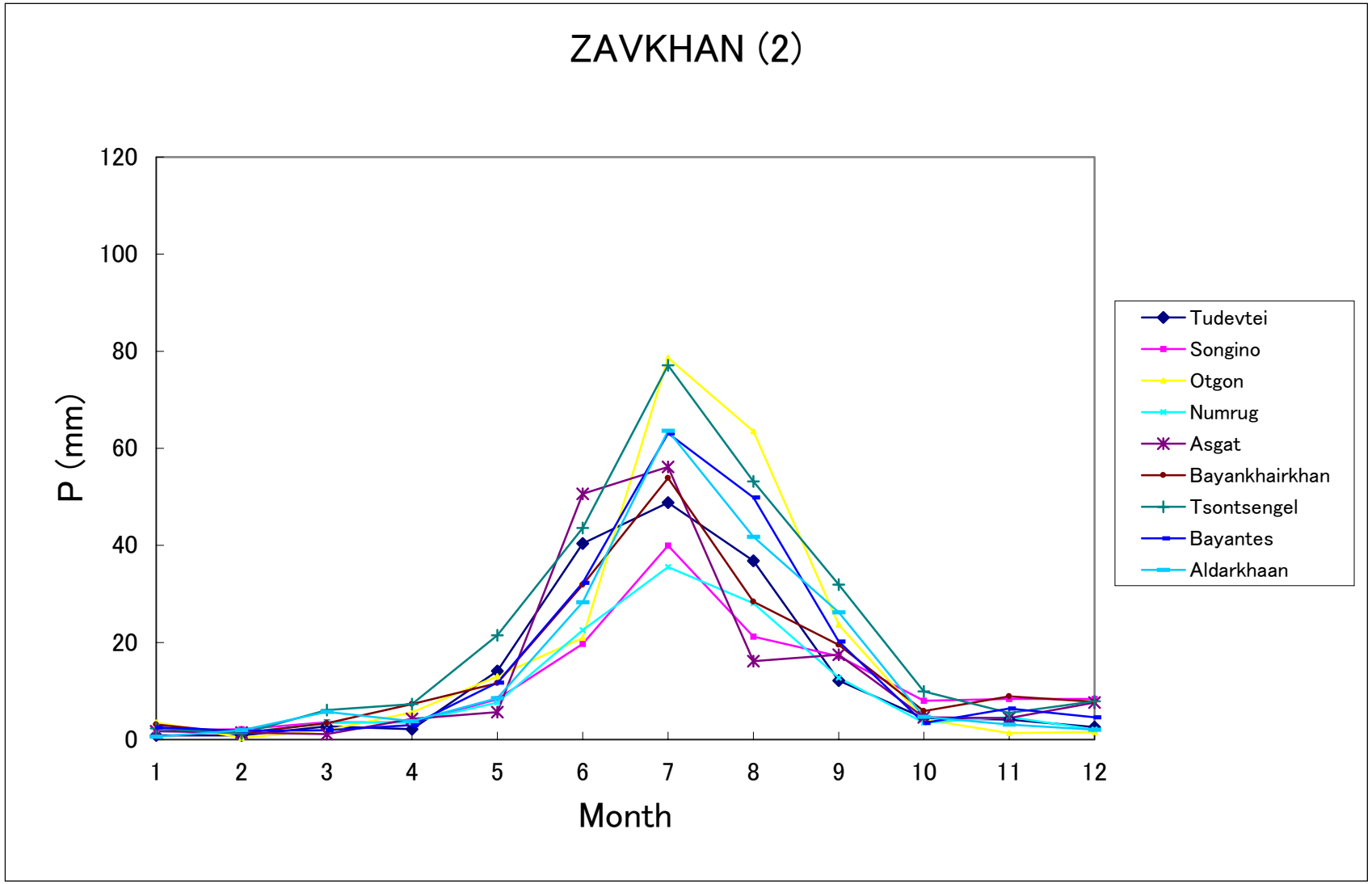
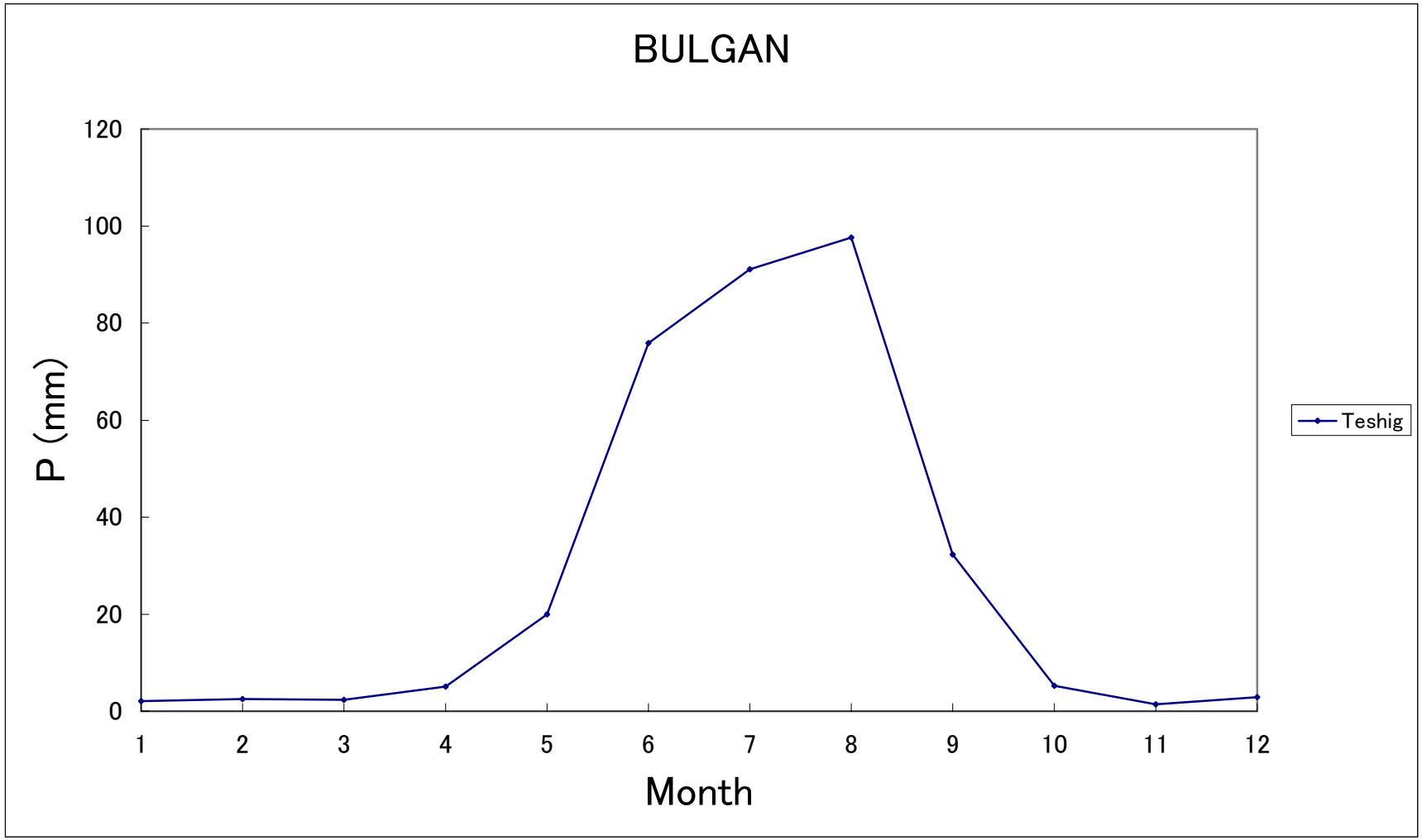
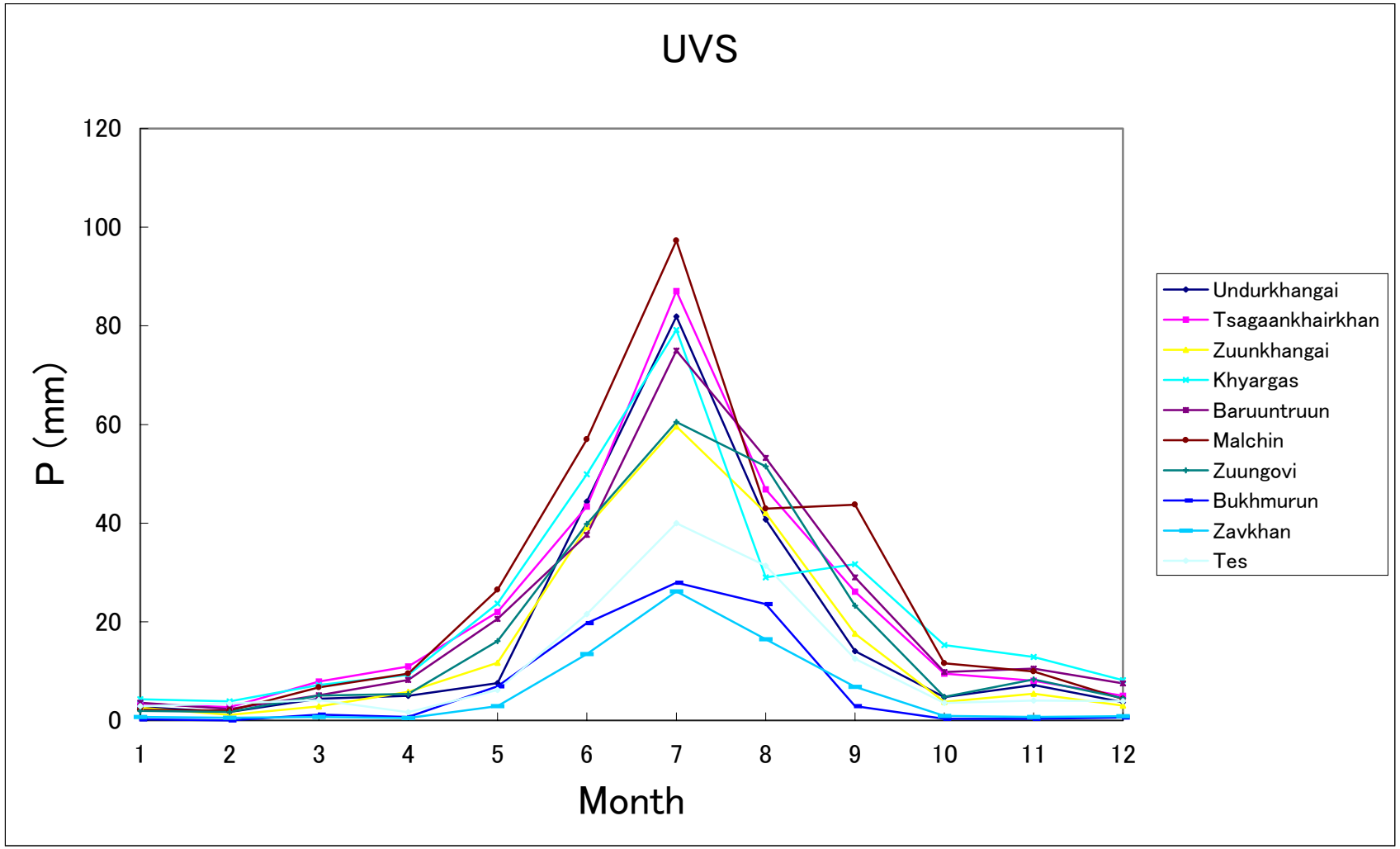
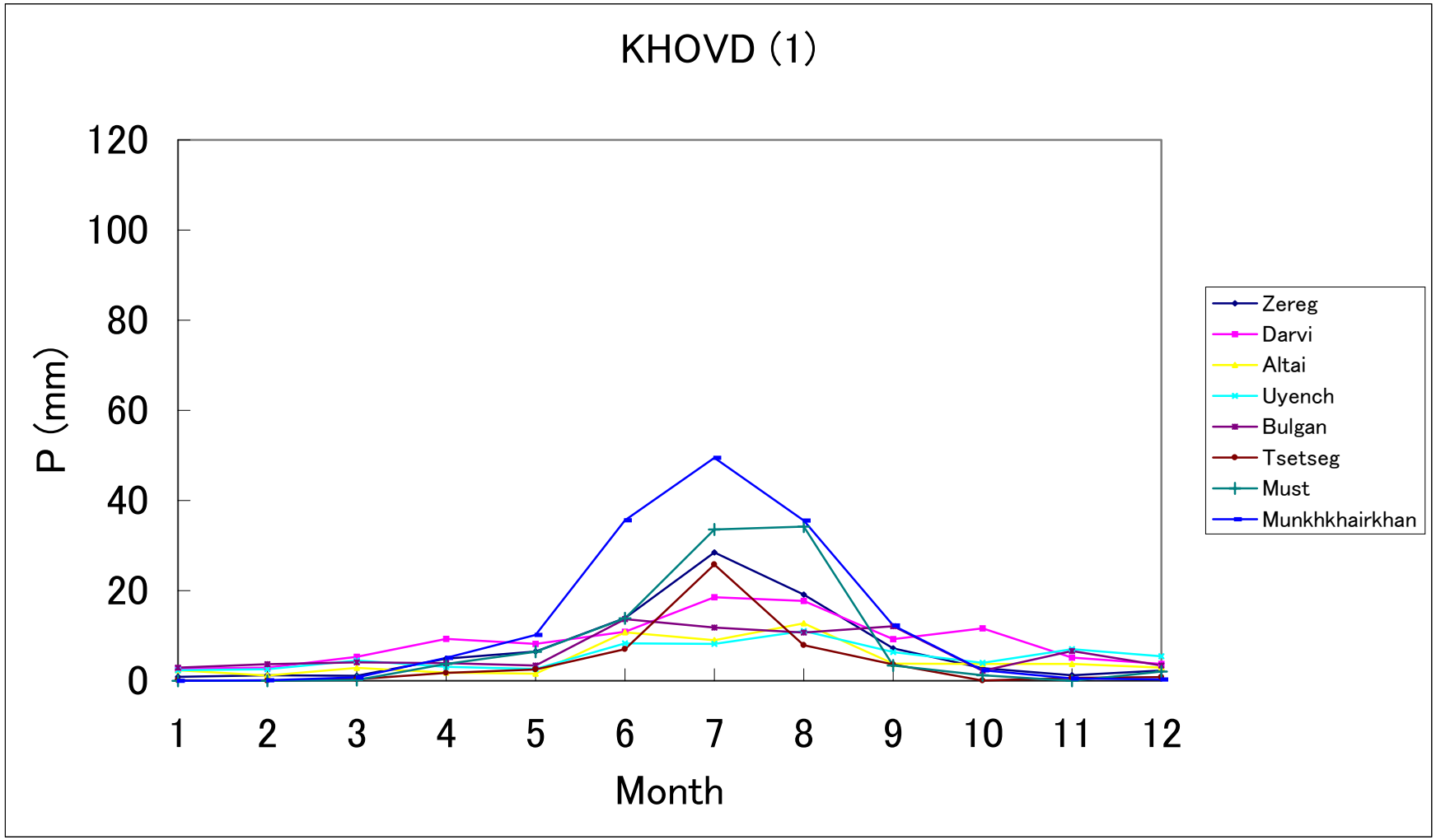
120
100
80
60
40
20
0
1
2
3
4
5
6
7
8
9
10
11
12
Month
Tsagaan-Uul
Ulaan-Uul
Renchinlkhunbe
Tunel
Tosontsengel
Alag-Erdene
Khatgal
Tsagaannuur
Erdenebulgan
Khankh

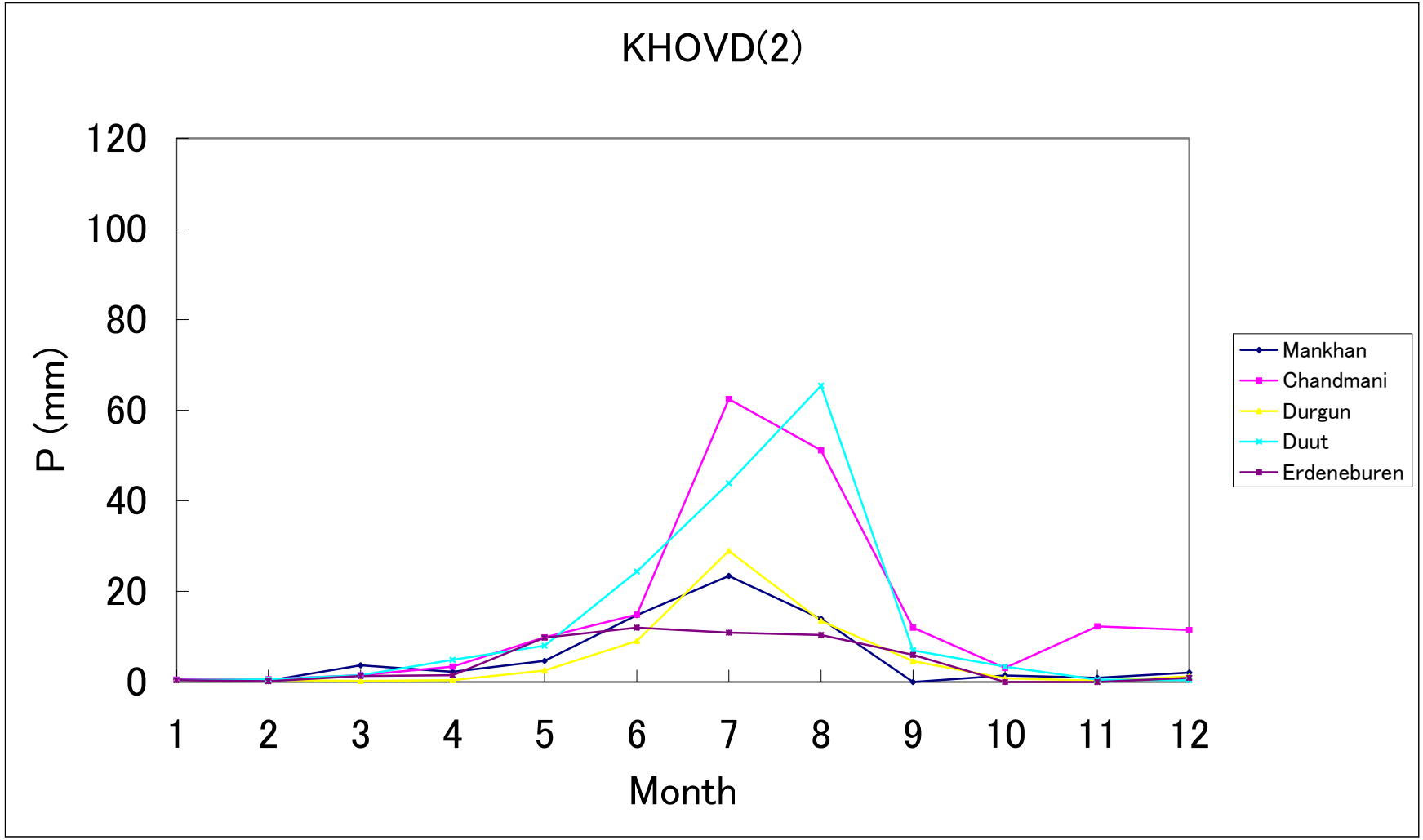

ZAVKHAN (1)
P (mm)
120
100
80
60
40
20
0
1
2
3
4
5
6
7
8
9
10
11
12
Month
Shiluustei
Durvuljin
Yaruu
Erdenekhairkhan
Zavkhanmandal
Urgamal
Santmargats
Tsetsen-Uul
Ider
Ikh-Uul
Tes
Tsagaanchuluut
Tsagaankhairkhan
Telmen

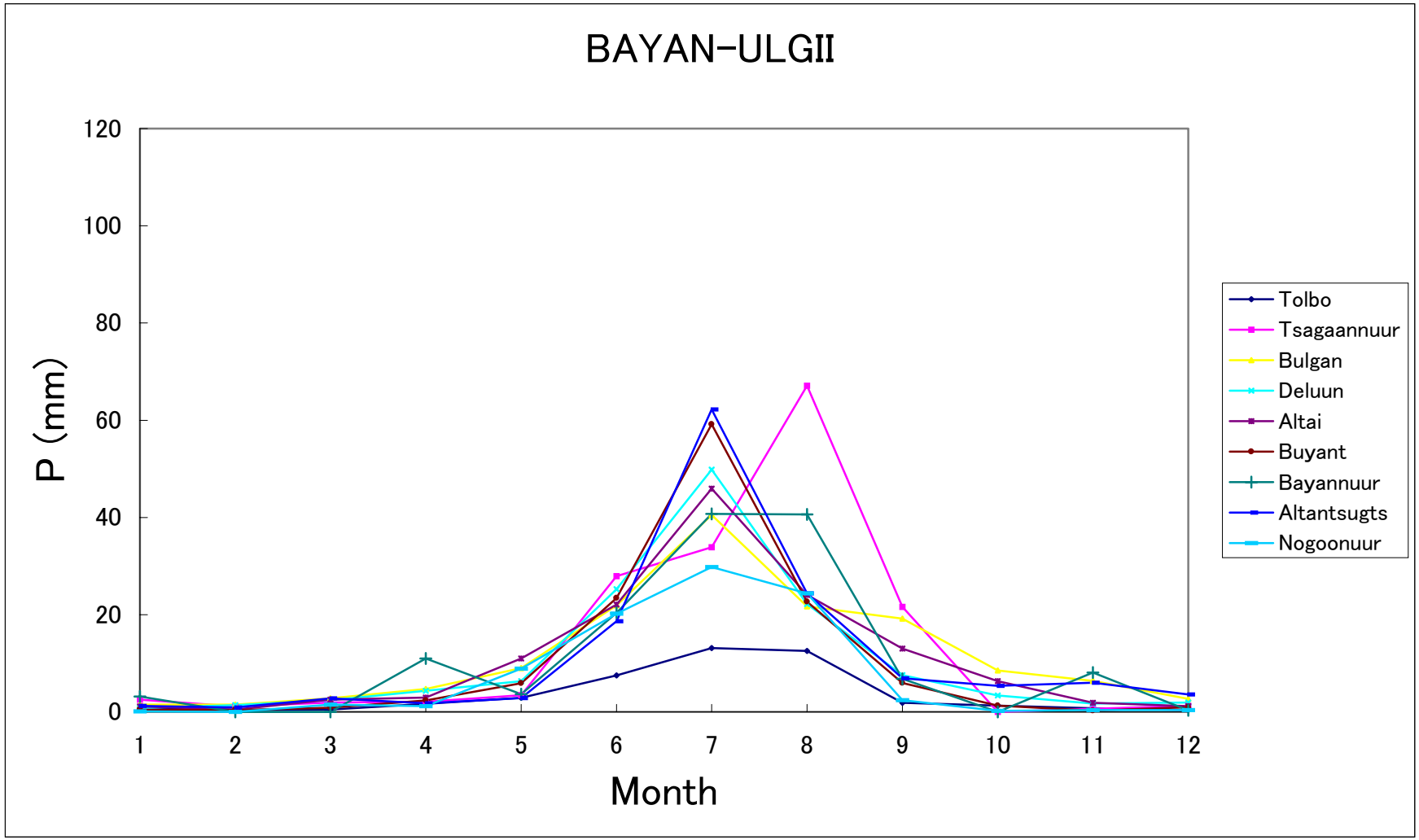

ZAVKHAN (2)
P (mm)
120
100
80
60
40
20
0
1
2
3
4
5
6
7
8
9
10
11
12
Month
Tudevtei
Songino
Otgon
Numrug
Asgat
Bayankhairkhan
Tsontsengel
Bayantes
Aldarkhaan


BULGAN
120
100
80
60
40
20
0
P (mm)
1
2
3
4
5
6
7
8
9
10
11
12
Month
Teshig


UVS
P (mm)
120
100
80
60
40
20
0
1
2
3
4
5
6
7
8
9
10
11
12
Month
Undurkhangai
Tsagaankhairkhan
Zuunkhangai
Khyargas
Baruuntruun
Malchin
Zuungovi
Bukhmurun
Zavkhan
Tes


KHOVD (1)
120
100
80
60
40
20
0
P (mm)
1
2
3
4
5
6
7
8
9
10
11
12
Month
Zereg
Darvi
Altai
Uyench
Bulgan
Tsetseg
Must
Munkhkhairkhan


KHOVD(2)
120
100
80
60
40
20
0
P (mm)
1
2
3
4
5
6
7
8
9
10
11
12
Month
Mankhan
Chandmani
Durgun
Duut
Erdeneburen

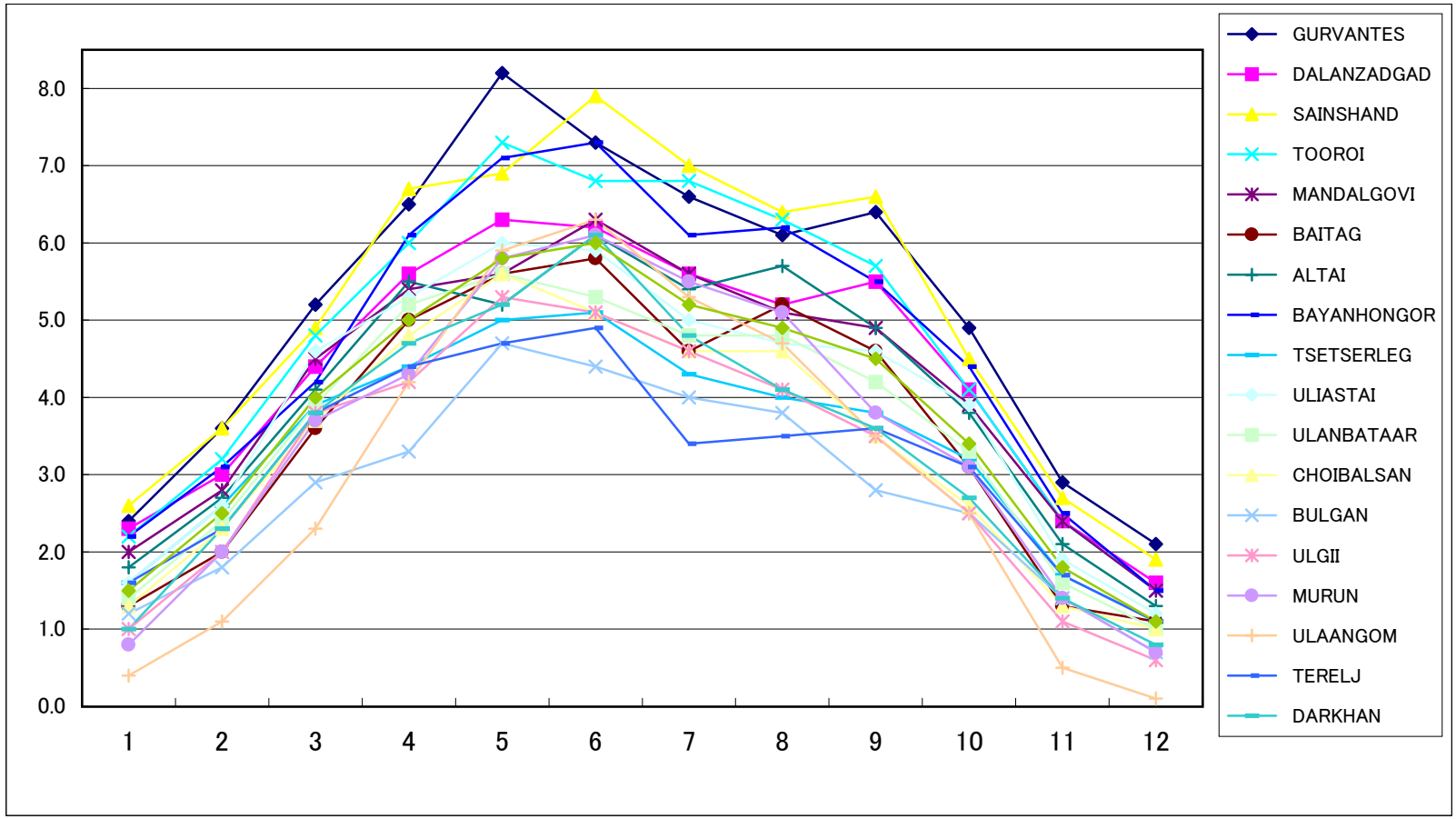

BAYAN-ULGII
P (mm)
120
100
80
60
40
20
0
1
2
3
4
5
6
7
8
9
10
11
12
Month
Tolbo
Tsagaannuur
Bulgan
Deluun
Altai
Buyant
Bayannuur
Altantsugts
Nogoonuur

3.4 Monthly Solar Irradiation

Global Solar Irradiation of Mongolian Country (kWh/m2・day)

S. No.	Meteorological Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Average	Latitude (Deg Min)	Longitude (Deg Min)	Elevation (Meter)
1	GURVANTES	2.4	3.6	5.2	6.5	8.2	7.3	6.6	6.1	6.4	4.9	2.9	2.1	5.1	43 14 N	101 02 E	1,725.8
2	DALANZADGAD	2.3	3.0	4.4	5.6	6.3	6.2	5.6	5.2	5.5	4.1	2.4	1.6	4.3	43 35 N	104 25 E	1,469.0
3	SAINSHAND	2.6	3.6	4.9	6.7	6.9	7.9	7.0	6.4	6.6	4.5	2.7	1.9	5.1	44 53 N	110 10 E	938.0
4	TOOROI	2.2	3.2	4.8	6.0	7.3	6.8	6.8	6.3	5.7	4.1	2.4	1.5	4.7	44 56 N	096 46 E	1,182.0
5	MANDALGOVI	2.0	2.8	4.5	5.4	5.6	6.3	5.6	5.1	4.9	3.9	2.4	1.5	4.1	45 46 N	106 17 E	1,397.0
6	BAITAG	1.3	2.0	3.6	5.0	5.6	5.8	4.6	5.2	4.6	3.1	1.3	1.1	3.6	46 07 N	091 38 E	1,186.0
7	ALTAI	1.8	2.7	4.1	5.5	5.2	6.1	5.4	5.7	4.9	3.8	2.1	1.3	4.0	46 24 N	096 15 E	2,181.0
8	BAYANHONGOR	2.2	3.1	4.2	6.1	7.1	7.3	6.1	6.2	5.5	4.4	2.5	1.5	4.6	46 46 N	100 41 E	1,859.0
9	TSETSERLEG	1.6	2.6	3.9	4.4	5.0	5.1	4.3	4.0	3.8	3.2	1.7	1.1	3.3	47 27 N	101 38 E	1,694.0
10	ULIASTAI	1.6	2.6	4.6	5.3	6.0	5.9	5.0	4.7	4.6	3.9	1.9	1.2	3.9	47 45 N	096 50 E	1,750.0
11	ULANBATAAR	1.4	2.4	3.9	5.2	5.6	5.3	4.8	4.8	4.2	3.3	1.6	1.0	3.6	47 56 N	106 56 E	1,305.0
12	TERELJ	1.6	2.3	3.8	4.4	4.7	4.9	3.4	3.5	3.6	3.1	1.7	1.1	3.1	47 59 N	107 29 E	1,540.0
13	CHOIBALSAN	1.3	2.3	3.7	4.8	5.6	5.1	4.6	4.6	3.5	2.6	1.3	1.0	3.3	48 04 N	114 30 E	759.0
14	BULGAN	1.2	1.8	2.9	3.3	4.7	4.4	4.0	3.8	2.8	2.5	1.4	0.7	2.7	48 48 N	103 33 E	1,209.0
15	ULGII	1.0	2.0	3.8	4.2	5.3	5.1	4.6	4.1	3.5	2.5	1.1	0.6	3.1	48 58 N	098 58 E	1,714.0
16	DARKHAN	1.0	2.3	3.8	4.7	5.2	6.1	4.8	4.1	3.6	2.7	1.4	0.8	3.3	49 28 N	105 59 E	706.0
17	MURUN	0.8	2.0	3.7	4.3	5.8	6.1	5.5	5.1	3.8	3.1	1.4	0.7	3.5	49 38 N	100 10 E	1,288.0
18	ULAANGOM	0.4	1.1	2.3	4.2	5.9	6.3	5.3	4.7	3.5	2.5	0.5	0.1	3.0	49 58 N	092 05 E	939.0
	Monthly Average	1.5	2.5	4.0	5.0	5.8	6.0	5.2	4.9	4.5	3.4	1.8	1.1	**3.8**			

Average data from 1988 to 1997


8.0
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6.0
5.0
4.0
3.0
2.0
1.0
0.0
1
2
3
4
5
6
7
8
9
10
11
12
GURVANTES
DALANZADGAD
SAINSHAND
TOOROI
MANDALGOVI
BAITAG
ALTAI
BAYANHONGOR
TSETSERLEG
ULIASTAI
ULANBATAAR
CHOIBALSAN
BULGAN
ULGII
MURUN
ULAANGOM
TERELJ
DARKHAN

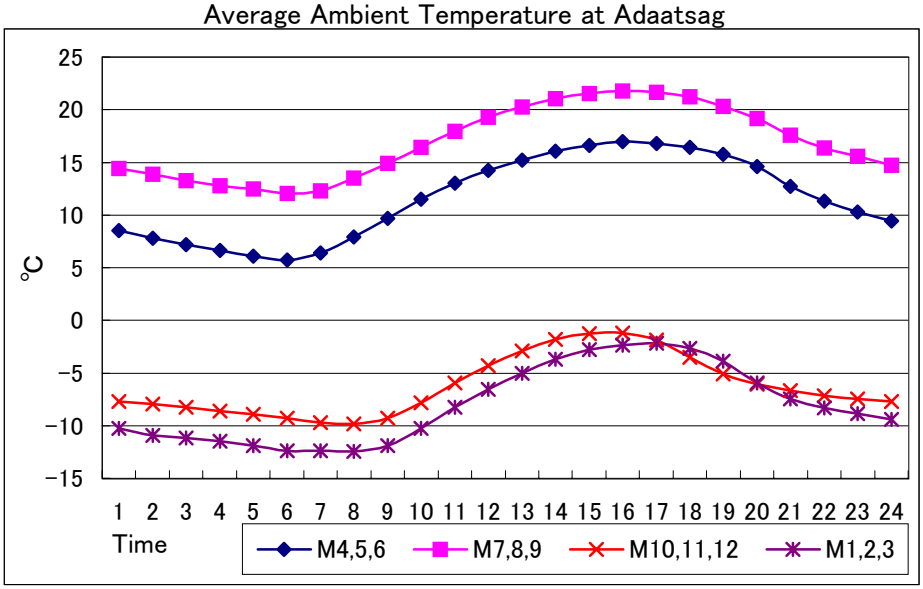
CHAPTER 4 PILOT PLANT DATA

4 PILOT PLANT DATA

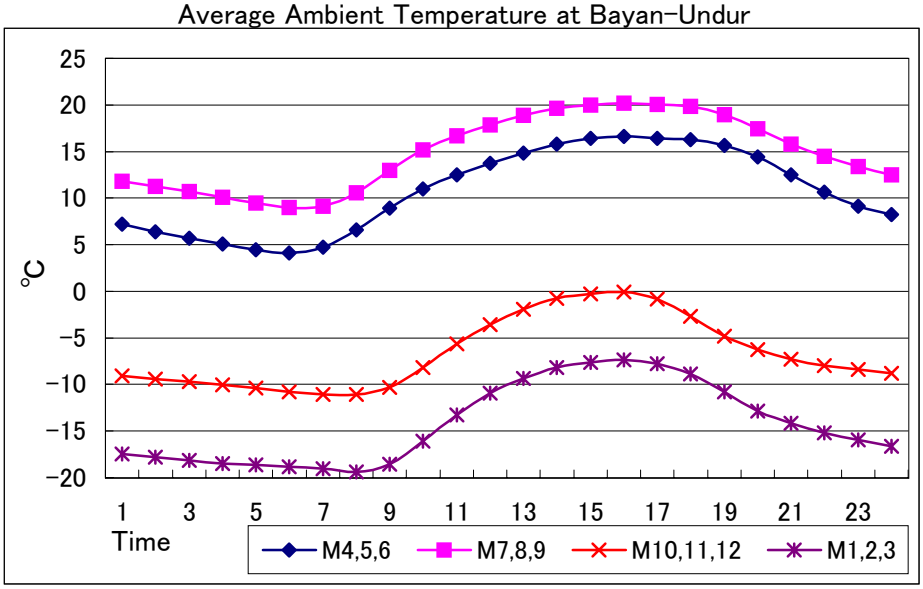
4. 1 Temperature

4.1.1 Diurnal Ambient Temperature (℃)

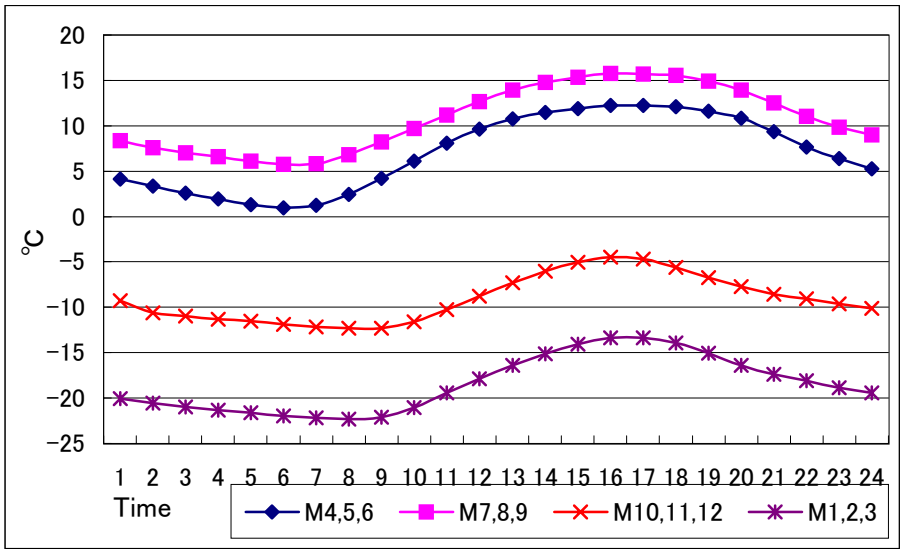
Average Ambient Temperature at Adaatsag



Average Ambient Temperature at Bayan-Undur

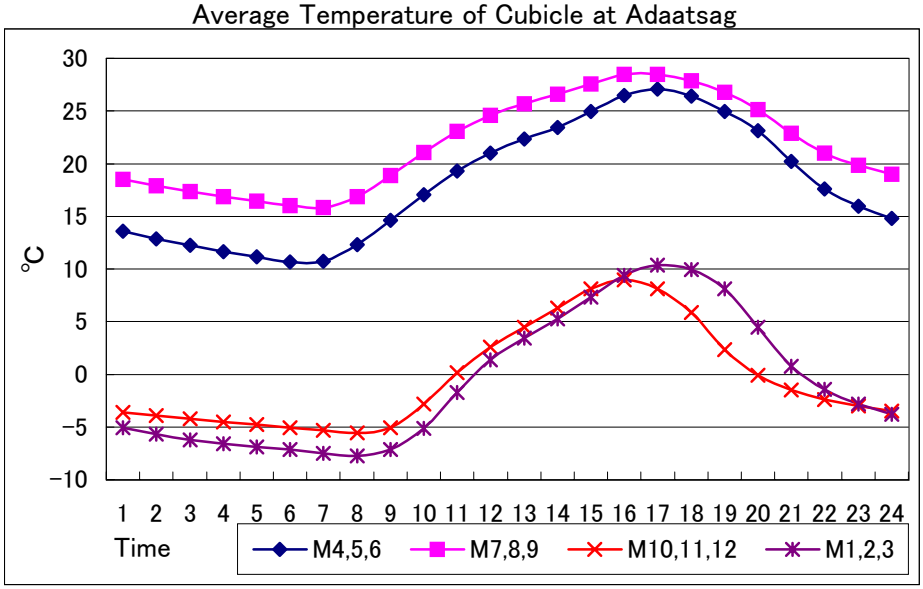


Average Ambient Temperature at Tariat

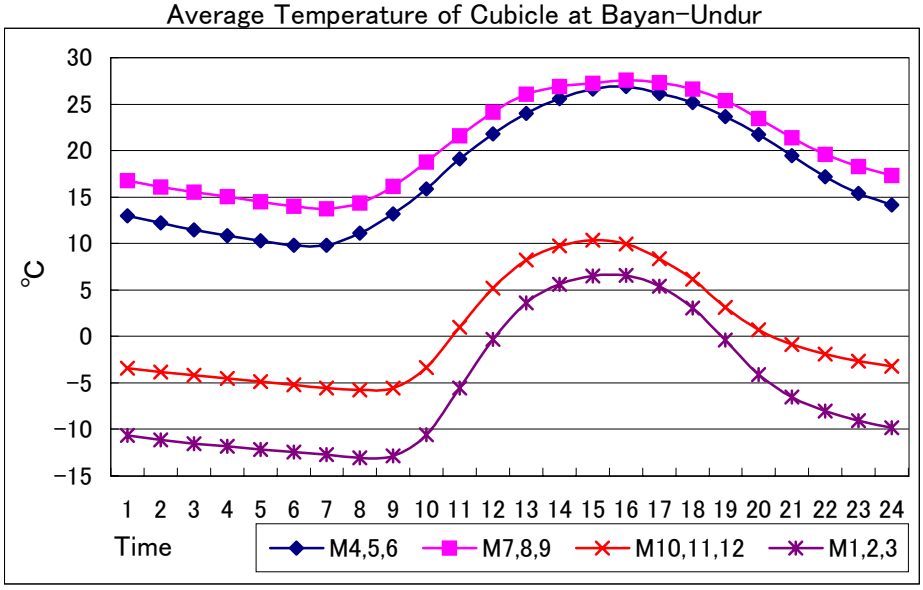


4.1.2 Diurnal Temperature in Cubicle (℃)

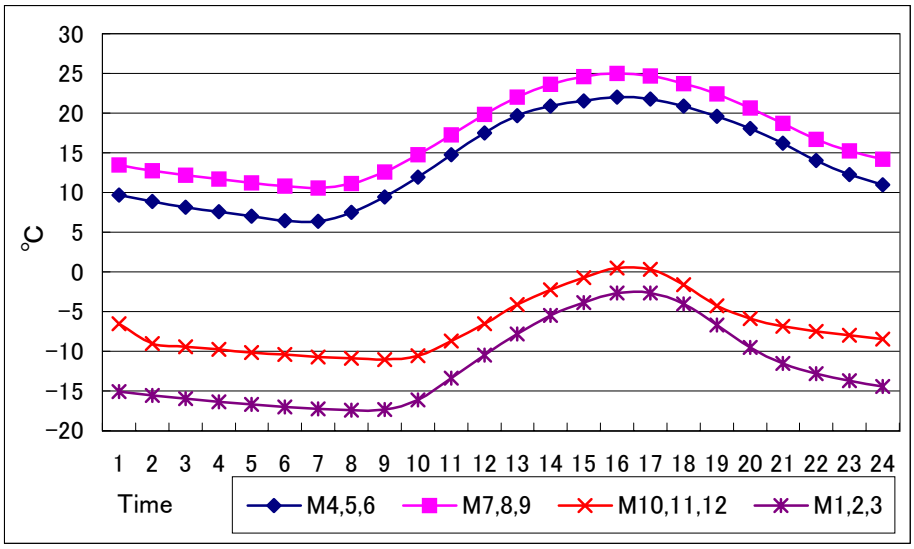
Average Temperature of Cubicle at Adaatsag



Average Temperature of Cubicle at Bayan-Undur

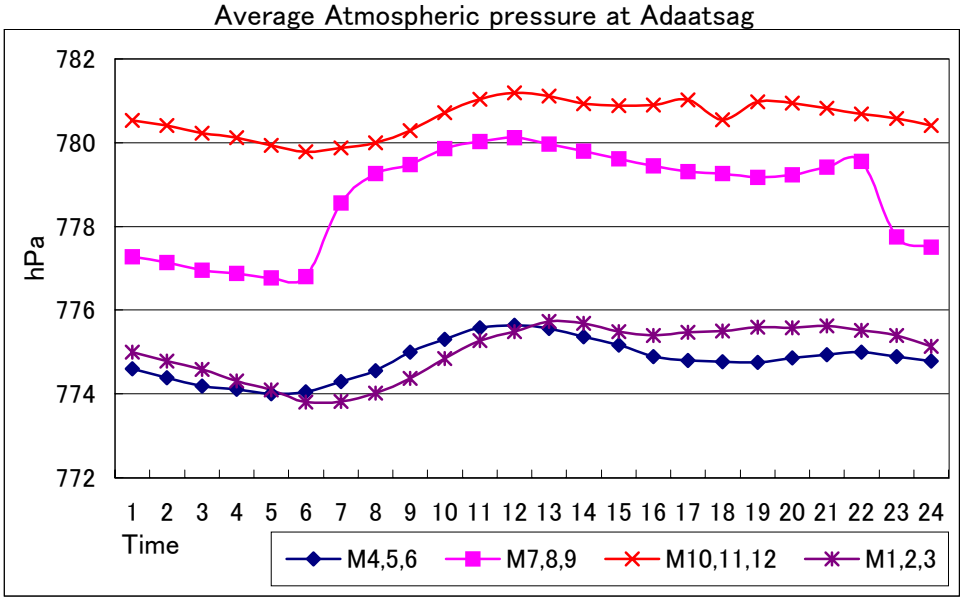


Average Temperature of Cubicle at Tariat

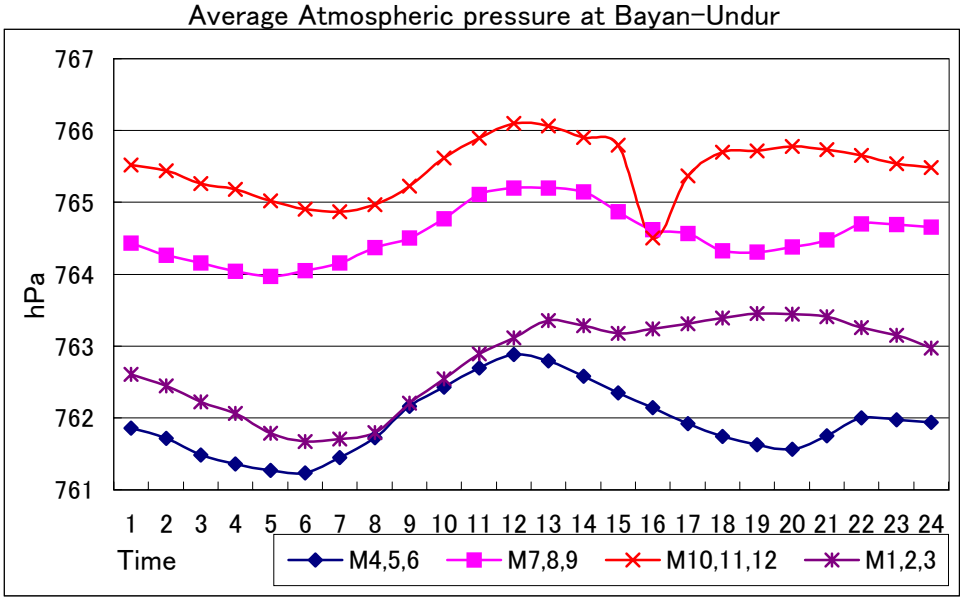


4.2 Barometric Pressure (hPa)

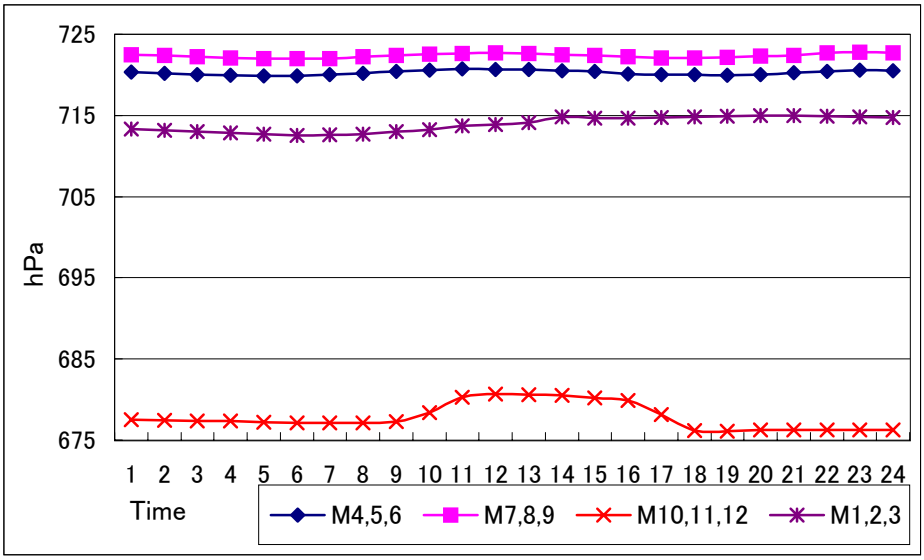
Average Atmospheric pressure at Adaatsag



Average Atmospheric pressure at Bayan-Undur

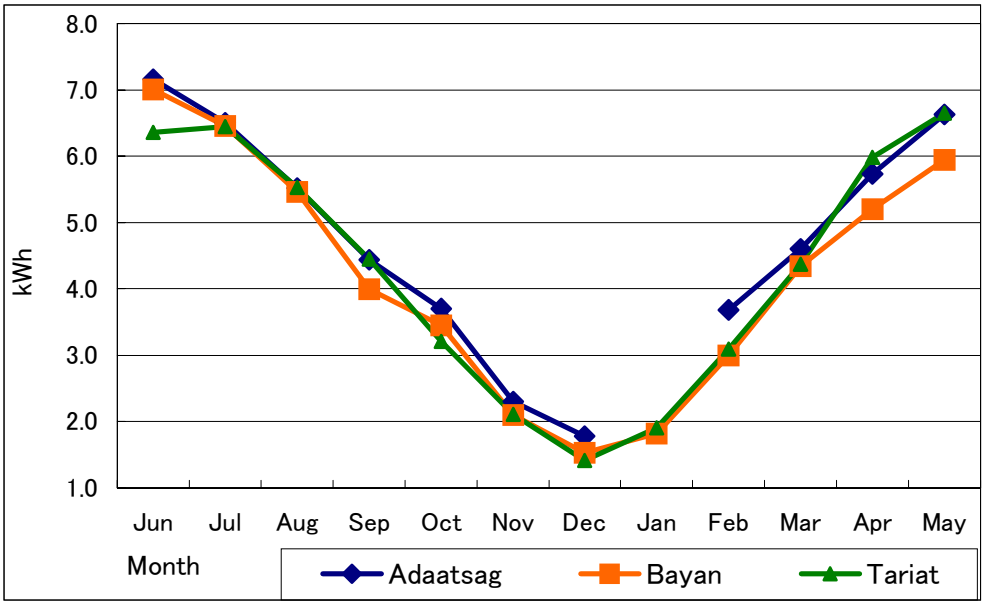


Average Atmospheric pressure at Tariat



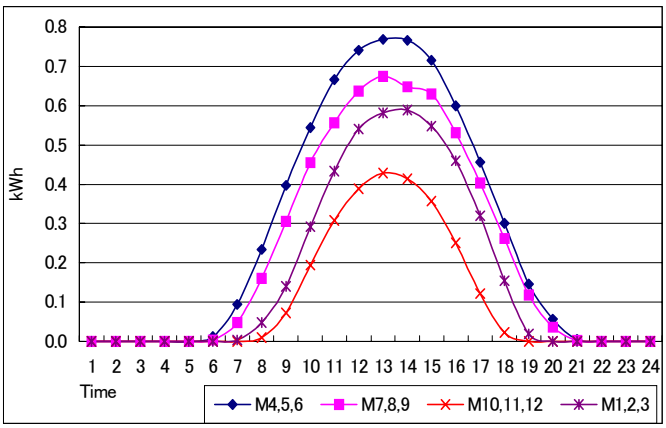
4.3 Solar Irradiation

4.3.1 Monthly Horizontal Solar Irradiation

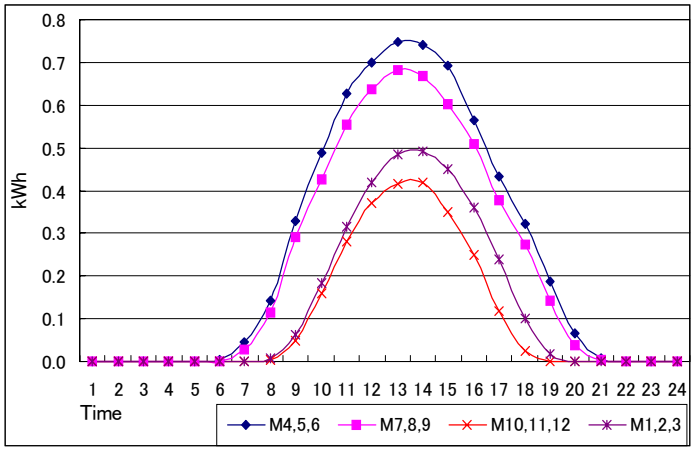


4.3.2 Diurnal Horizontal Solar Irradiation

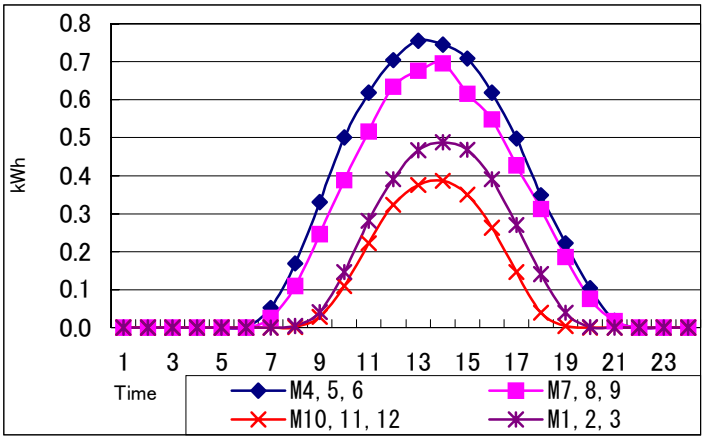
Time wise Global Irradiation of Adaatsag



Time wise Global Irradiation of Bayan-Undur

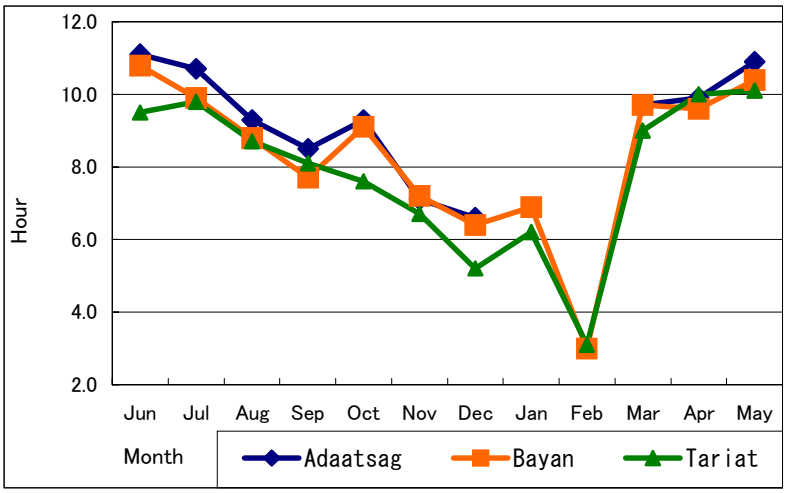


Time wise Global Irradiation of Tariat



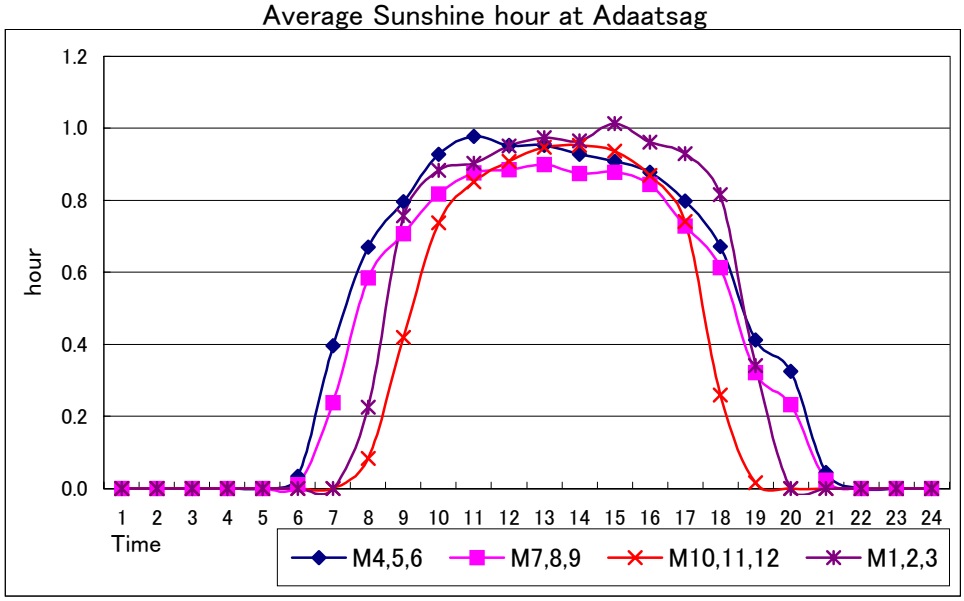
4.4 Sunshine Hour

4.4.1 Monthly Average Sunshine Hour

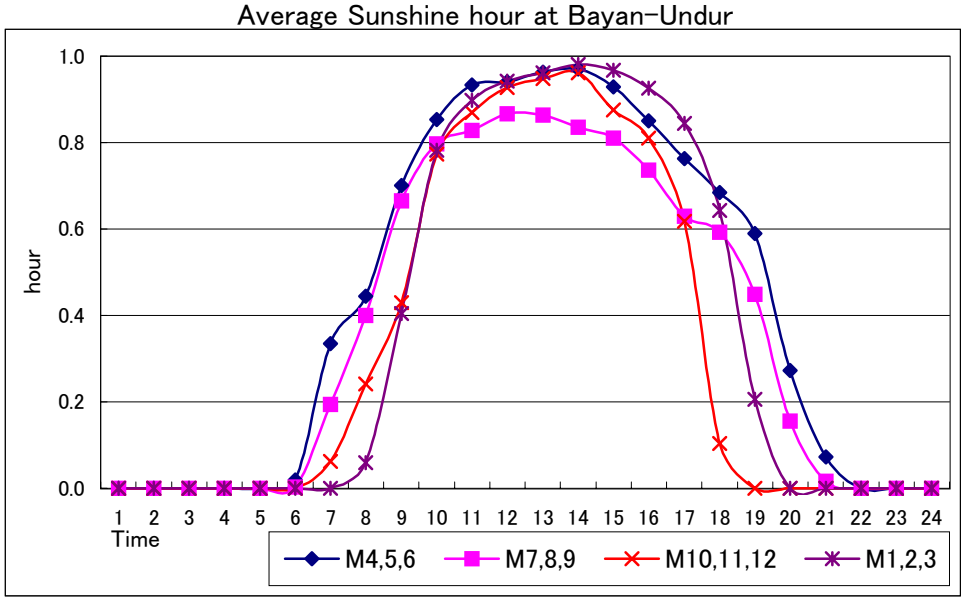


4.4.2 Diurnal Average Sunshine Hour

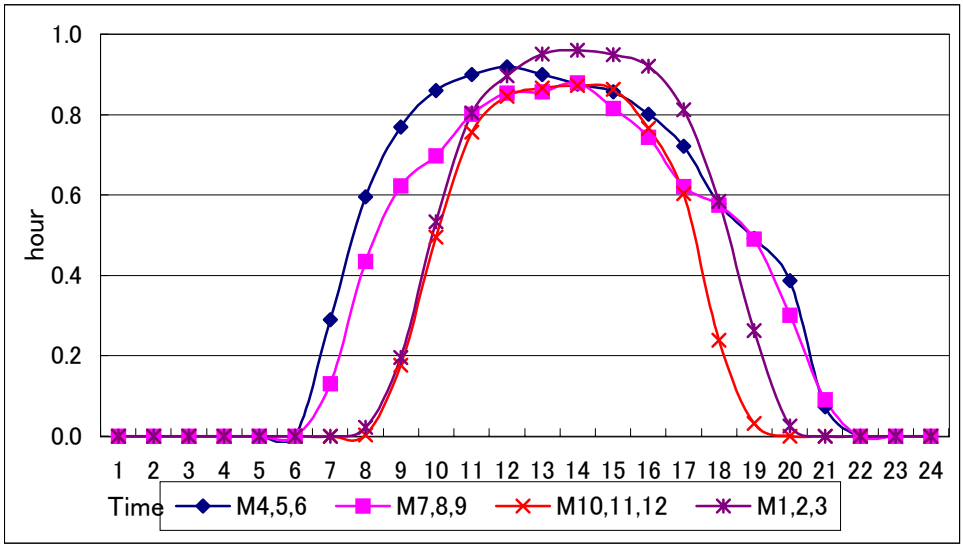
Average Sunshine hour at Adaatsag



Average Sunshine hour at Bayan-Undur

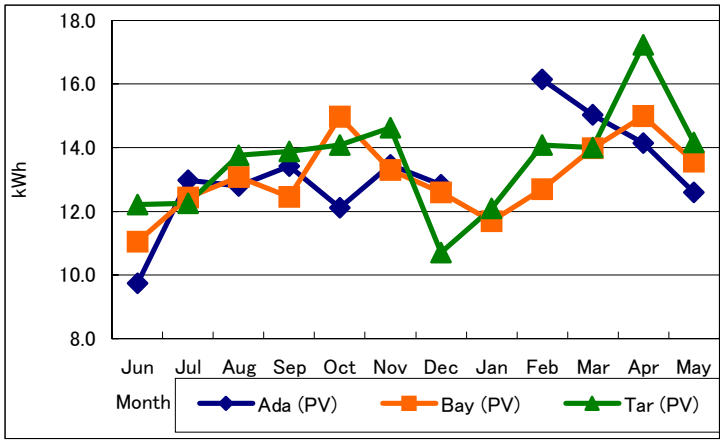


Average Sunshine hour at Tariat

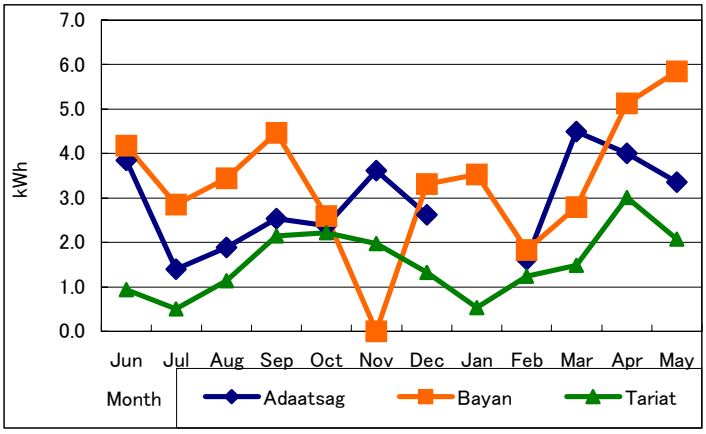


4.5 Power Output

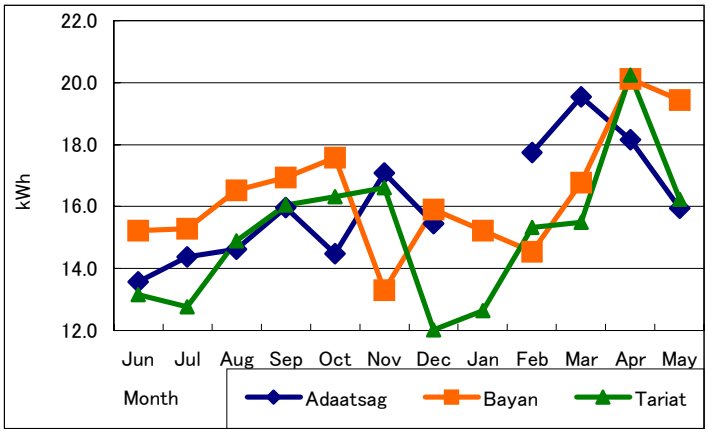
4.5.1 Monthly Average Power Output by PV-generation



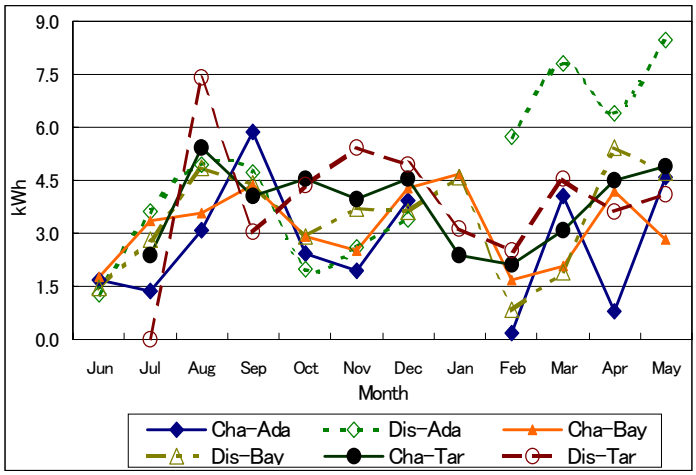
4.5.2 Monthly Average Power Output by Wind-generation



4.5.3 Monthly Average Power Output by PV and Wind generation

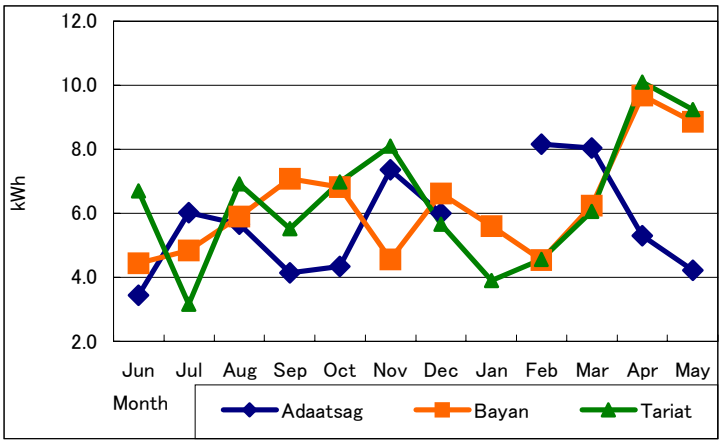


4.6 Monthly Average Charge/Discharge of Storage Battery

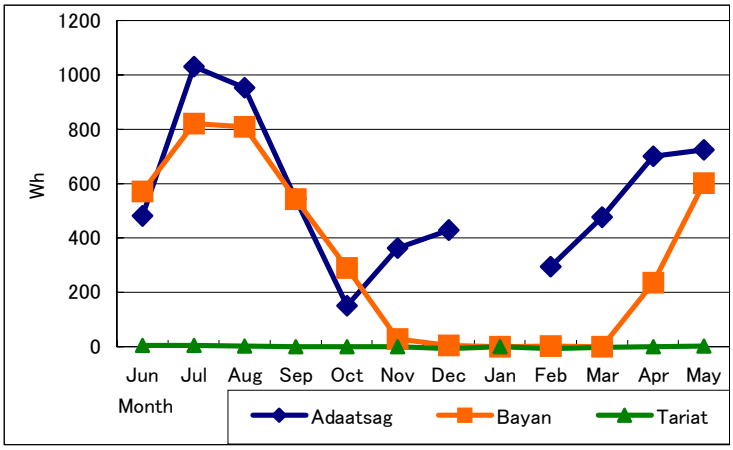


4.7 Monthly Average Power Generation

4.7.1 Alternative Current (AC) Power

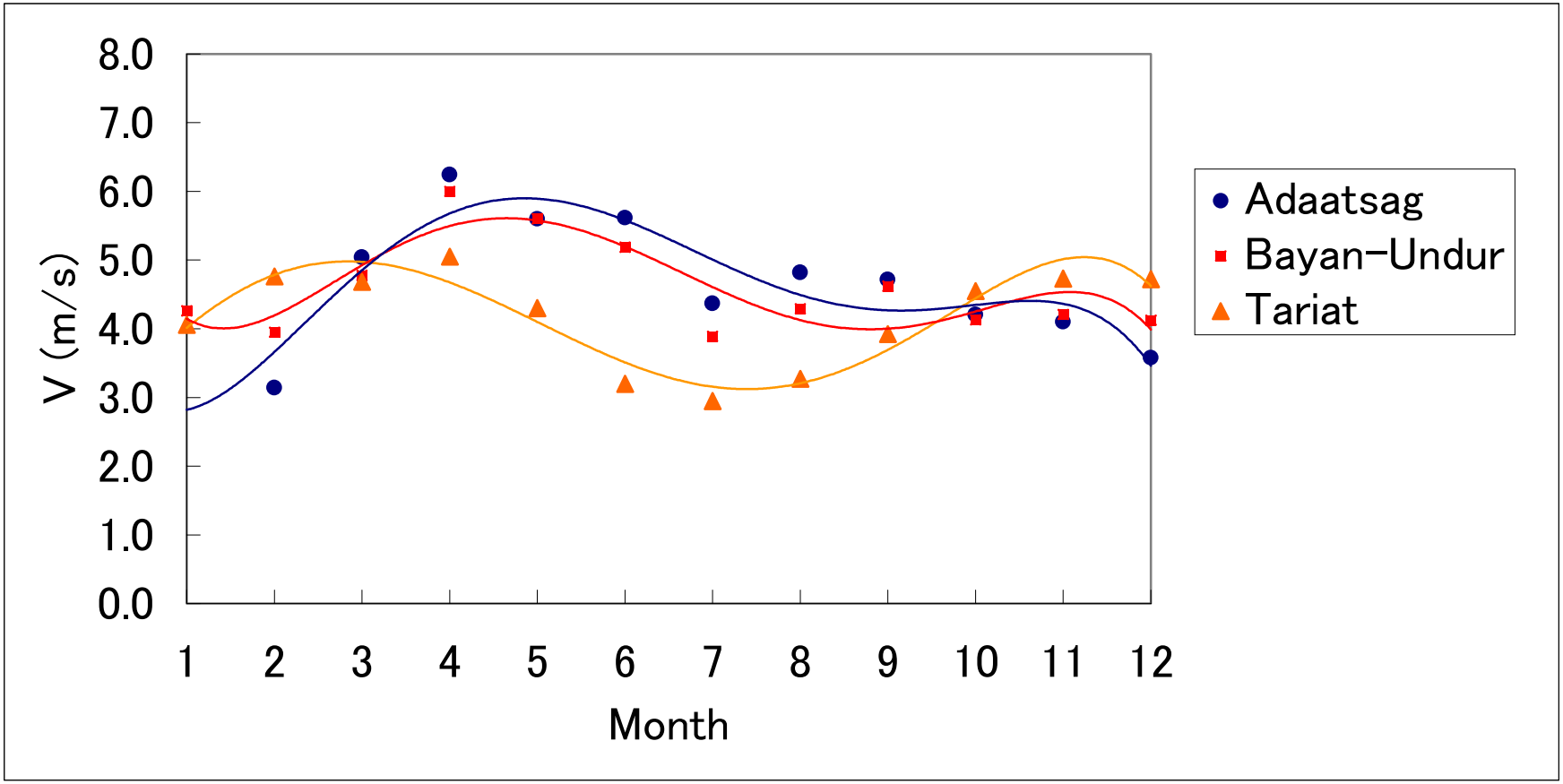


4.7.2 Direct Current (DC) Power



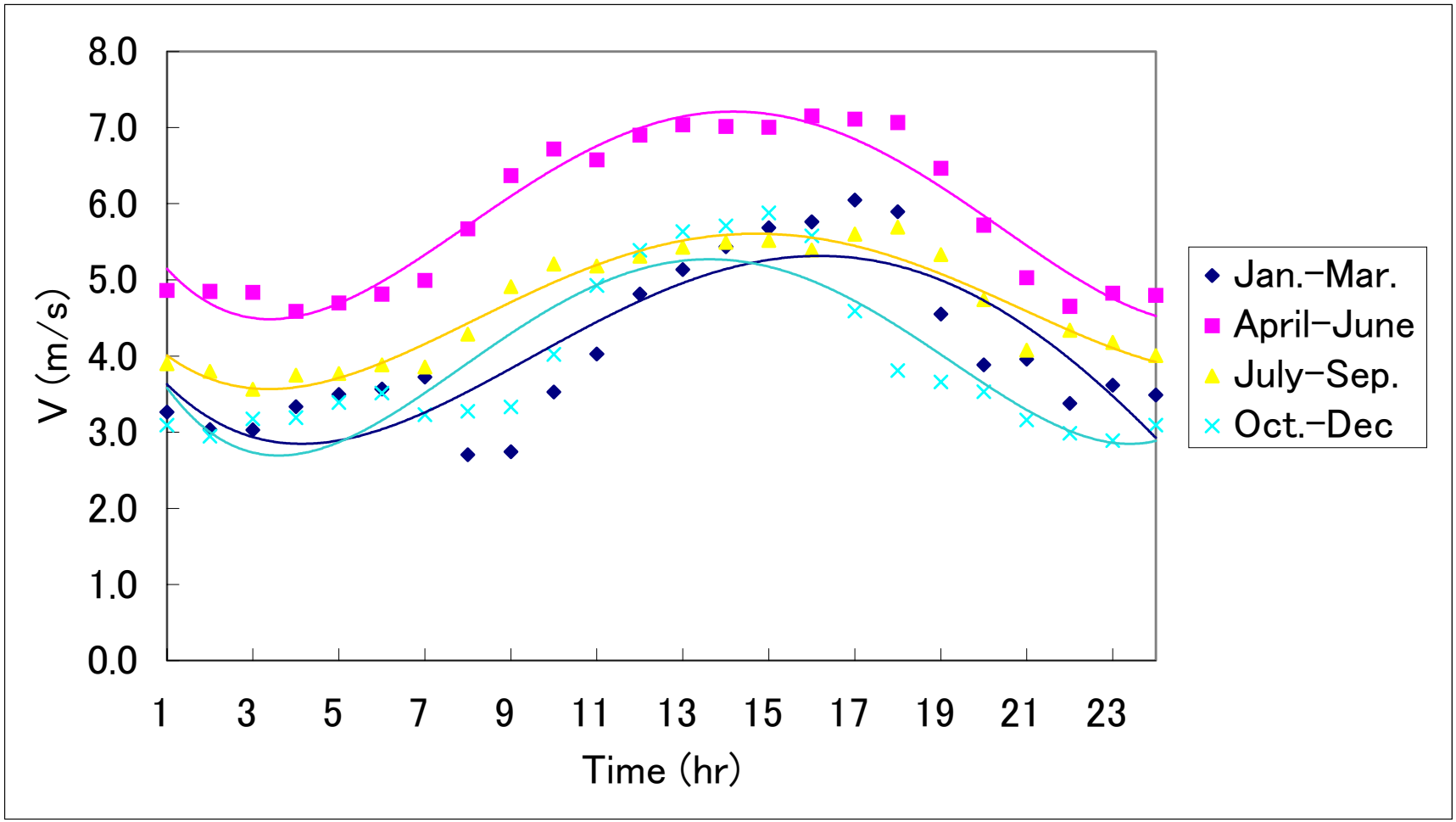
4.8 Wind Energy

4.8.1 Monthly Average Wind Speed



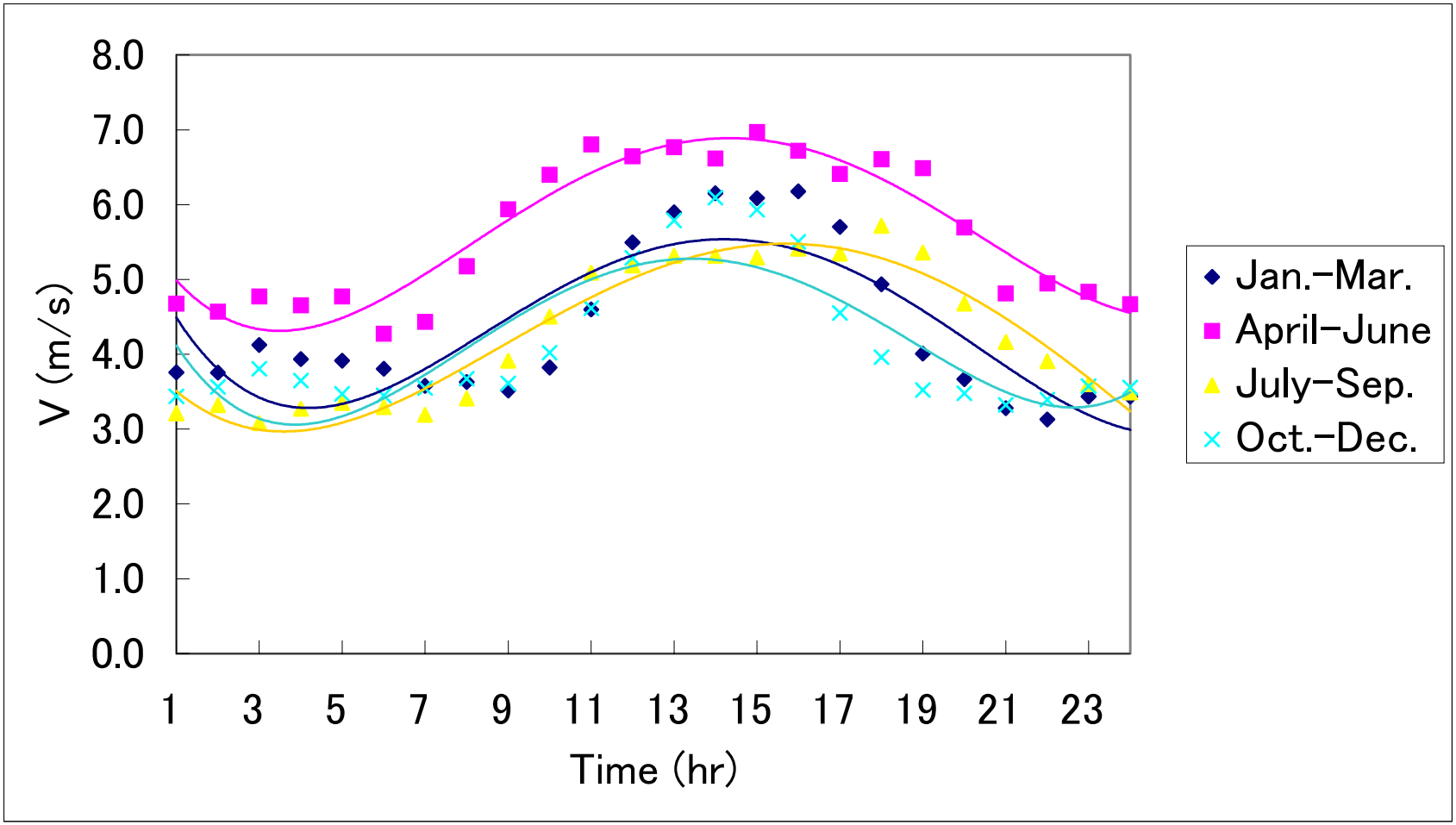
4.8.2 Diurnal Average Wind Speed

◆ Adaatsag



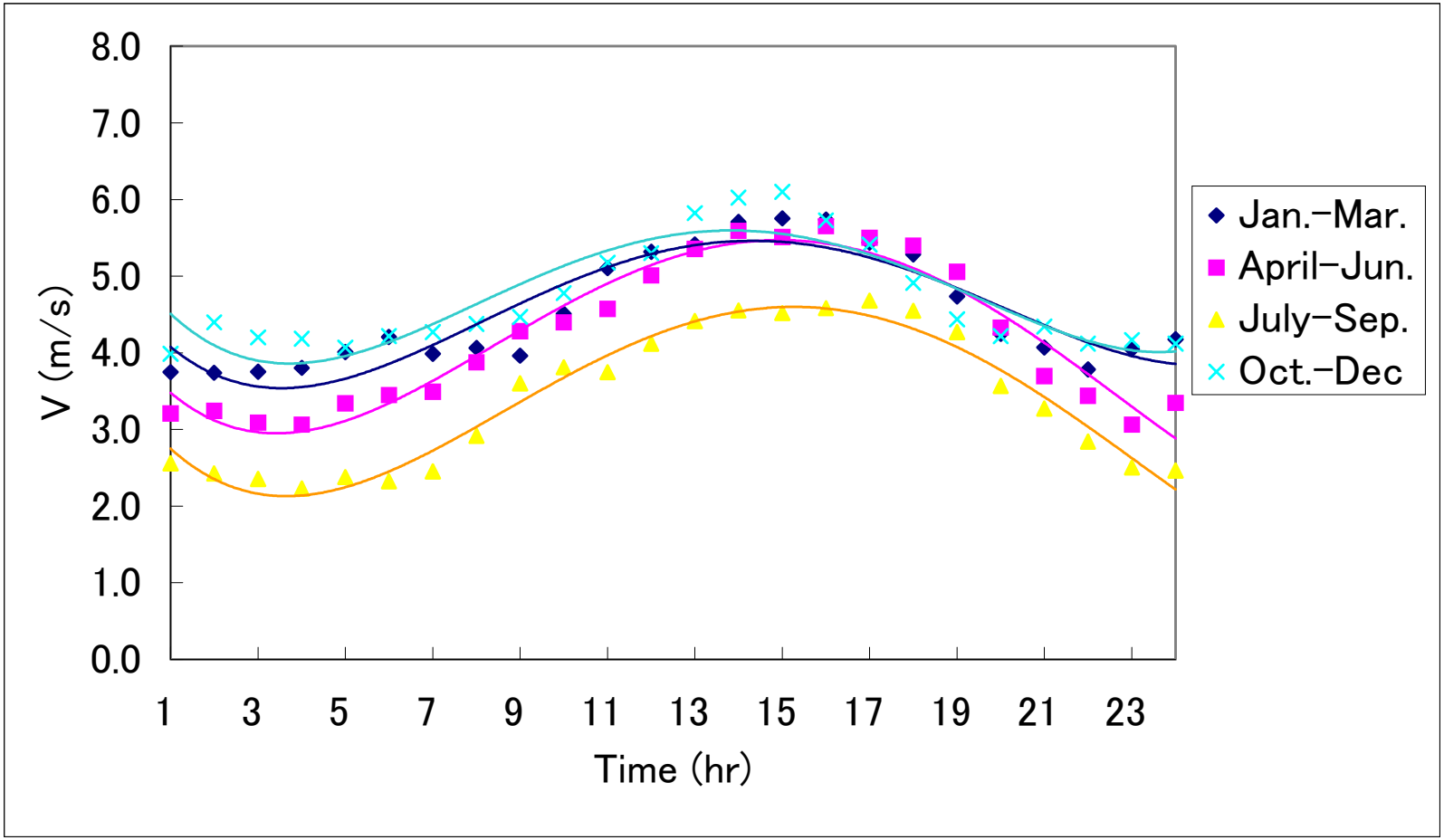
4.8.2 Diurnal Average Wind Speed

◆ Bayan-Undur



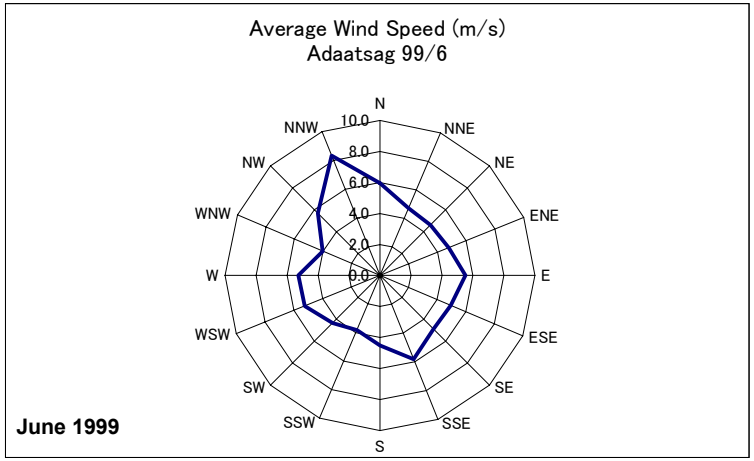
4.8.2 Diurnal Average Wind Speed

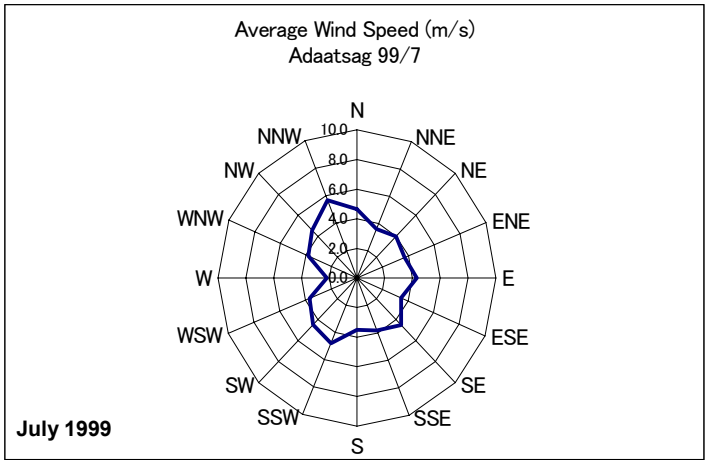
◆ Tariat

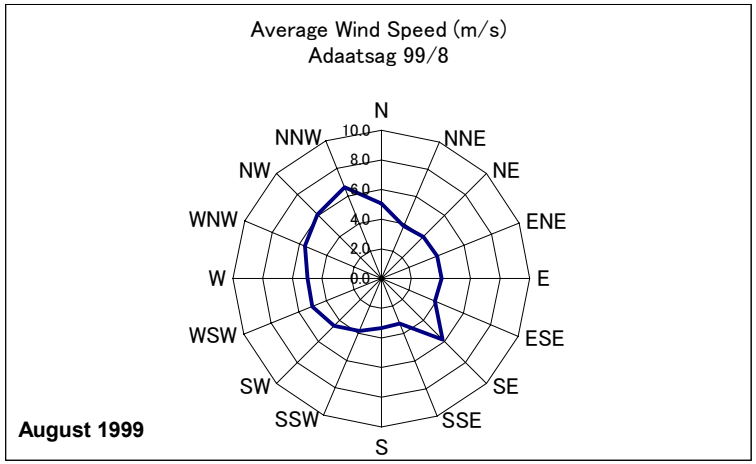


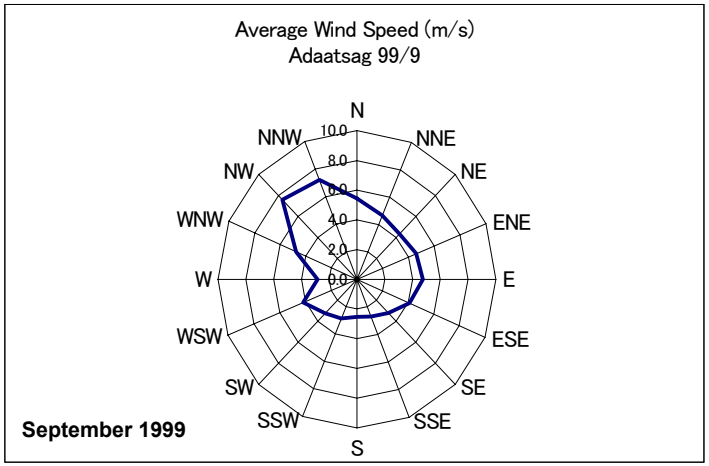
4.8.3 Monthly Average Directional Wind Speed

◆ Adaatsag



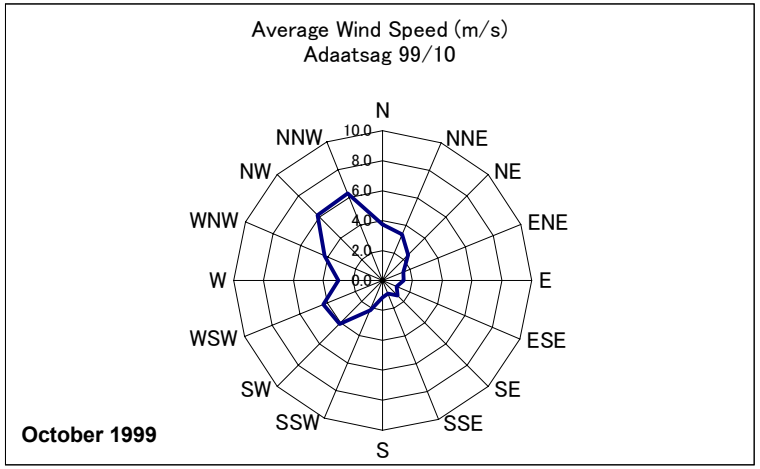


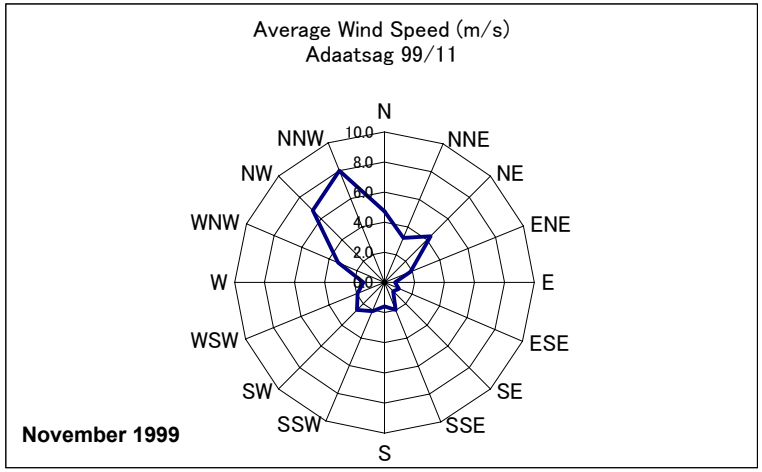


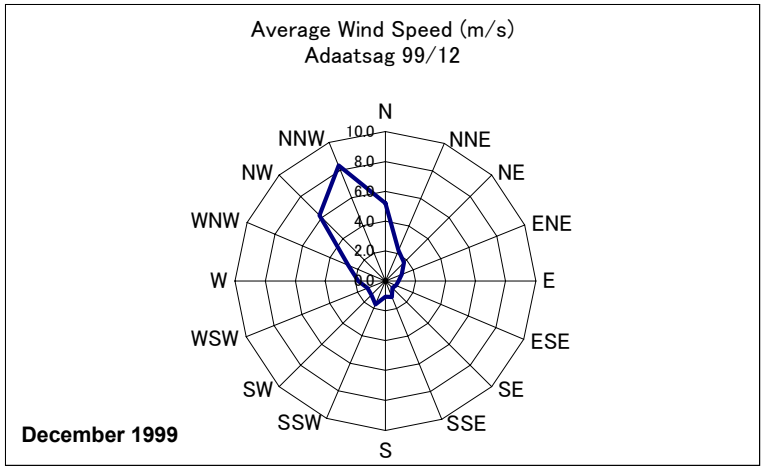


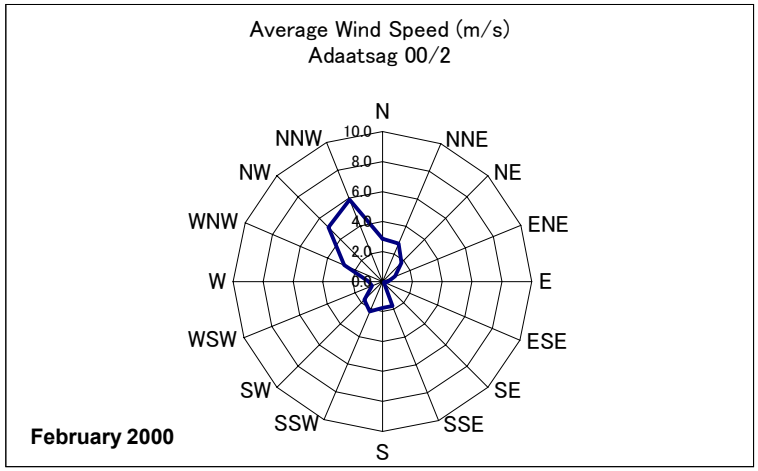
4.8.3 Monthly Average Directional Wind Speed

◆ Adaatsag (cont'd)



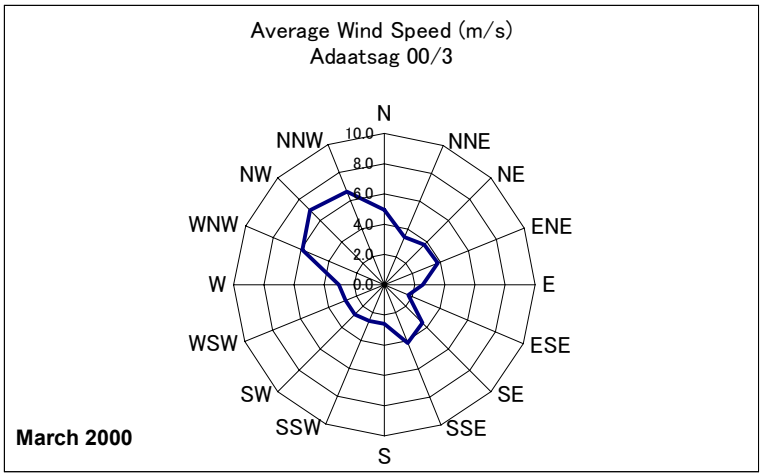


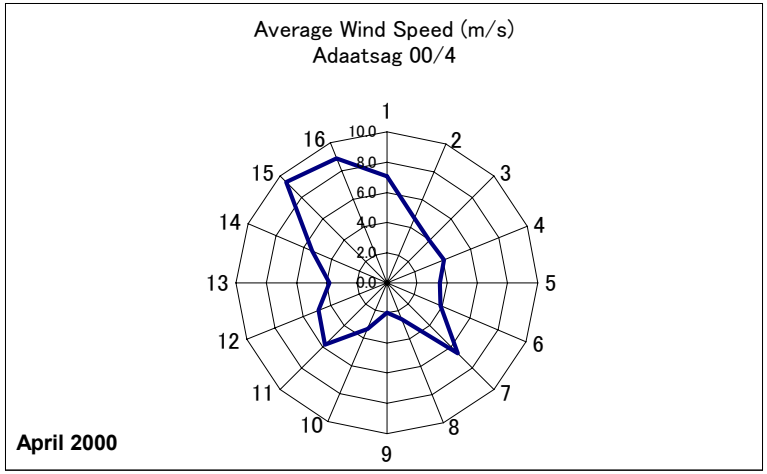


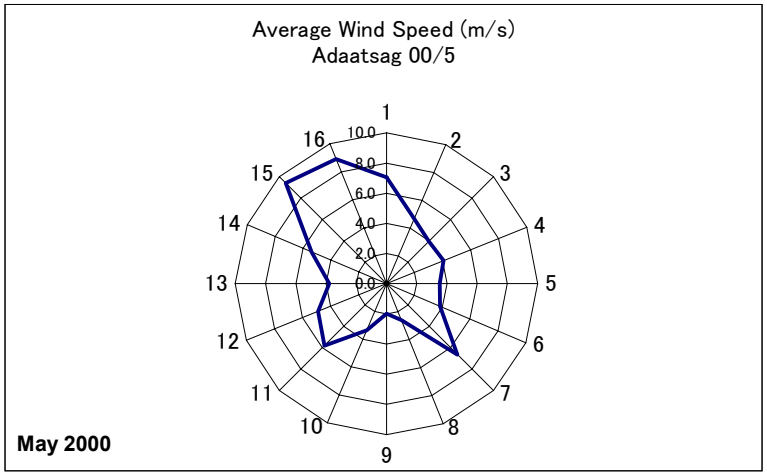


4.8.3 Monthly Average Directional Wind Speed

◆ Adaatsag (cont'd)

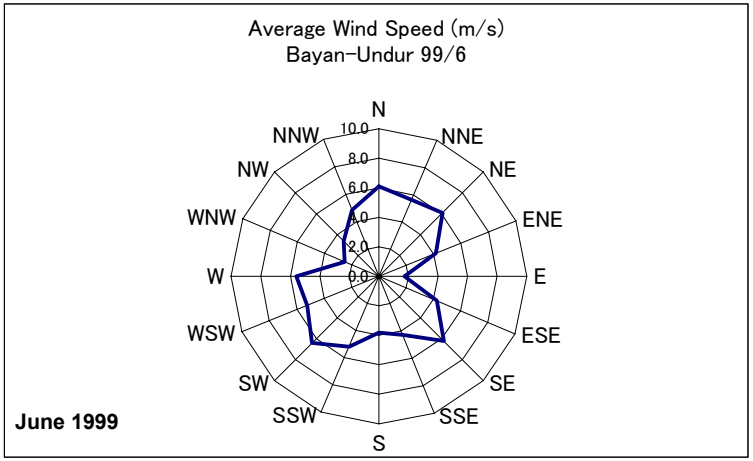


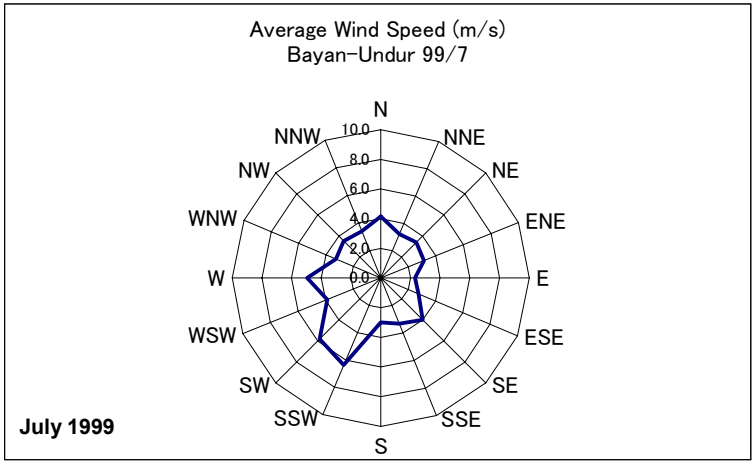


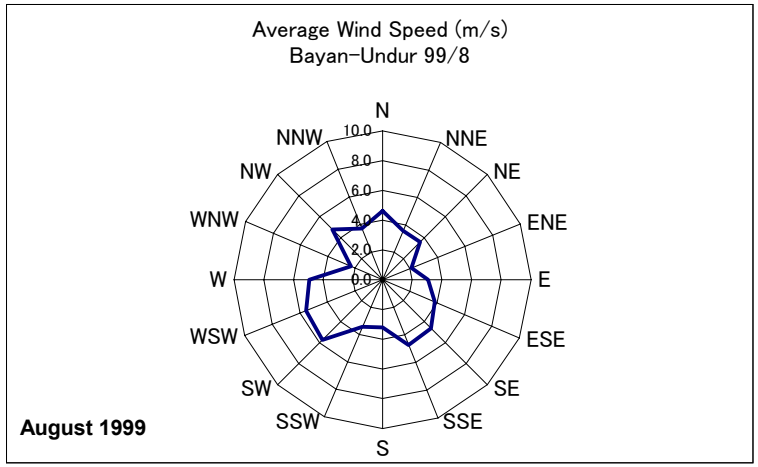


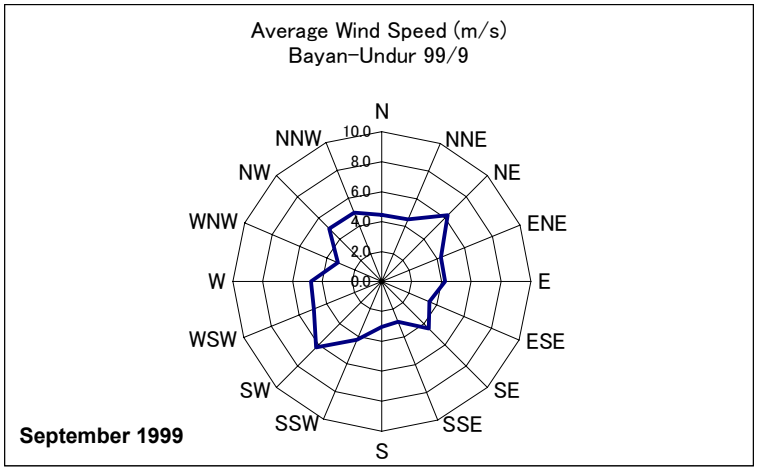
4.8.3 Monthly Average Directional Wind Speed

◆ Bayan-Undur



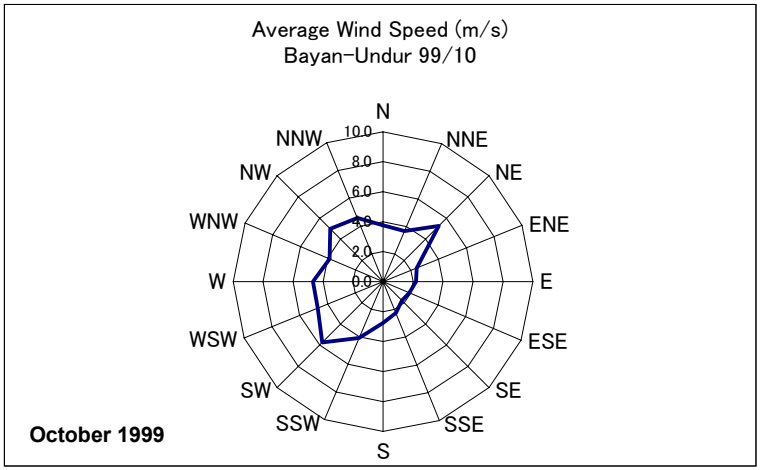


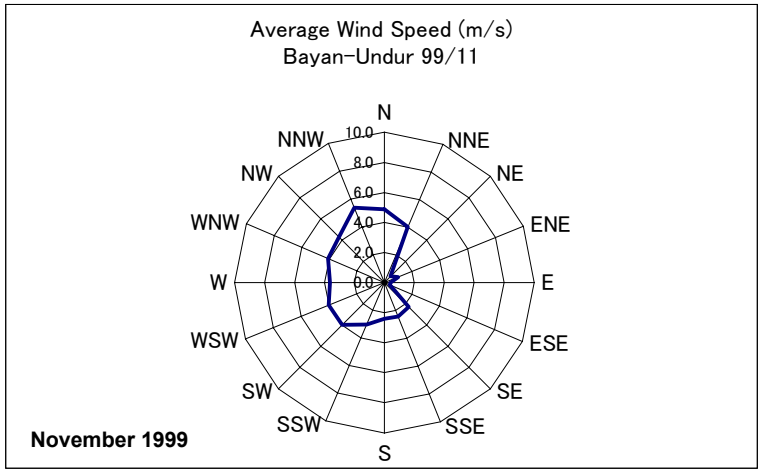


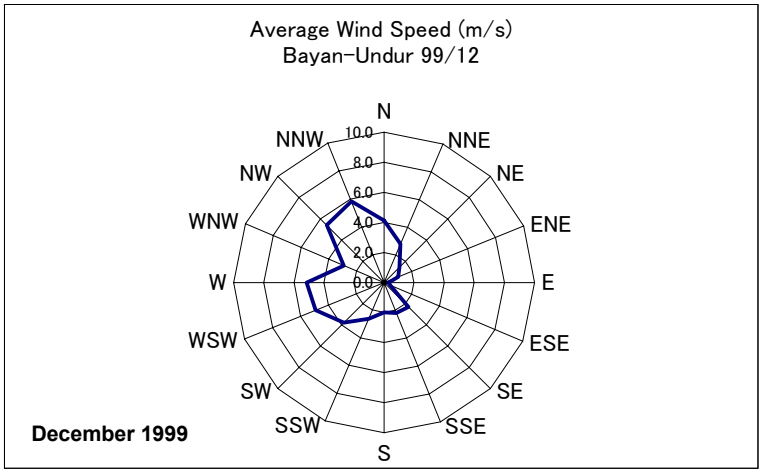


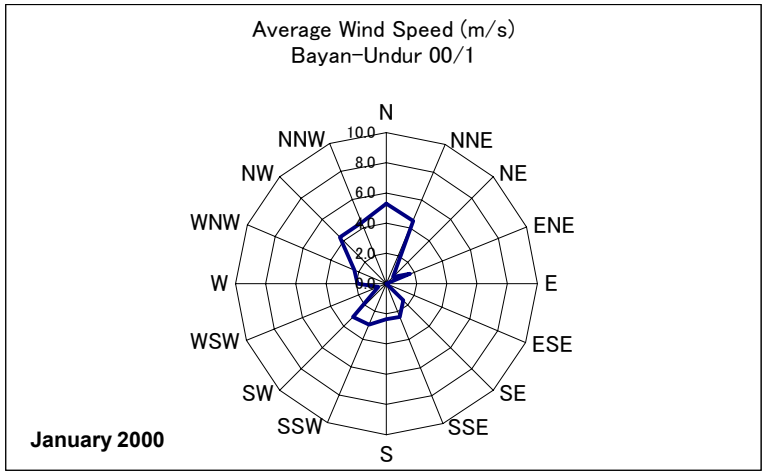
4.8.3 Monthly Average Directional Wind Speed

◆ Bayan-Undur (cont'd)



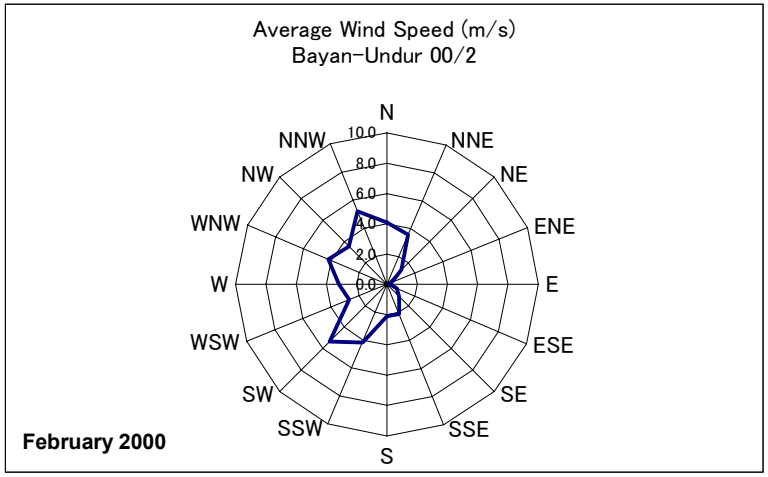


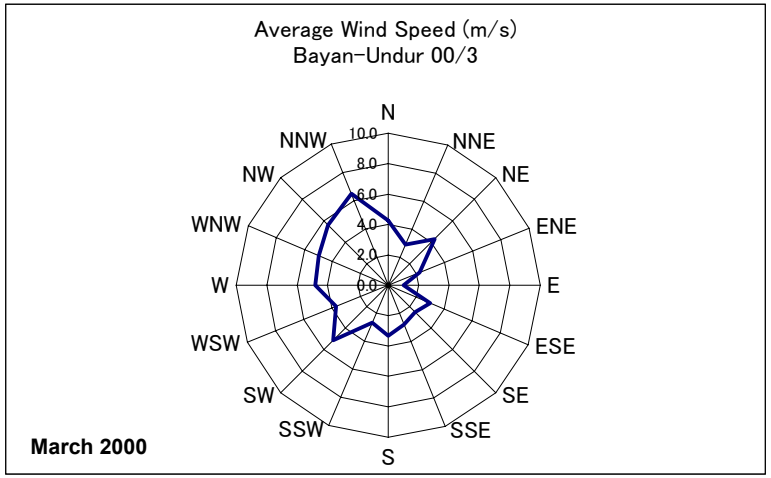


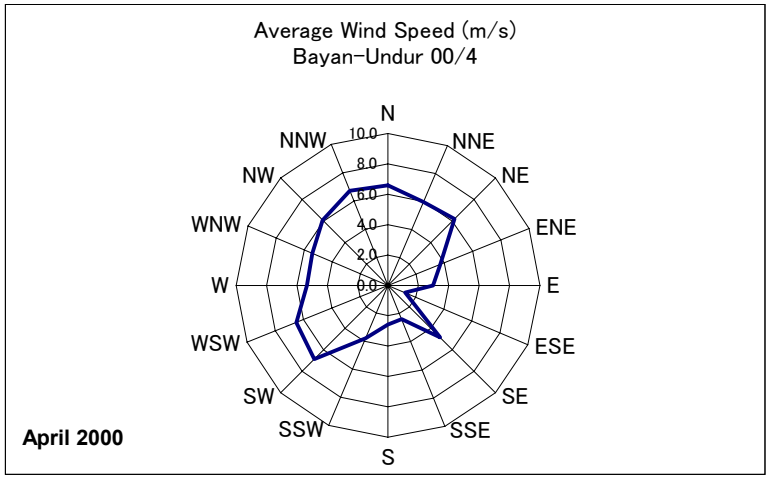


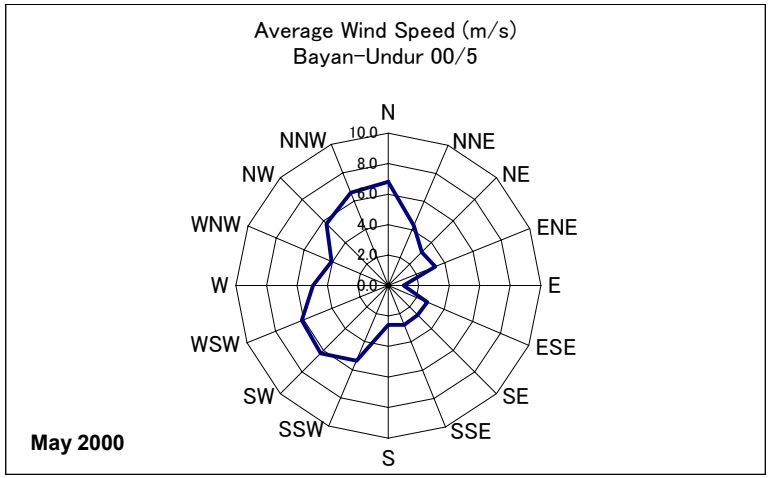
4.8.3 Monthly Average Directional Wind Speed

◆ Bayan-Undur (cont'd)



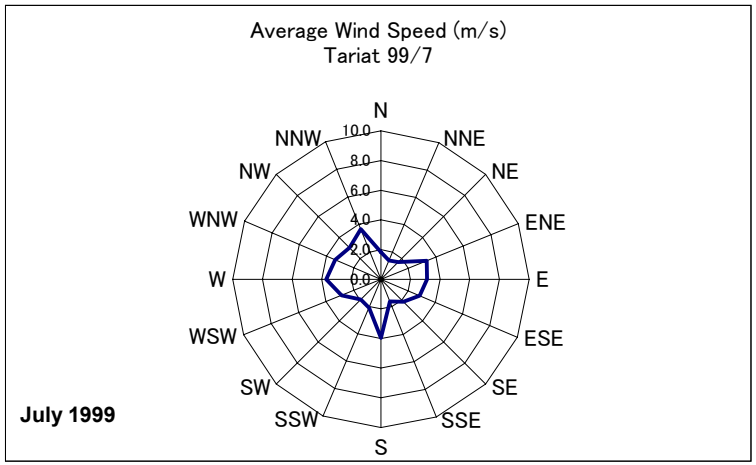


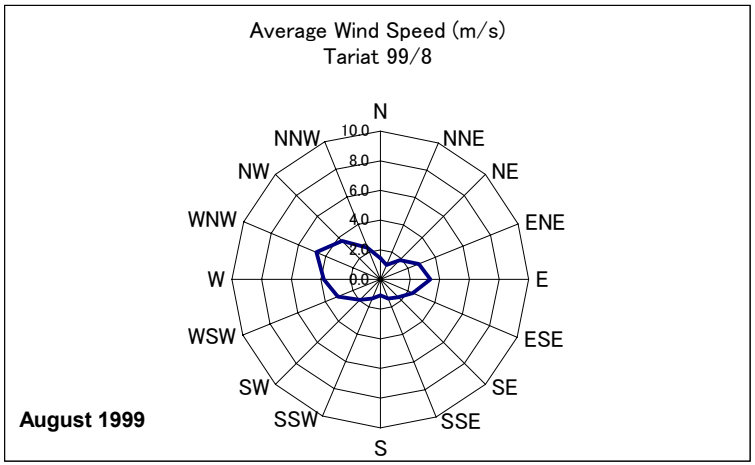


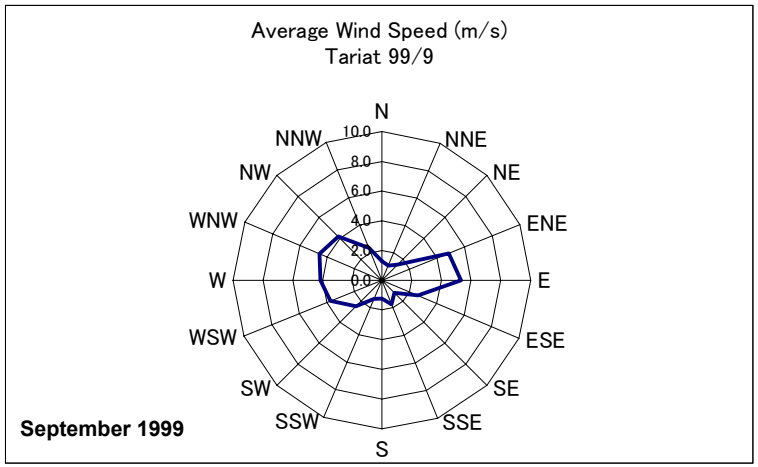


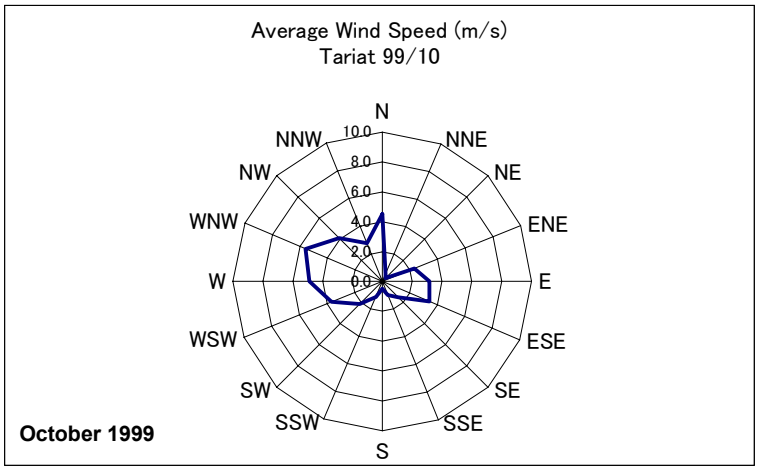
4.8.3 Monthly Average Directional Wind Speed

◆ Tariat



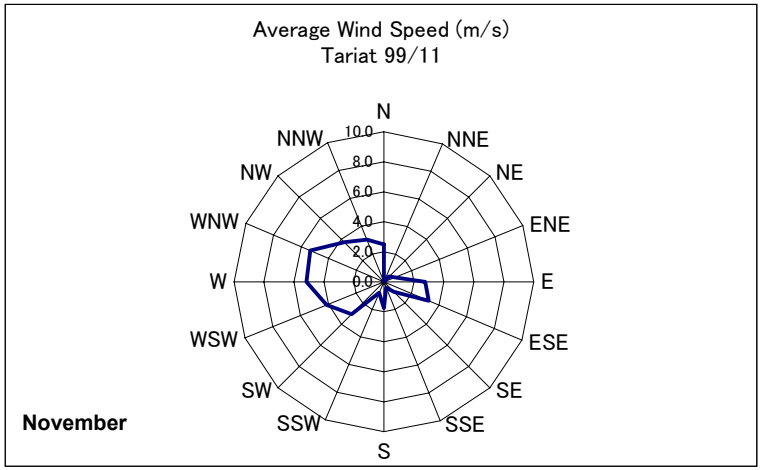


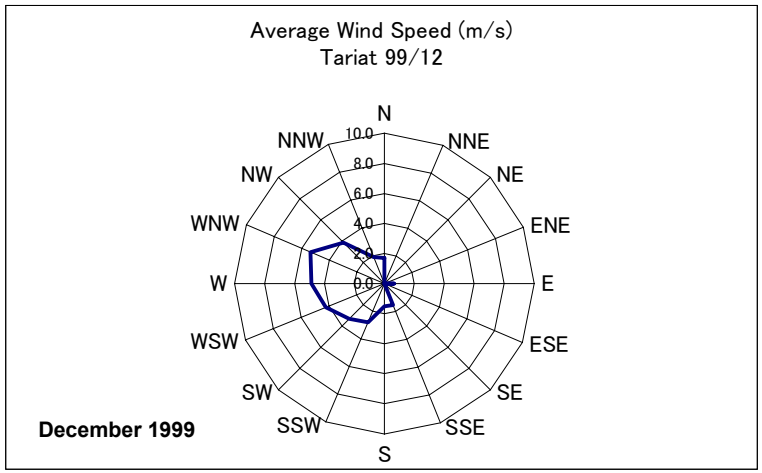


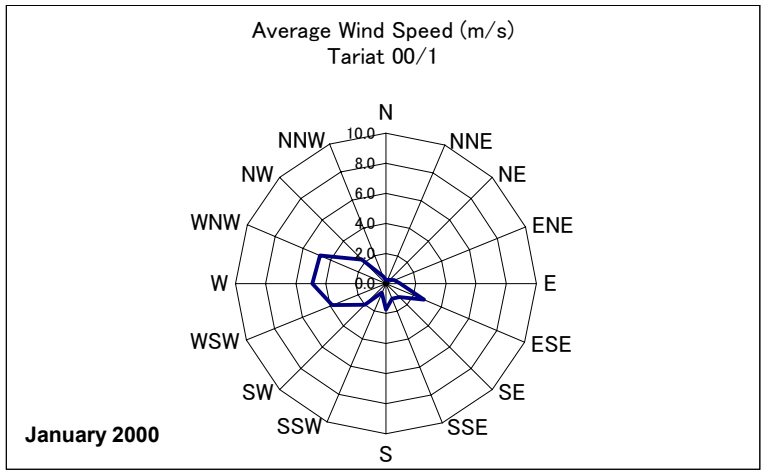


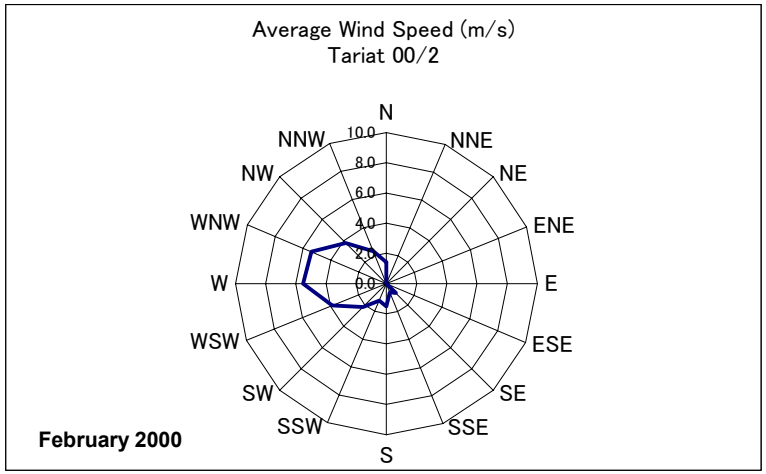
4.8.3 Monthly Average Directional Wind Speed

◆ Tariat (cont'd)



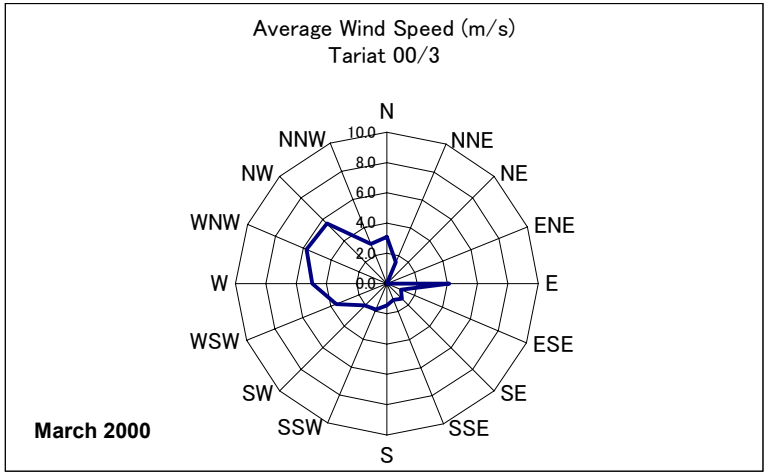


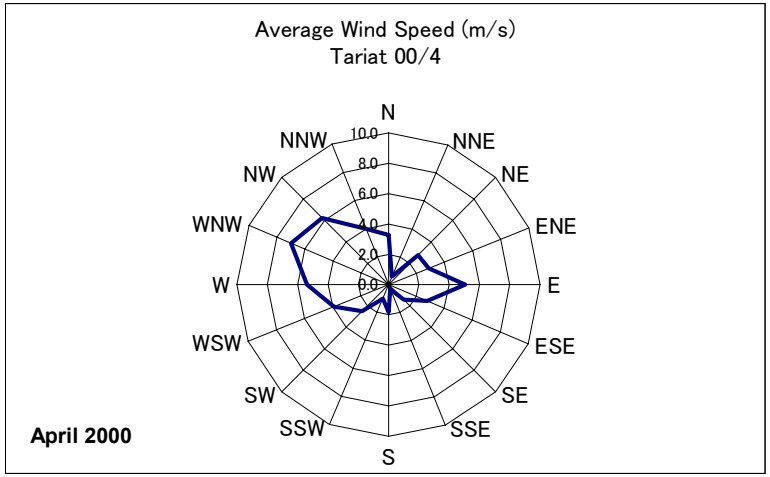


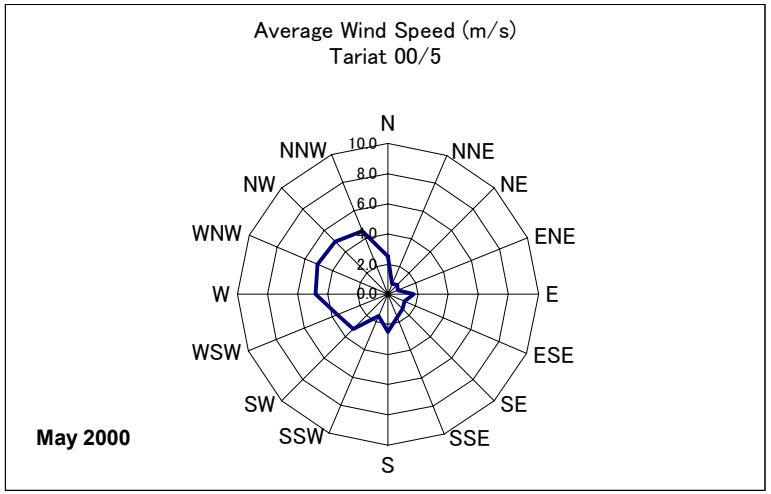


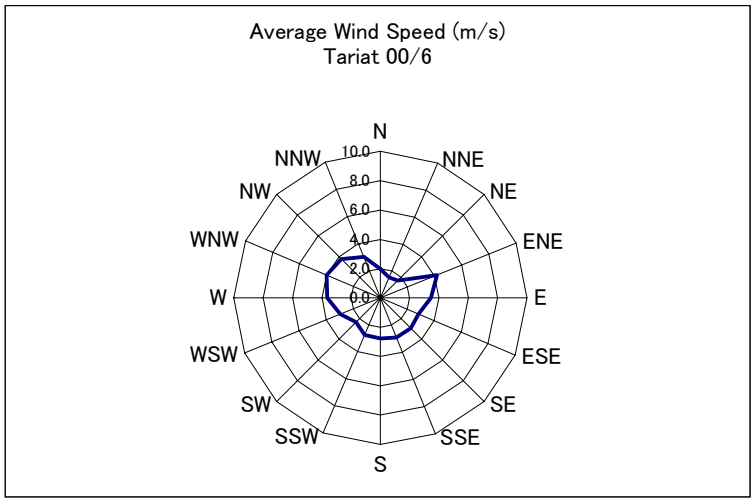
4.8.3 Monthly Average Directional Wind Speed

◆ Tariat (cont'd)









4.8.4 Monthly Wind Speed Directional Frequency Distribution (%)

Adaatsag

	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
0<V<0.5	3.1	4.2	4.6	11.4	12.1	16.9	18.7	17.6	16.5	8.1	11.4	12.2	13.9	4.6	2.7	2.4
0.5<=V<1	1.5	5.7	2.9	5.2	9.5	10.7	8.3	8.4	9.1	9.7	7.7	11.1	13.3	5.4	1.6	1.0
1<=V<2	4.0	9.2	13.2	15.7	16.1	14.6	13.5	16.0	25.3	21.3	13.8	13.6	26.4	13.7	4.7	2.1
2<=V<3	8.6	16.6	14.4	12.7	12.1	12.4	11.4	13.2	17.2	18.1	13.6	11.6	11.5	17.1	7.4	3.8
3<=V<4	14.8	19.6	18.8	13.7	9.0	10.7	10.4	10.8	9.8	16.7	13.0	6.6	6.1	11.8	9.0	5.9
4<=V<5	18.5	16.6	17.8	12.1	11.1	11.2	8.8	8.8	6.7	12.3	10.2	10.2	7.2	12.1	9.6	8.8
5<=V<6	13.5	12.9	9.8	12.7	8.5	8.4	7.8	8.4	6.0	3.9	10.7	8.6	5.3	9.6	10.6	11.7
6<=V<7	12.0	5.7	11.2	4.2	6.5	4.5	4.1	6.8	6.7	4.6	5.4	8.4	4.5	5.8	8.6	9.3
7<=V<8	9.5	3.2	4.4	6.5	6.5	3.9	5.7	4.0	1.8	2.8	4.1	5.4	3.2	6.6	10.5	10.8
8<=V<9	5.9	3.2	1.5	3.3	4.5	1.7	2.6	2.4	1.1	1.4	3.6	6.8	5.6	4.7	8.7	10.3
9<=V<10	3.6	2.2	0.7	1.0	2.5	2.2	4.1	1.2	0.0	0.2	3.2	3.2	1.3	3.9	5.6	9.9
10<=V<11	3.3	0.7	0.2	1.3	1.0	0.0	2.1	1.6	0.0	0.5	2.5	1.1	0.5	1.6	5.1	7.6
11<=V<12	1.2	0.2	0.2	0.0	0.5	1.7	2.6	0.4	0.0	0.0	0.5	0.5	0.5	1.8	5.1	6.1
12<=V<13	0.3	0.0	0.0	0.0	0.0	1.1	0.0	0.4	0.0	0.0	0.0	0.5	0.3	0.7	2.7	3.4
13<=V<14	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.3	0.1	2.2	3.5
14<=V<15	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.3	2.1	1.5
15<=V<16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.0	1.3	0.6
16<=V<17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.1
17<=V<18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.3
18<=V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.8

4.8.4 Monthly Wind Speed Directional Frequency Distribution (%)

Bayan-Undur

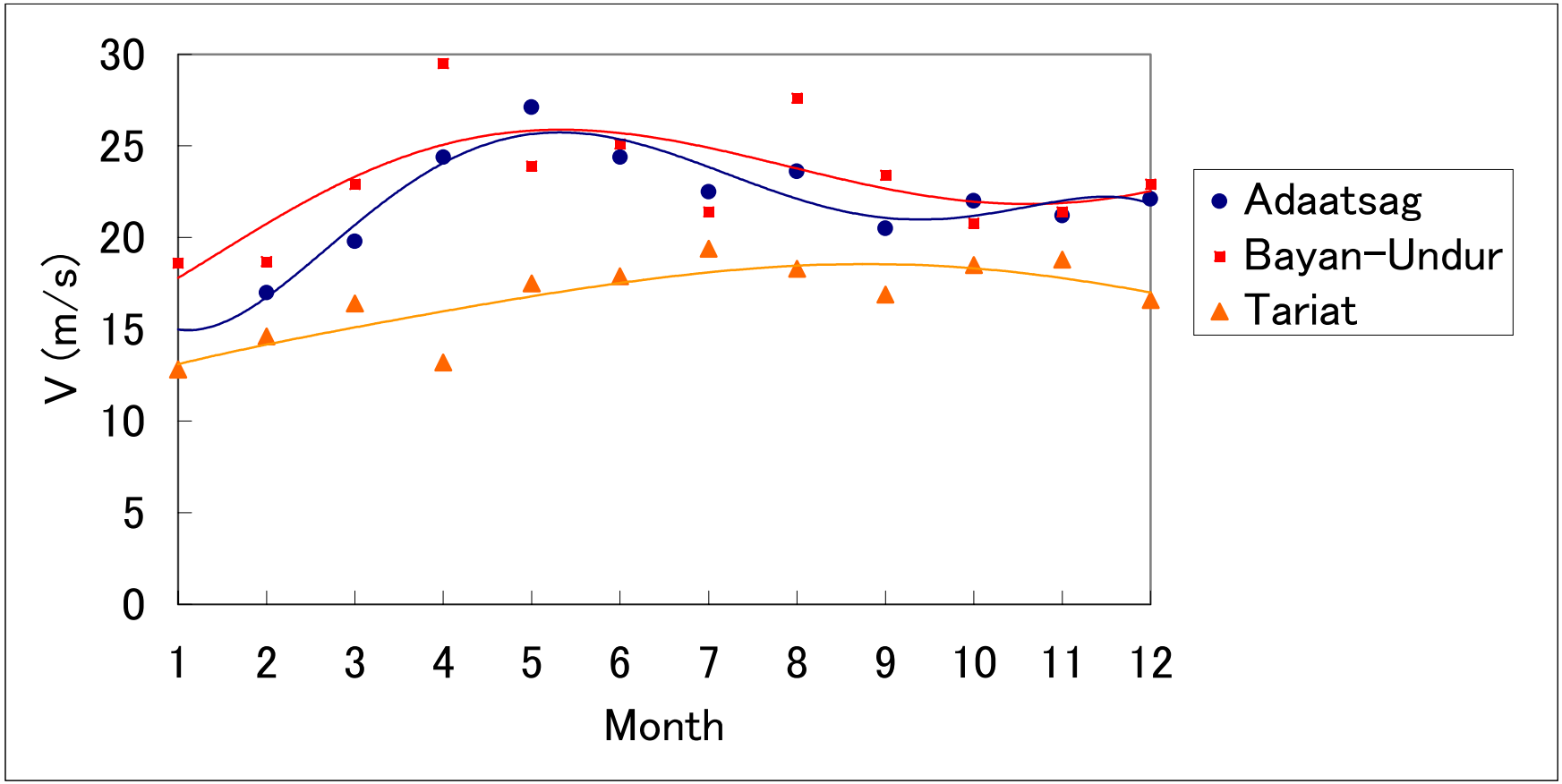
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
0<V<0.5	2.8	3.7	13.1	11.2	25.0	17.9	8.3	5.9	6.7	7.3	3.2	5.4	6.2	6.8	4.0	3.0
0.5<=V<1	3.3	4.4	6.3	10.2	11.7	7.1	8.3	9.3	5.1	4.1	3.6	1.3	3.3	6.8	3.2	3.1
1<=V<2	13.5	15.6	12.2	11.2	15.0	25.0	21.1	21.9	21.1	15.9	6.8	4.9	5.8	9.5	9.5	11.5
2<=V<3	18.6	18.3	9.7	10.2	10.0	14.3	11.3	18.3	28.0	12.0	6.8	8.9	6.6	11.3	10.4	14.7
3<=V<4	12.1	12.5	6.8	18.4	21.7	10.7	15.0	18.0	17.4	13.7	8.6	10.2	8.4	13.1	9.5	10.0
4<=V<5	7.8	13.2	9.3	19.4	6.7	3.6	5.3	11.1	11.0	13.9	12.6	15.9	12.8	16.2	12.8	9.2
5<=V<6	9.4	9.8	10.5	9.2	8.3	7.1	6.0	7.5	6.3	9.0	14.0	16.7	25.2	16.2	14.0	7.9
6<=V<7	6.7	7.7	7.6	8.2	0.0	10.7	8.3	3.3	2.4	7.6	9.9	13.2	19.0	13.1	10.5	8.2
7<=V<8	6.7	5.1	8.0	2.0	0.0	1.8	3.8	1.3	2.0	6.6	11.3	8.6	8.4	5.0	10.7	9.2
8<=V<9	5.6	4.2	5.5	0.0	1.7	0.0	4.5	1.5	0.0	4.4	10.4	6.5	2.9	1.4	5.5	7.0
9<=V<10	5.0	2.2	4.6	0.0	0.0	1.8	2.3	1.0	0.0	2.9	4.3	3.0	0.7	0.9	4.5	5.0
10<=V<11	3.2	0.8	2.5	0.0	0.0	0.0	4.5	0.8	0.0	1.0	3.2	2.2	0.4	0.0	2.7	3.8
11<=V<12	2.7	1.3	0.8	0.0	0.0	0.0	1.5	0.3	0.0	0.2	2.9	2.7	0.4	0.0	1.0	2.9
12<=V<13	1.2	1.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	1.0	2.3	0.5	0.0	0.0	0.9	1.9
13<=V<14	0.5	0.1	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.1	1.7
14<=V<15	0.4	0.1	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.1	0.6
15<=V<16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.4
16<=V<17	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.1
17<=V<18	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18<=V	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

4.8.4 Monthly Wind Speed Directional Frequency Distribution (%)

Tariat

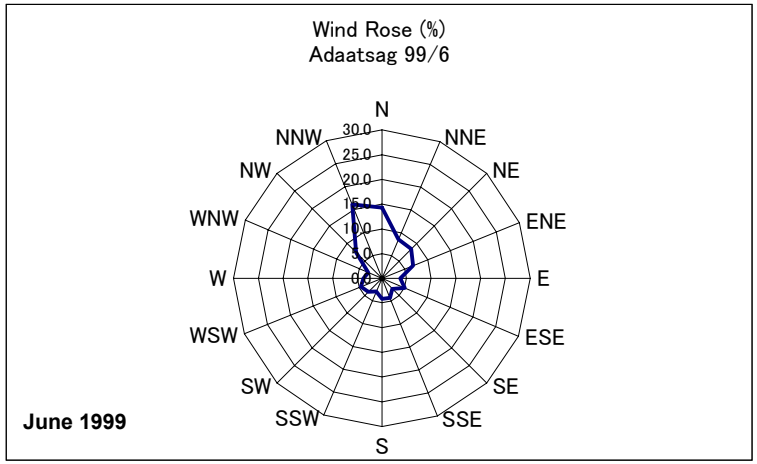
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
0<V<0.5	31.9	29.1	25.8	6.8	6.4	13.4	21.9	27.6	19.1	20.7	13.3	2.9	0.8	1.6	5.1	17.5
0.5<=V<1	18.1	26.2	20.2	4.9	5.2	7.5	12.3	19.7	15.7	17.2	7.6	3.4	1.0	0.9	2.9	7.9
1<=V<2	20.2	29.1	24.7	14.8	8.8	20.2	22.8	23.7	23.6	29.9	26.5	11.0	6.3	4.7	9.5	17.5
2<=V<3	7.4	8.7	12.4	11.7	13.7	16.6	22.8	14.5	18.0	18.4	24.2	20.2	10.7	9.6	12.8	17.5
3<=V<4	5.3	1.9	3.4	21.6	13.1	17.4	7.9	3.9	6.7	5.7	13.6	20.3	15.3	13.5	19.0	8.8
4<=V<5	7.4	1.9	7.9	13.6	18.6	12.6	7.0	0.0	6.7	3.4	6.1	17.8	17.9	15.8	16.8	13.2
5<=V<6	3.2	2.9	3.4	10.5	14.9	7.9	2.6	3.9	4.5	3.4	5.3	11.2	19.3	18.2	10.3	7.9
6<=V<7	4.3	0.0	1.1	8.6	7.3	2.4	0.9	5.3	3.4	1.1	2.3	7.5	15.1	13.9	9.2	4.4
7<=V<8	1.1	0.0	1.1	5.6	8.8	1.2	0.9	1.3	1.1	0.0	0.4	3.9	7.4	8.8	6.2	3.5
8<=V<9	1.1	0.0	0.0	1.9	3.0	0.8	0.9	0.0	1.1	0.0	0.0	1.2	3.5	6.5	2.6	0.9
9<=V<10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.5	1.4	3.4	1.1	0.0
10<=V<11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.1	0.8	2.0	2.2	0.0
11<=V<12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.8	1.1	0.9
12<=V<13	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.4	0.7	0.0
13<=V<14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0
14<=V<15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
15<=V<16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16<=V<17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17<=V<18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18<=V	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

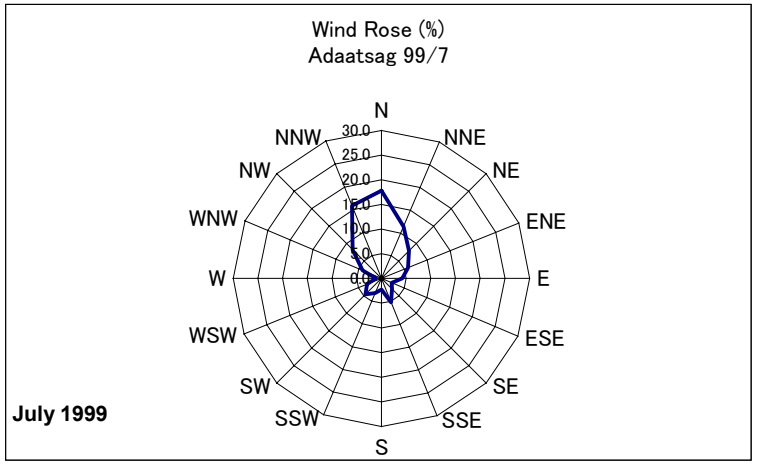
4.8.5 Monthly Maximum Wind Speed

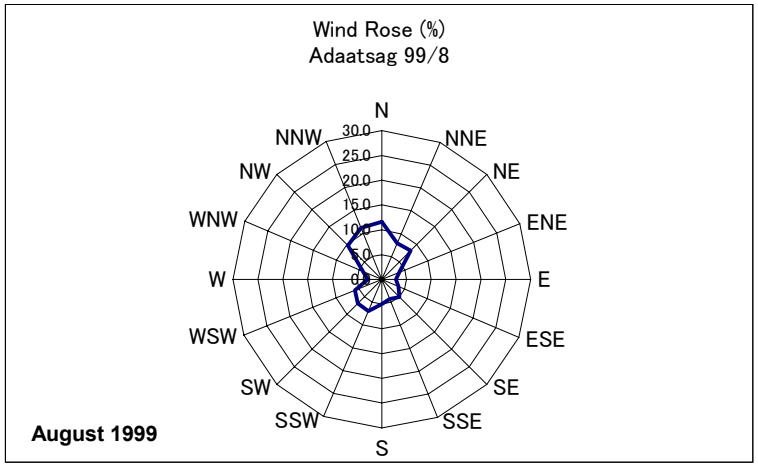


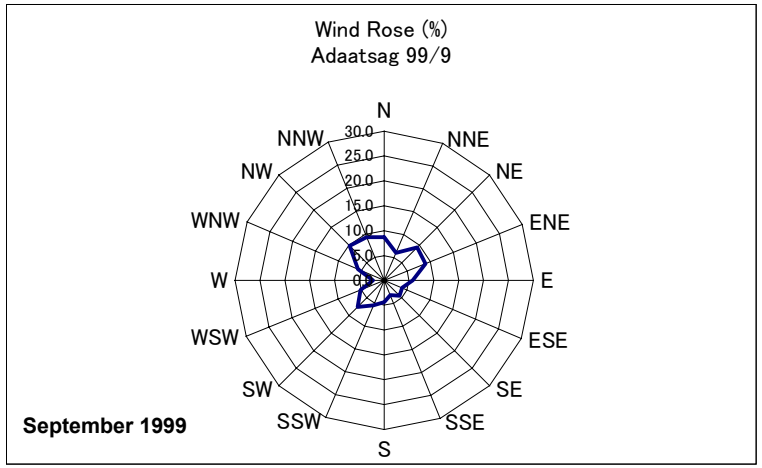
4.8.6 Wind Direction Frequency Distribution

◆ Adaatsag



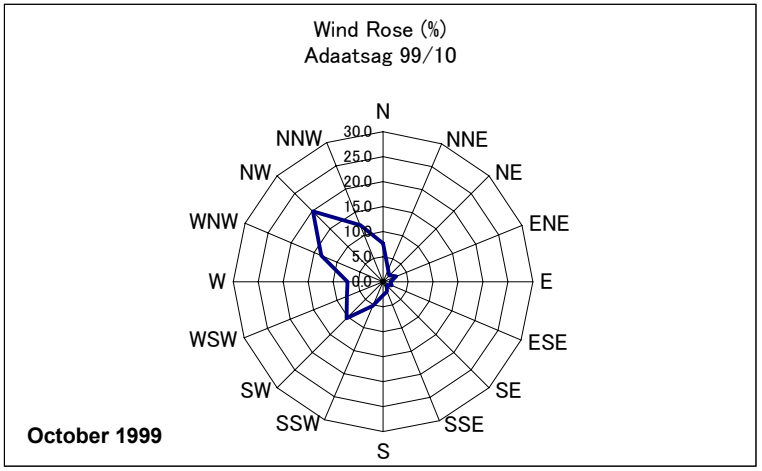


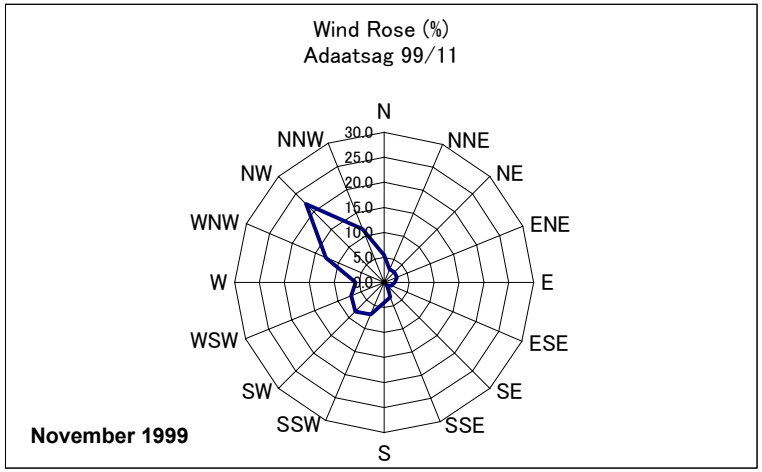


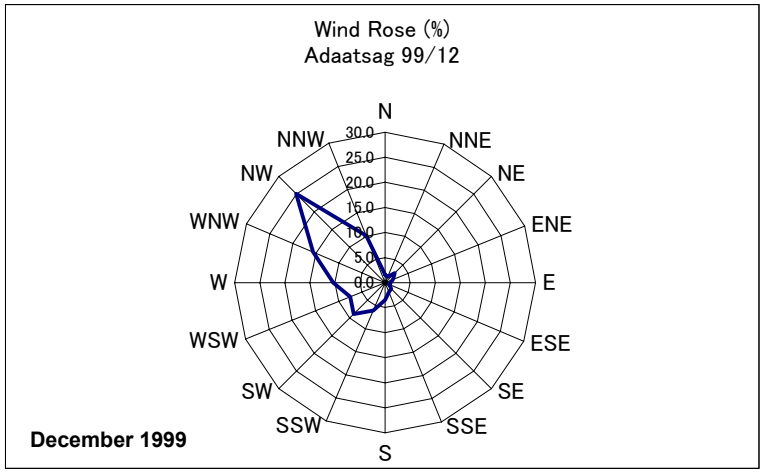


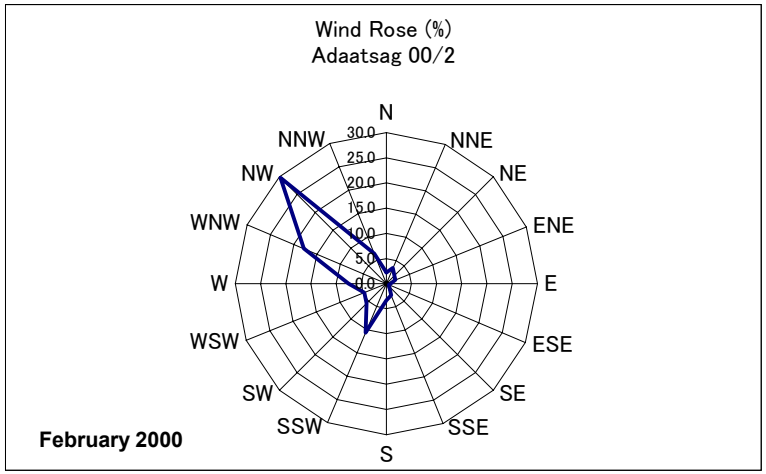
4.8.6 Wind Direction Frequency Distribution

◆ Adaatsag (cont'd)



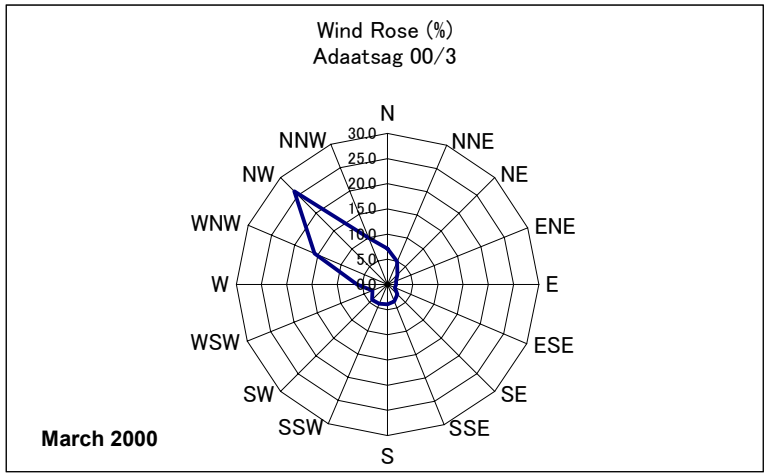


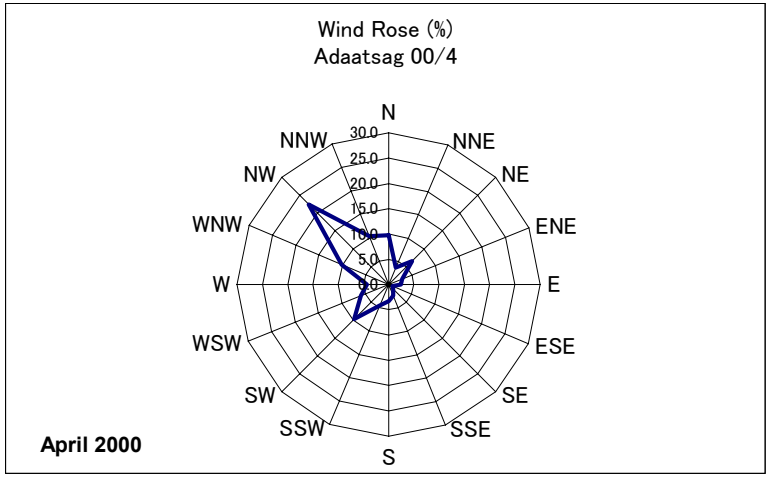


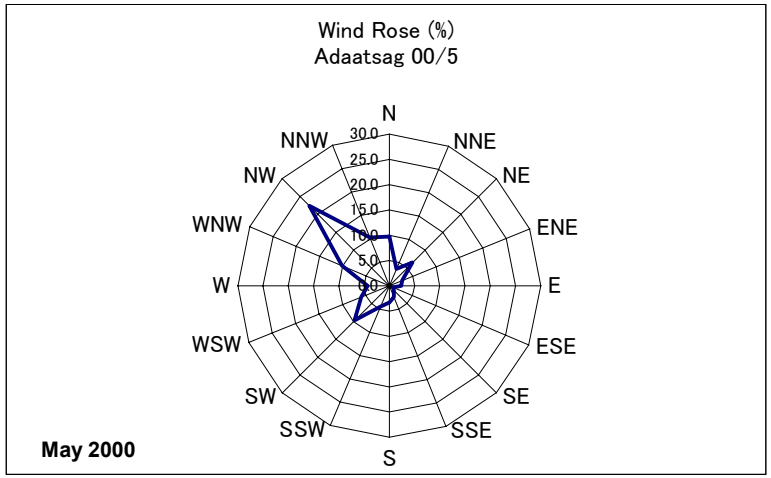


4.8.6 Wind Direction Frequency Distribution

◆ Adaatsag (cont'd)

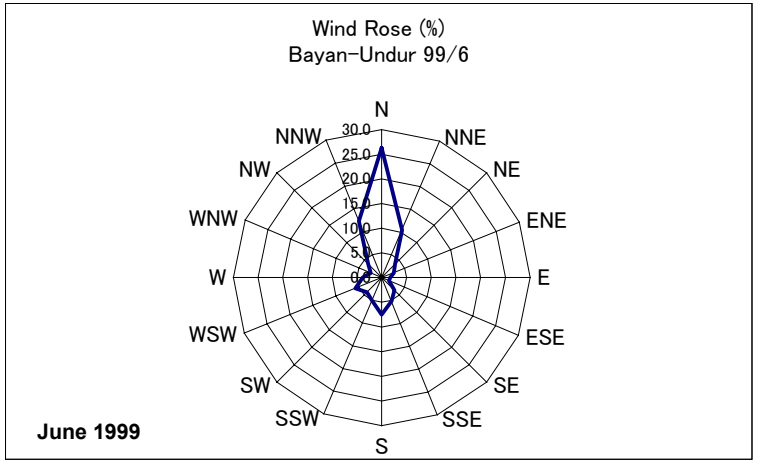


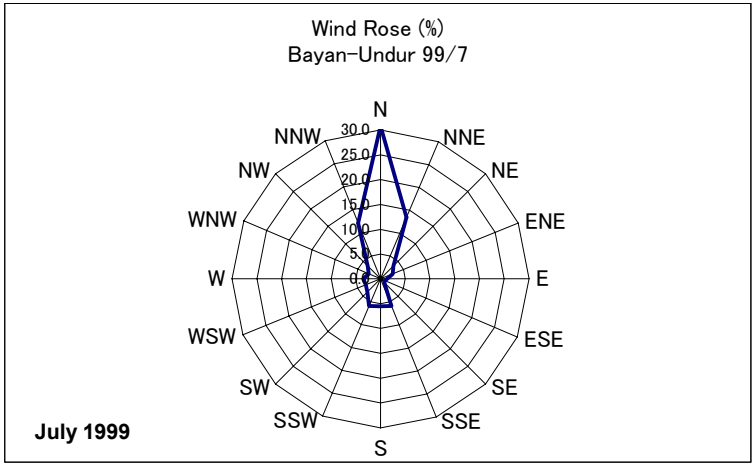


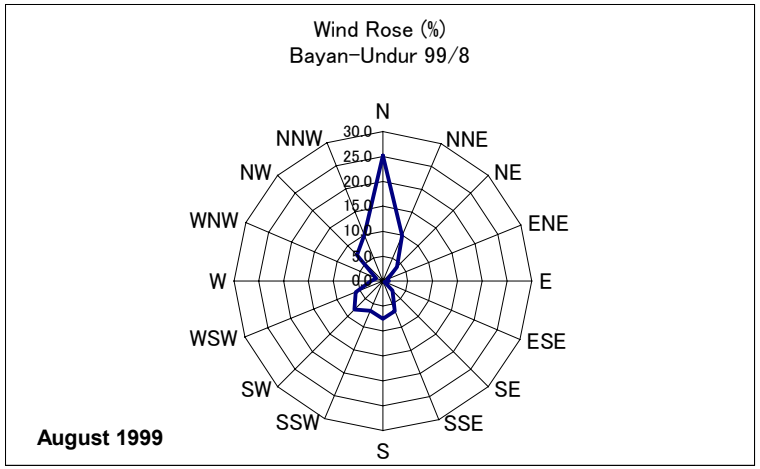


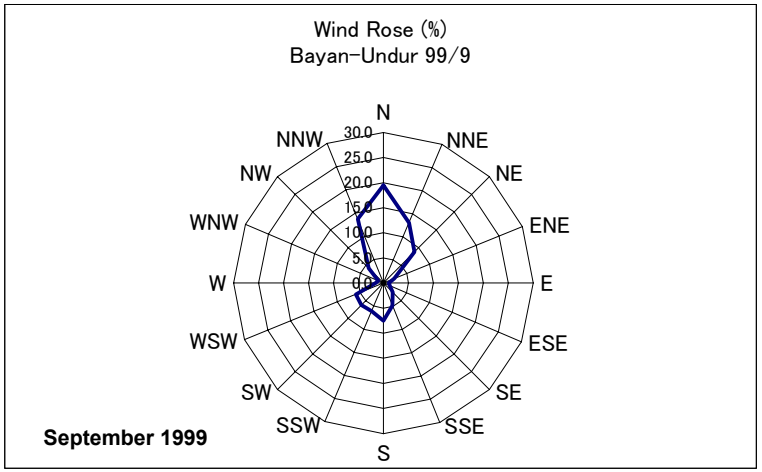
4.8.6 Wind Direction Frequency Distribution

◆ Bayan-Undur



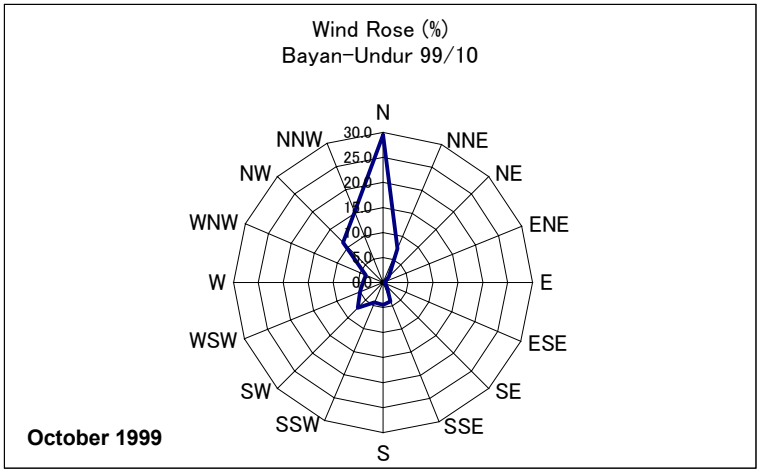


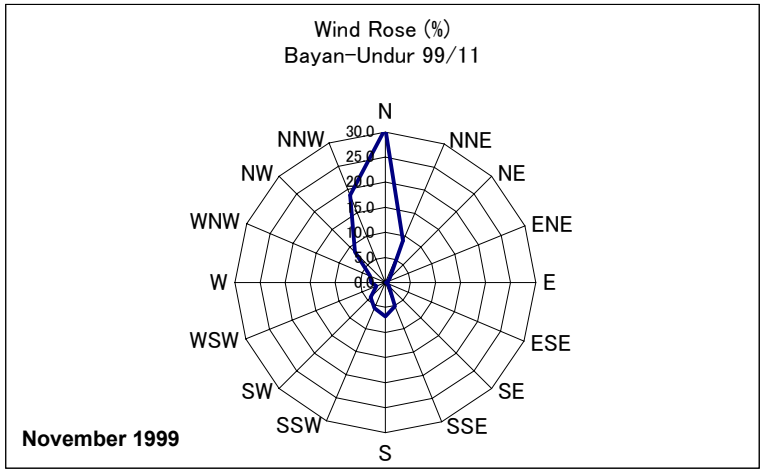


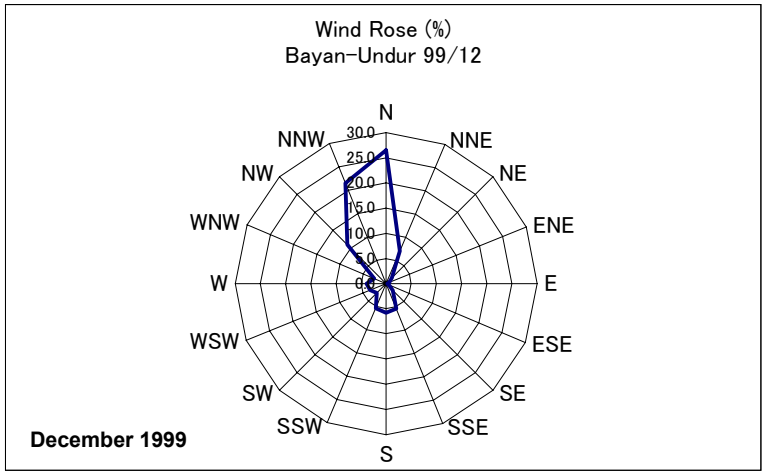


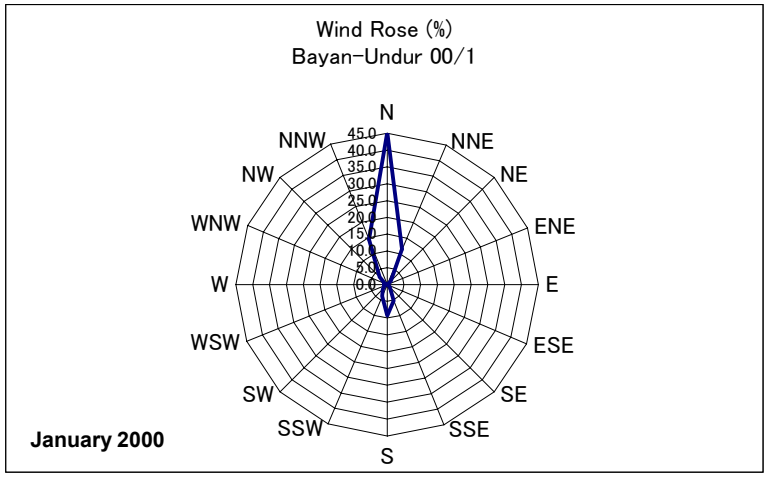
4.8.6 Wind Direction Frequency Distribution

◆ Bayan-Undur (cont'd)



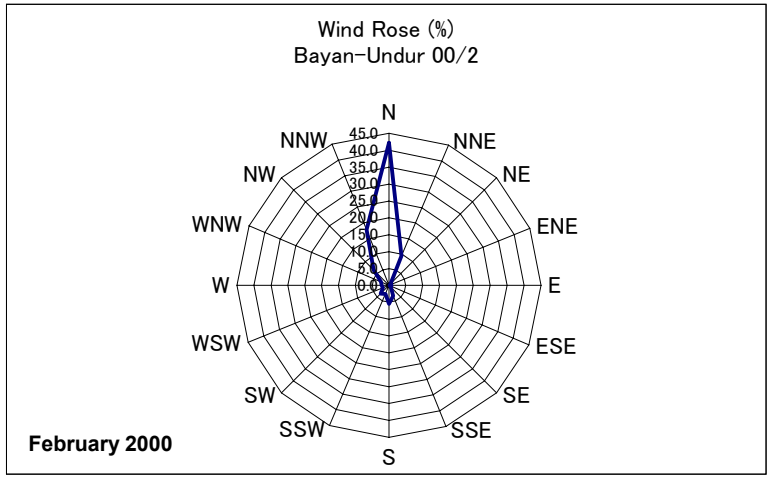


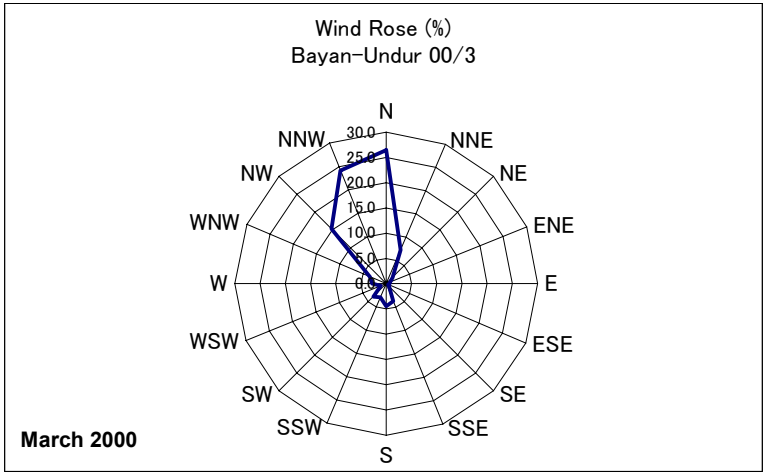


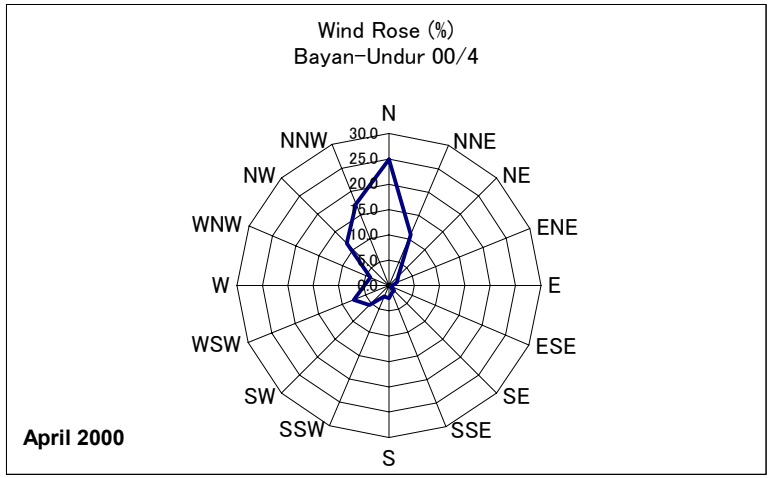


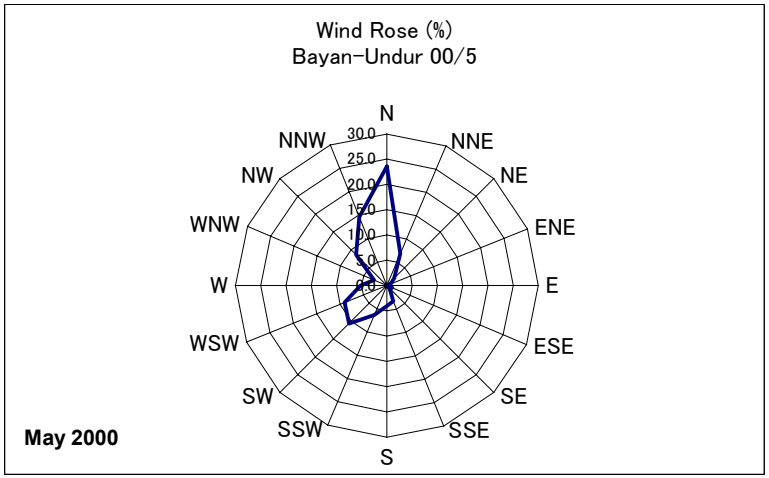
4.8.6 Wind Direction Frequency Distribution

◆ Bayan-Undur (cont'd)



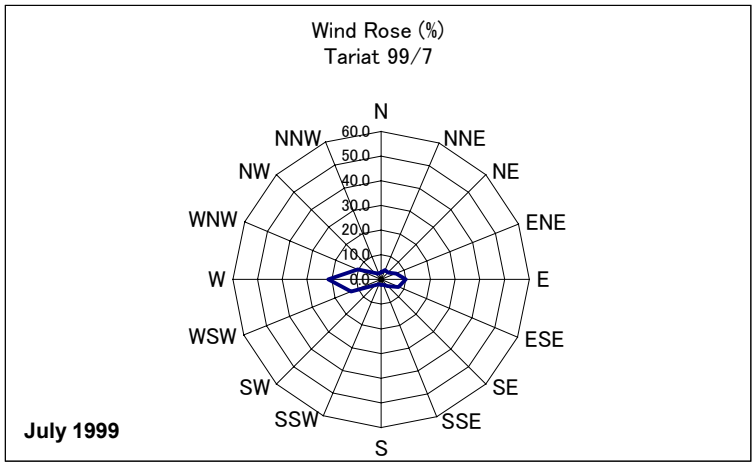


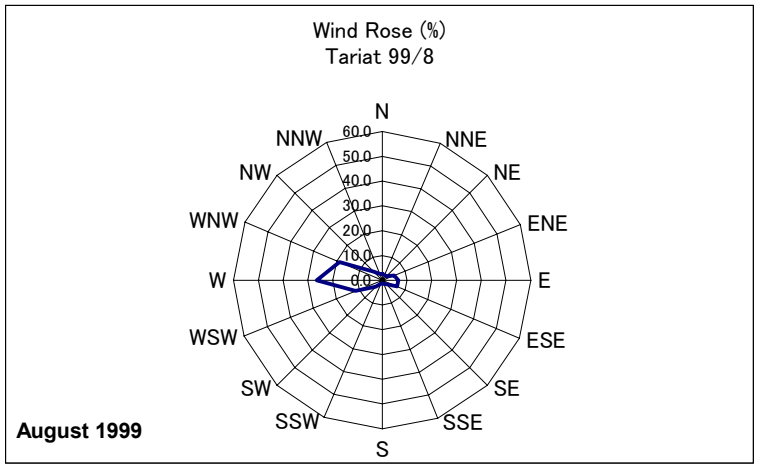


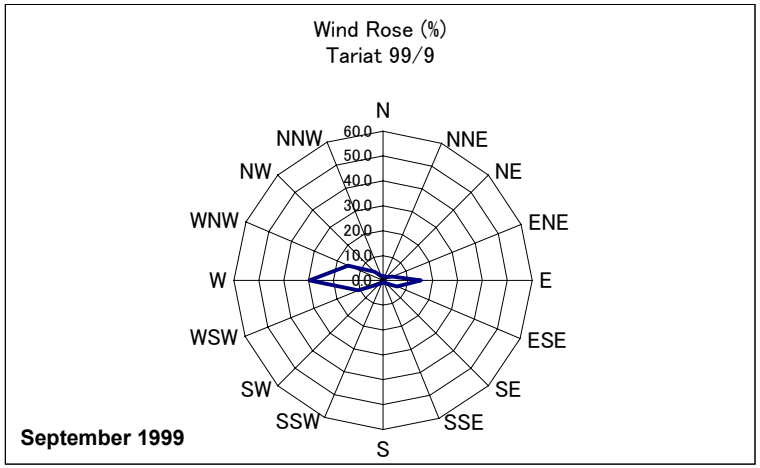


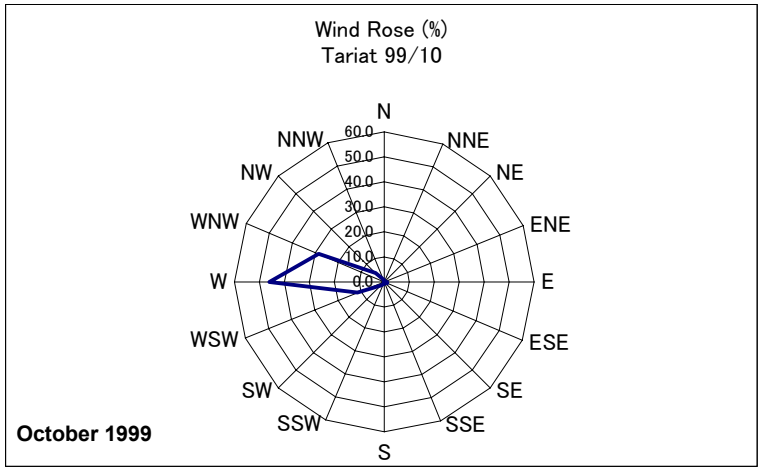
4.8.6 Wind Direction Frequency Distribution

◆ Tariat



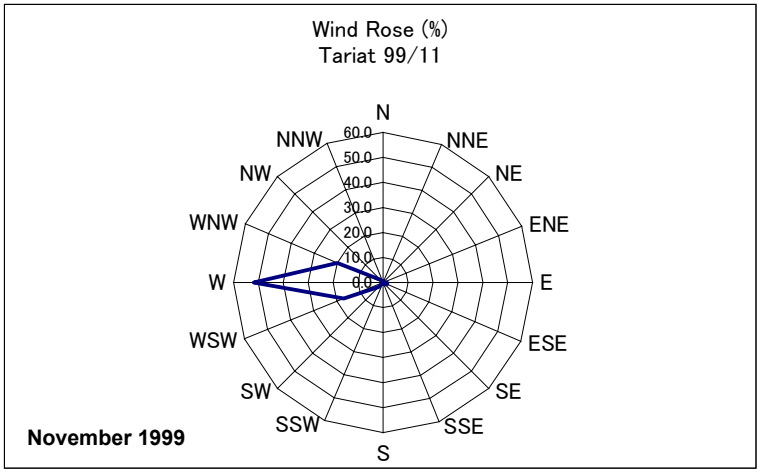


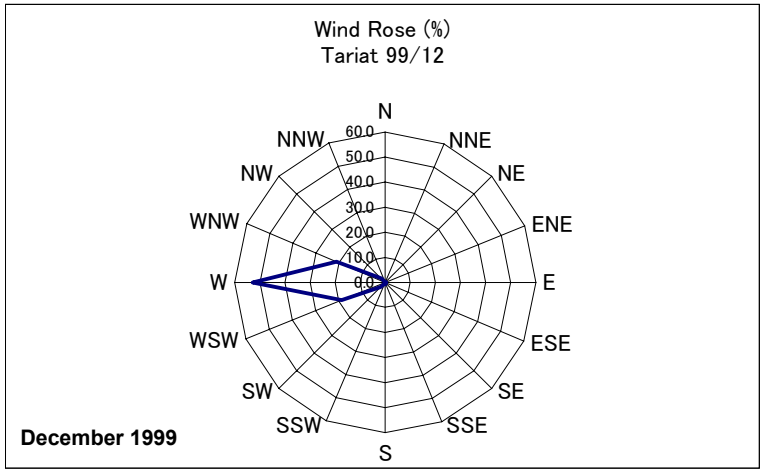


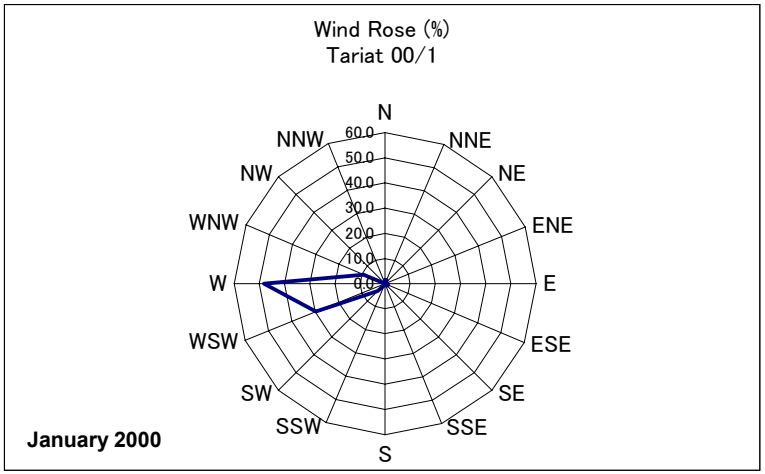


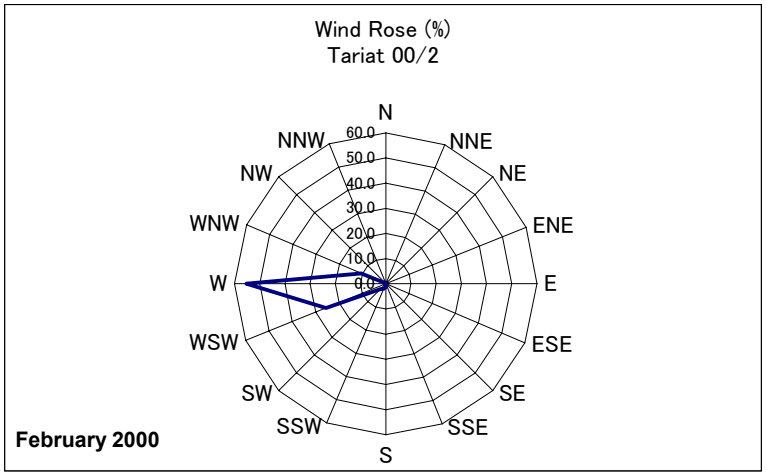
4.8.6 Wind Direction Frequency Distribution

◆ Tariat (cont'd)



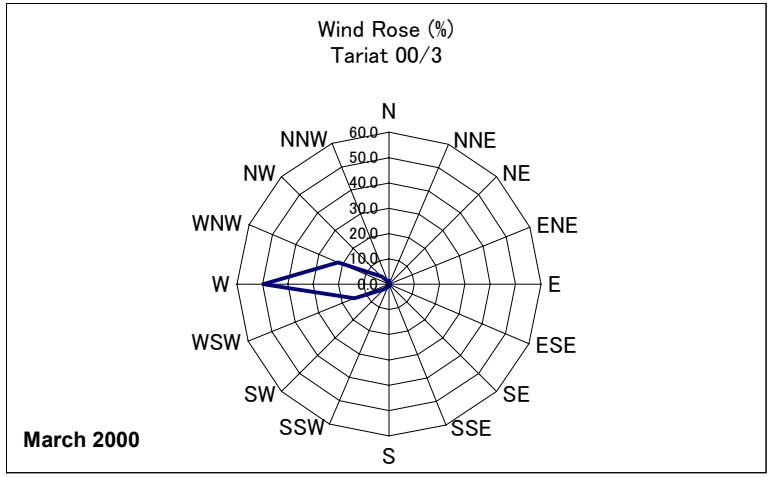


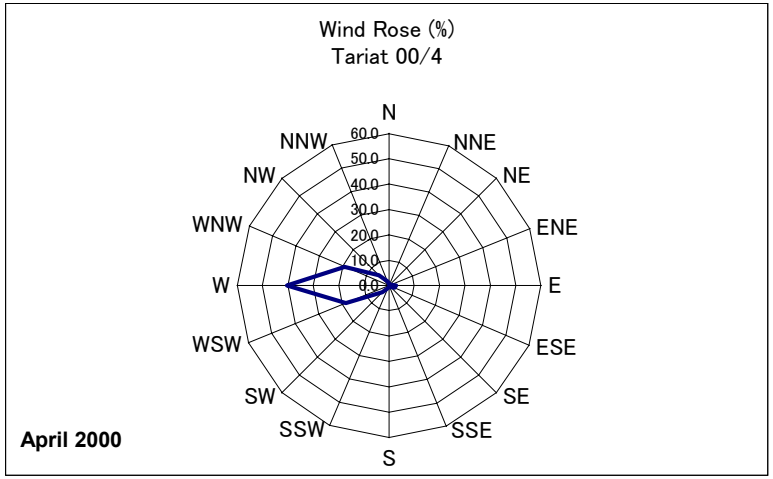


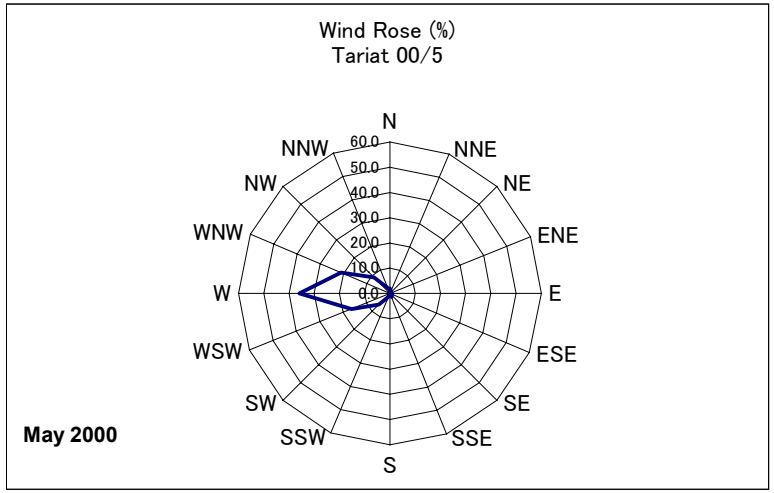


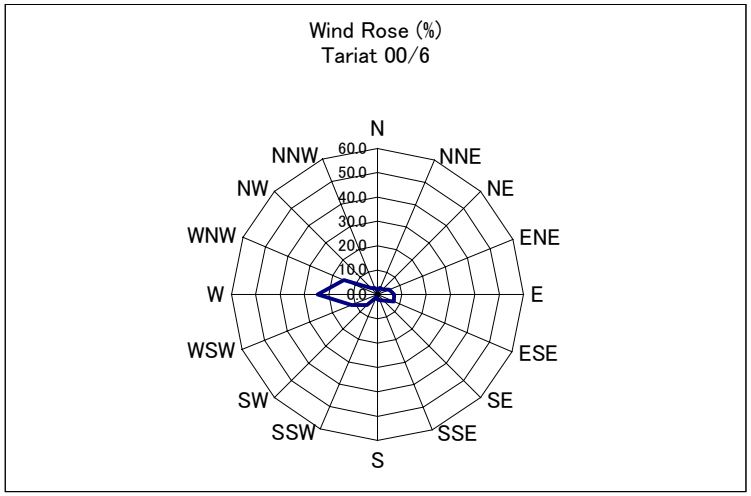
4.8.6 Wind Direction Frequency Distribution

◆ Tariat (cont'd)



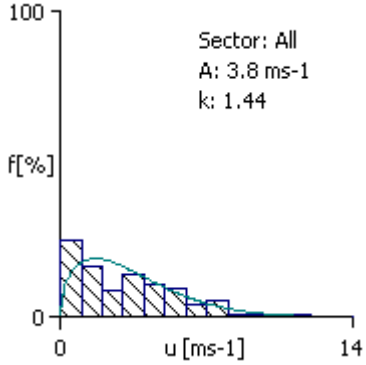




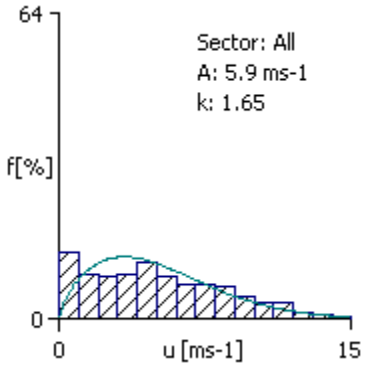


4.8.7 Weibull Distribution

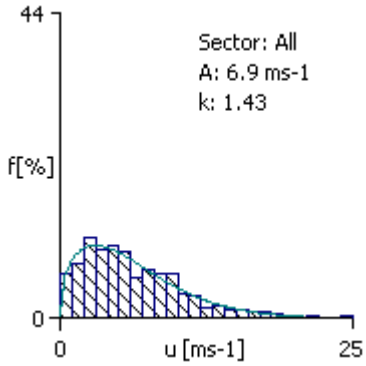
Adaatsag



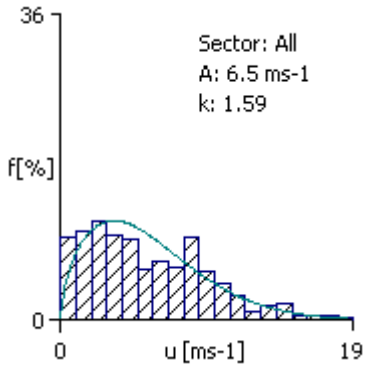
Weibull distribution (Adaatsag, February 2000)



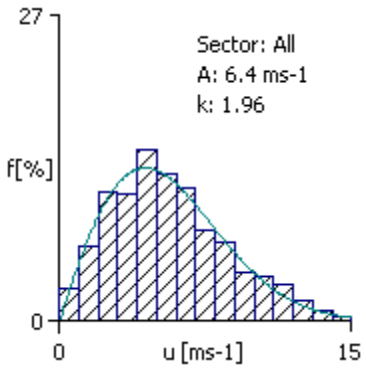
Weibull distribution (Adaatsag, March 2000)



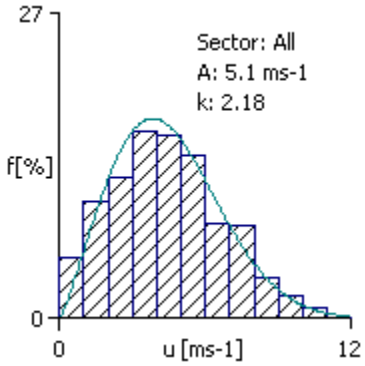
Weibull distribution (Adaatsag, April 2000)



Weibull distribution（Adaatsag, May 2000）



Weibull distribution（Adaatsag, June 1999）



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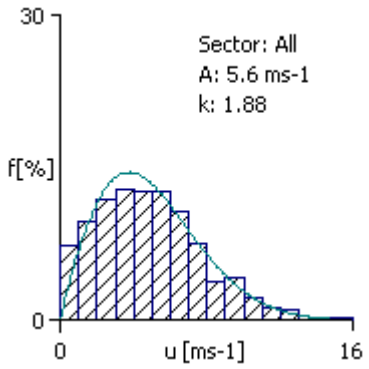

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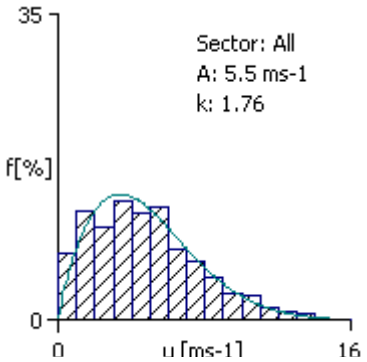

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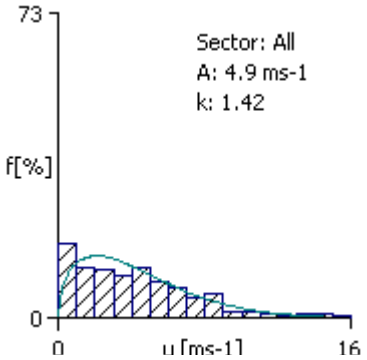

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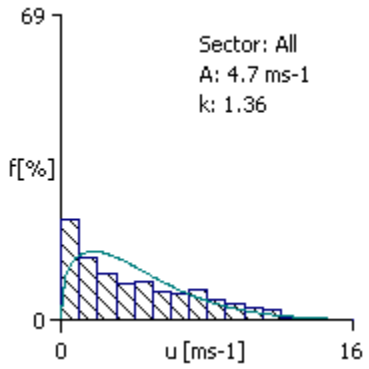

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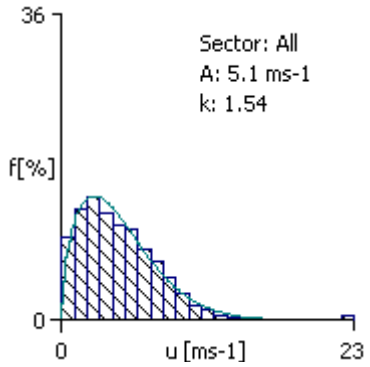

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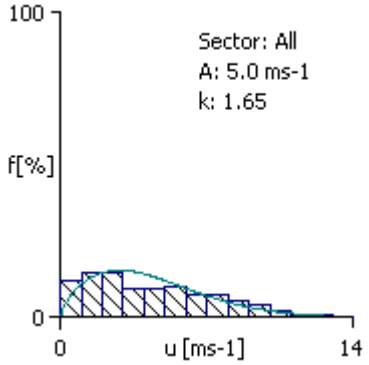
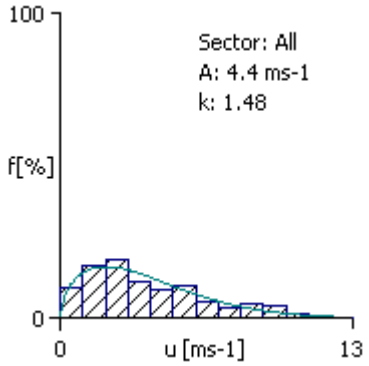
Bayan-Undur



Weibull distribution（Bayan-Undur, January 2000）



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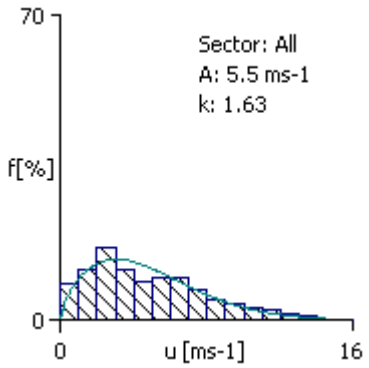
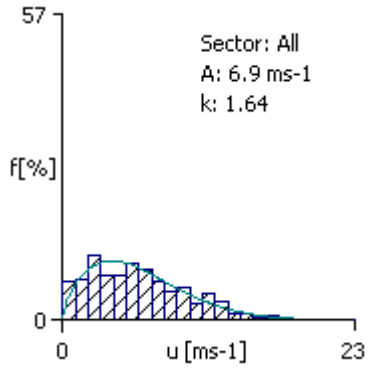
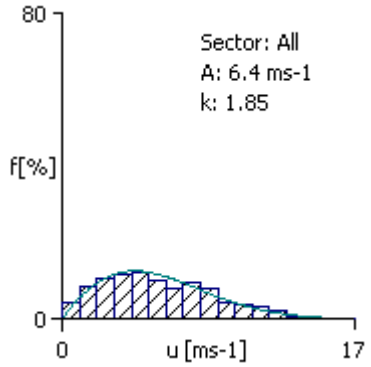


Weibull distribution（Bayan-Undur, March 2000）



Weibull distribution（Bayan-Undur, April 2000）



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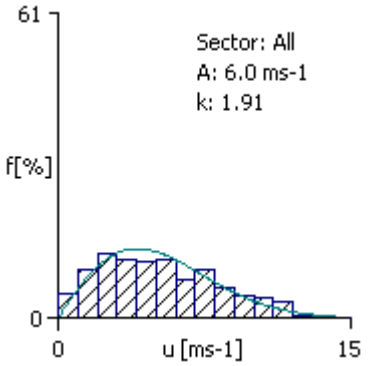

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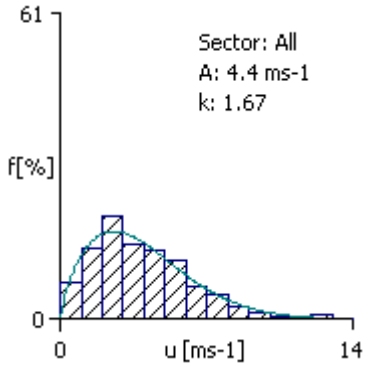
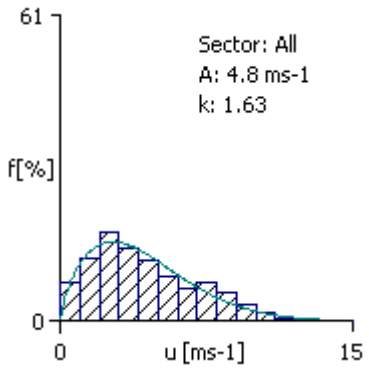
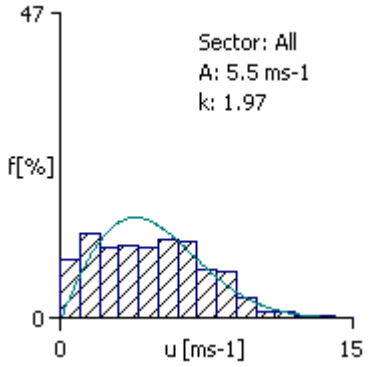


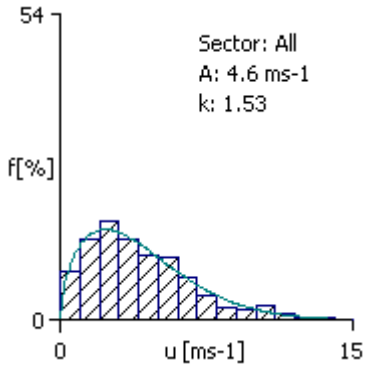
Weibull distribution（Bayan-Undur, July 1999）



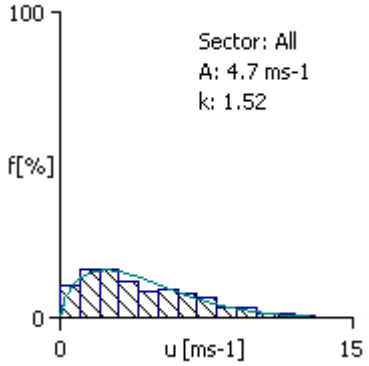
Weibull distribution（Bayan-Undur, August 1999）



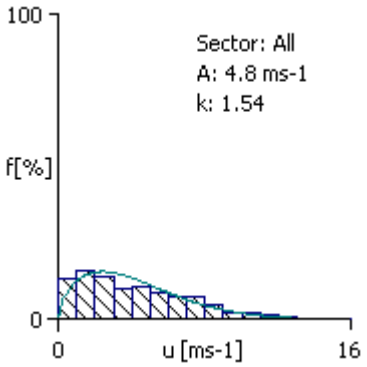
Weibull distribution(Bayan-Undur, September 1999)



Weibull distribution（Bayan-Undur, October 1999）

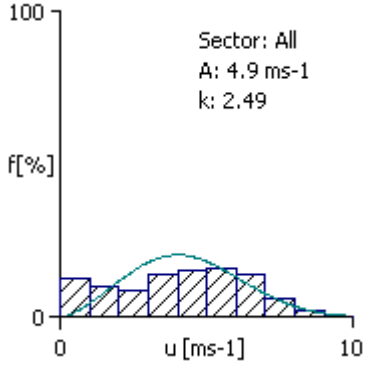


Weibull distribution（Bayan-Undur, November 1999）



Weibull distribution（Bayan-Undur, December 1999）

Tariat



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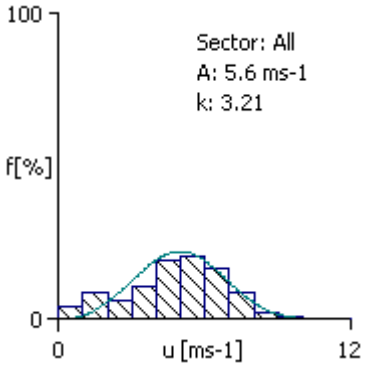

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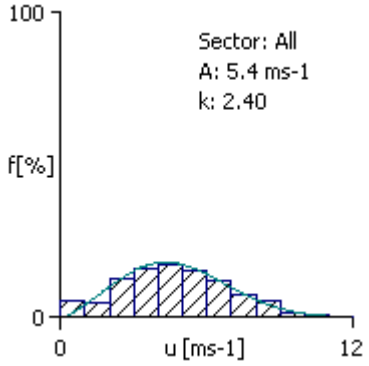
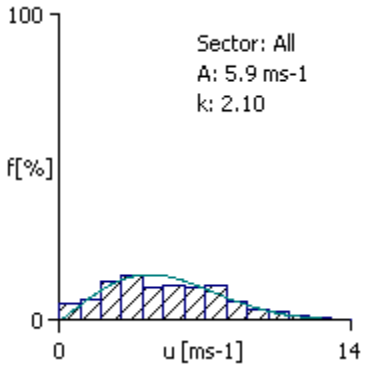


Weibull distribution（Tariat, March 2000）



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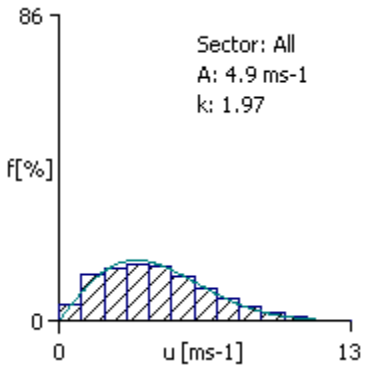

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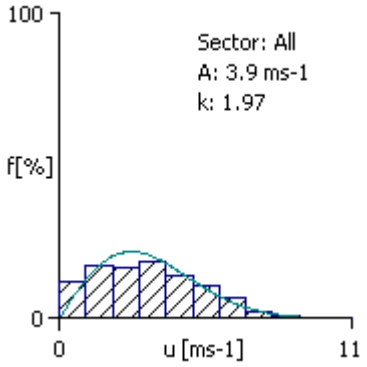

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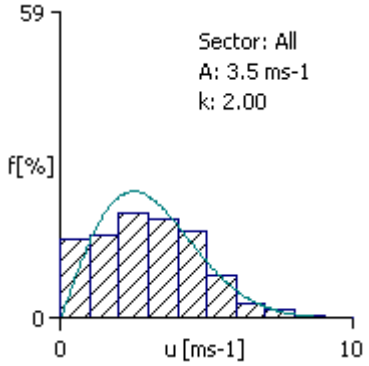

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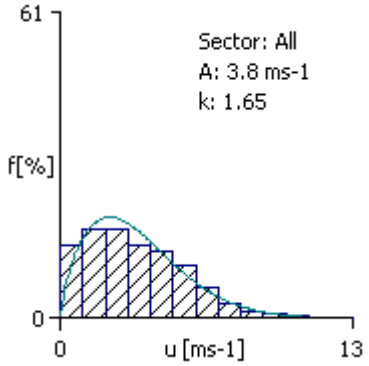

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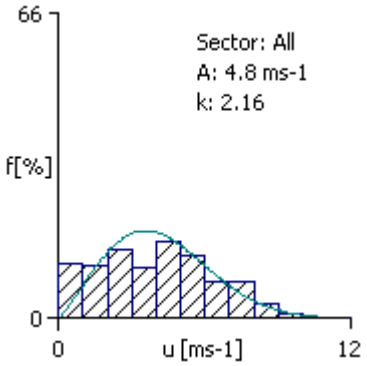

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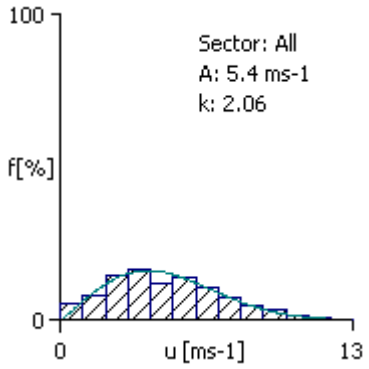
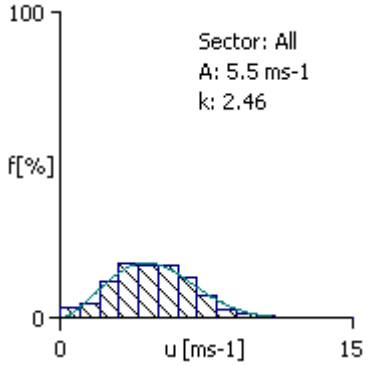
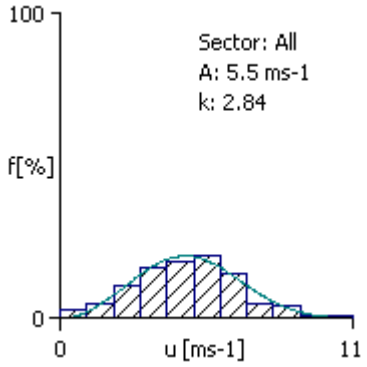


Weibull distribution（Tariat, October 1999）



Weibull distribution（Tariat, November 1999）



Weibull distribution（Tariat, December 1999）

4.8.8 Monthly Wind Energy Density

Adaatsag	1月	2月	3月	4月	5月	6月	7月	8月	9月	10月	11月	12月
気温(℃)	–	−12.2	−3.8	3.8	13.1	17.7	22.2	18.2	10.1	1.7	−6.2	−14.3
気圧(hPa)	–	775	774	773	774	777	779	777	781	782	780	780
空気密度(kg/m^3)	–	1.035	1.002	0.973	0.942	0.931	0.919	0.929	0.961	0.992	1.019	1.05
平均風速(m/s)	–	3.1	5.0	6.2	5.6	5.6	4.4	4.8	4.7	4.2	4.1	3.6
風力エネルギー密度(W/m^2)	–	60.6	172.3	224.6	157.2	158.8	71.6	115.2	118.2	125.8	126.1	118.7

Bayan-Undur	1月	2月	3月	4月	5月	6月	7月	8月	9月	10月	11月	12月
気温(℃)	−22.3	−14.9	−5.4	2.9	12.2	17.0	19.7	16.5	8.2	0.6	−7.3	−13.2
気圧(hPa)	764	762	762	761	762	763	764	764	766	767	765	765
空気密度(kg/m^3)	1.06	1.029	0.992	0.961	0.931	0.916	0.909	0.919	0.949	0.977	1.003	1.026
平均風速(m/s)	4.3	4.0	4.8	6.0	5.6	5.2	3.9	4.3	4.6	4.1	4.2	4.1
風力エネルギー密度(W/m^2)	108.7	85.6	139.2	197.2	155.3	134.4	64.0	86.7	103.9	91.9	102.5	103.7

Tariat	1月	2月	3月	4月	5月	6月	7月	8月	9月	10月	11月	12月
気温(℃)	−25.4	−20.0	−10.0	−0.8	8.0	13.8	15.6	12.2	4.4	−1.6	−9.8	−16.0
気圧(hPa)	705	718	719	719	720	722	722	722	723	724	708	602
空気密度(kg/m^3)	0.99	0.989	0.952	0.92	0.893	0.877	0.871	0.882	0.908	0.929	0.937	0.816
平均風速(m/s)	4.1	4.8	4.7	5.1	4.3	3.2	3.0	3.3	3.9	4.6	4.7	4.7
風力エネルギー密度(W/m^2)	62.9	88.13	82.96	112.6	67.42	27.3	21.25	40.8	58.0	83.16	82.19	65.8

CHAPTER 5 ECONOMIC EVALUATION

5 Economic Evaluation

5.1 Economic Evaluation (Year 2005)

Power Sources		type		1	2	3	4	5	6	7	8	9	10
Existing Grant Aid	PV	1	Revenue	0	160,814	165,638	170,608	175,726	180,998	186,428	192,020	197,781	203,714
			Revenue+CO2	0	33,892	33,892	33,892	33,892	33,892	33,892	33,892	33,892	33,892
			Cost	3,463,300	27,157	27,157	27,157	27,157	27,157	27,157	582,157	27,157	27,157
			Cash Flow	−3,463,300	133,657	138,481	143,451	148,569	153,841	159,271	−390,137	170,624	176,557
			Cash Flow +CO2	−3,463,300	167,549	172,374	177,343	182,461	187,733	193,163	−356,244	204,516	210,450
Existing Grant Aid	PV&WI	2	Revenue	0	86,258	88,846	91,511	94,256	97,084	99,997	102,997	106,086	109,269
			Revenue+CO2	0	20,245	20,245	20,245	20,245	20,245	20,245	20,245	20,245	20,245
			Cost	1,628,676	13,976	13,976	13,976	13,976	13,976	13,976	133,976	13,976	13,976
			Cash Flow	−1,628,676	72,282	74,870	77,535	80,280	83,108	86,021	−30,979	92,110	95,293
			Cash Flow +CO2	−1,628,676	92,527	95,114	97,780	100,525	103,353	106,265	−10,735	112,355	115,538
Diesel	PV	3	Revenue	0	897,891	924,827	952,572	981,149	1,010,584	1,040,901	1,072,128	1,104,292	1,137,421
			Revenue+CO2	0	15,346	15,346	15,346	15,346	15,346	15,346	15,346	15,346	15,346
			Cost	8,698,764	848,666	850,504	852,398	854,349	856,358	858,427	1,349,558	862,754	865,015
			Cash Flow	−8,698,764	49,225	74,323	100,174	126,801	154,226	182,474	−277,430	241,539	272,406
			Cash Flow +CO2	−8,698,764	64,571	89,669	115,520	142,147	169,573	197,821	−262,084	256,885	287,753
Diesel	PV&WI	4	Revenue	0	234,418	241,451	248,694	256,155	263,840	271,755	279,908	288,305	296,954
			Revenue+CO2	0	6,026	6,026	6,026	6,026	6,026	6,026	6,026	6,026	6,026
			Cost	2,921,075	303,211	309,697	310,617	311,564	312,540	313,545	395,581	315,647	316,745
			Cash Flow	−2,921,075	−68,793	−68,246	−61,923	−55,409	−48,700	−41,790	−115,673	−27,342	−19,791
			Cash Flow +CO2	−2,921,075	−62,767	−62,221	−55,897	−49,383	−42,675	−35,764	−109,647	−21,316	−13,765
Diesel	Hydro	5	Revenue	0	57,310	59,029	60,800	62,624	64,503	66,438	68,431	70,484	72,599
			Revenue+CO2	0	3,649	3,649	3,649	3,649	3,649	3,649	3,649	3,649	3,649
			Cost	1,003,800	41,427	41,532	41,640	41,752	41,867	41,985	42,107	42,232	42,361
			Cash Flow	−1,003,800	15,883	17,497	19,160	20,873	22,637	24,453	26,325	28,252	30,238
			Cash Flow +CO2	−1,003,800	19,532	21,147	22,809	24,522	26,286	28,103	29,974	31,902	33,887
	Grid	6	Revenue	0	121,199	124,835	128,580	132,438	136,411	140,503	144,718	149,060	153,531
			Revenue+CO2	0	9,316	9,316	9,316	9,316	9,316	9,316	9,316	9,316	9,316
			Cost	1,415,800	45,534	45,744	45,960	46,183	46,413	46,649	46,893	47,144	47,402
			Cash Flow	−1,415,800	75,665	79,091	82,620	86,254	89,998	93,854	97,825	101,916	106,129
			Cash Flow +CO2	−1,415,800	84,982	88,407	91,936	95,570	99,314	103,170	107,141	111,232	115,445
Diesel	Diesel	7	Revenue	0	254,819	262,463	270,337	278,447	286,801	295,405	304,267	313,395	322,797
			Revenue+CO2	0	0	0	0	0	0	0	0	0	0
			Cost	1,940,720	274,622	275,252	275,901	276,570	277,259	277,968	278,699	279,452	280,227
			Cash Flow	−1,940,720	−19,803	−12,789	−5,564	1,877	9,542	17,436	25,568	33,943	42,570
			Cash Flow +CO2										
Diesel	Improvement of Distribution	7	Revenue	13,560,559	2,215,515	2,217,444	2,198,089	2,225,906	2,799,580	2,233,364	2,237,261	2,241,276	2,245,410
			Revenue+CO2	0	10,526	10,526	10,526	10,526	10,526	10,526	10,526	10,526	10,526
			Cost	14,990,447	2,137,028	2,140,390	2,121,035	2,147,420	2,721,093	2,154,877	2,158,775	2,162,789	2,166,924
			Cash Flow	−1,429,888	78,487	77,054	77,054	78,487	78,487	78,487	78,487	78,487	78,487
			Cash Flow +CO2	−1,429,888	89,013	87,580	87,580	89,013	89,013	89,013	89,013	89,013	89,013
Diesel	Introduction of Meter	7	Revenue	238,334	401,511	3,448,689	911,681	4,360,371	13,131,759	2,240,311	2,243,673	2,247,136	2,250,702
			Revenue+CO2	0	10,526	10,526	10,526	10,526	10,526	10,526	10,526	10,526	10,526
			Cost	13,560,559	2,099,154	2,103,524	2,108,026	2,112,662	2,687,438	2,122,357	2,127,424	2,132,642	2,138,017
			Cash Flow	−428,800	141,157	140,149	139,110	138,040	152,013	135,803	134,634	133,429	132,189
			Cash Flow +CO2	−428,800	151,684	150,675	149,636	148,566	162,539	146,329	145,160	143,956	142,715

5 Economic Evaluation

5.1 Economic Evaluation (Year 2005)

Power Sources		type	11	12	13	14	15	16	17	18	19	20	21	NPV	EIRR
			209,826	216,121	222,604	229,282	236,161	243,246	250,543	258,059	265,801	273,775	281,988	3,396,976	
Existing			33,892	33,892	33,892	33,892	33,892	33,892	33,892	33,892	33,892	33,892	33,892	543,323	
Grant Aid	PV	1	27,157	27,157	27,157	27,157	582,157	27,157	27,157	27,157	27,157	27,157	-146,008	4,602,551	
			182,669	188,964	195,447	202,125	-345,996	216,089	223,386	230,902	238,644	246,618	427,996	-1,205,575	-1.5%
			216,561	222,856	229,340	236,018	-312,104	249,981	257,278	264,795	272,536	280,510	461,889	-662,252	0.1%
			112,547	115,924	119,401	122,983	126,673	130,473	134,387	138,419	142,571	146,848	151,254	1,822,083	
Existing			20,245	20,245	20,245	20,245	20,245	20,245	20,245	20,245	20,245	20,245	20,245	324,540	
Grant Aid	PV&WI	2	13,976	13,976	13,976	13,976	133,976	13,976	13,976	13,976	13,976	13,976	-67,458	1,958,640	
			98,571	101,948	105,425	109,007	-7,303	116,497	120,411	124,443	128,595	132,872	218,712	-136,558	1.2%
			118,816	122,192	125,670	129,252	12,942	136,742	140,656	144,688	148,840	153,117	238,956	187,982	3.0%
			1,171,544	1,206,690	1,242,891	1,280,177	1,318,583	1,358,140	1,398,884	1,440,851	1,484,077	1,528,599	1,574,457	18,966,716	
			15,346	15,346	15,346	15,346	15,346	15,346	15,346	15,346	15,346	15,346	15,346	246,014	
Diesel	PV	3	3,679,844	869,743	872,214	874,759	1,366,380	880,080	882,861	885,725	888,676	891,714	459,906	25,200,840	
			-2,508,300	336,947	370,677	405,419	-47,797	478,060	516,024	555,126	595,401	636,884	1,114,551	-6,234,123	-4.9%
			-2,492,954	352,294	386,023	420,765	-32,451	493,407	531,370	570,472	610,747	652,231	1,129,897	-5,988,109	-4.6%
			305,863	315,039	324,490	334,224	344,251	354,579	365,216	376,172	387,458	399,081	411,054	4,951,766	
			6,026	6,026	6,026	6,026	6,026	6,026	6,026	6,026	6,026	6,026	6,026	96,600	
Diesel	PV&WI	4	1,172,876	319,042	320,242	321,478	403,751	324,063	325,413	326,805	328,238	329,714	185,180	8,681,005	
			-867,014	-4,003	4,248	12,746	-59,500	30,516	39,803	49,368	59,220	69,368	225,874	-3,729,239	-14.2%
			-860,988	2,023	10,274	18,772	-53,474	36,542	45,829	55,394	65,246	75,394	231,900	-3,632,639	-13.5%
			74,777	77,020	79,331	81,711	84,162	86,687	89,287	91,966	94,725	97,567	100,494	1,210,598	
			3,649	3,649	3,649	3,649	3,649	3,649	3,649	3,649	3,649	3,649	3,649	58,502	
Diesel	Hydro	5	117,494	42,631	42,773	42,918	43,068	43,222	43,381	43,545	43,713	43,887	-6,124	1,693,267	
			-42,718	34,389	36,558	38,793	41,094	43,465	45,906	48,421	51,012	53,680	106,618	-482,669	-2.9%
			-39,068	38,038	40,207	42,442	44,743	47,114	49,556	52,071	54,661	57,329	110,267	-424,167	-2.3%
			158,137	162,882	167,768	172,801	177,985	183,325	188,824	194,489	200,324	206,333	212,523	2,560,167	
			9,316	9,316	9,316	9,316	9,316	9,316	9,316	9,316	9,316	9,316	9,316	149,345	
	Grid	6	47,668	47,943	48,225	48,516	48,815	49,124	49,442	49,769	50,106	50,454	-19,979	2,106,947	
			110,469	114,939	119,543	124,285	129,170	134,201	139,383	144,720	150,217	155,880	232,502	453,219	4.7%
			119,785	124,255	128,859	133,601	138,486	143,517	148,699	154,036	159,534	165,196	241,818	602,564	5.5%
			332,481	342,455	352,729	363,310	374,210	385,436	396,999	408,909	421,176	433,812	446,826	5,382,696	
			0	0	0	0	0	0	0	0	0	0	0		
Diesel	Diesel	7	1,226,025	281,848	282,695	283,568	284,466	285,392	286,346	287,328	288,339	289,381	193,418	7,108,092	
			-893,545	60,607	70,034	79,743	89,743	100,044	110,654	121,581	132,837	144,431	253,408	-1,725,395	-6.3%
			6,862,169	2,371,786	2,376,304	2,380,957	2,385,751	2,960,688	2,395,773	2,401,011	2,406,406	2,411,962	1,739,658	54,392,348	
	Improvement		10,526	10,526	10,526	10,526	10,526	10,526	10,526	10,526	10,526	10,526	10,526	168,745	
Diesel	of	7	6,783,682	2,175,569	2,180,087	2,184,741	2,189,534	2,764,471	2,199,556	2,204,794	2,210,189	2,215,746	1,471,947	53,640,973	0.0%
	Distribution		78,487	196,217	196,217	196,217	196,217	196,217	196,217	196,217	196,217	196,217	267,711	751,375	5.8%
			89,013	206,743	206,743	206,743	206,743	206,743	206,743	206,743	206,743	206,743	278,237	920,120	6.6%
			2,839,451	2,258,160	2,262,057	2,266,072	2,270,206	6,886,965	2,278,852	2,283,370	2,288,023	2,292,817	2,882,829	50,389,113	
	Introduction		10,526	10,526	10,526	10,526	10,526	10,526	10,526	10,526	10,526	10,526	10,526	168,745	
Diesel	of	7	6,756,054	2,149,256	2,155,130	2,161,180	2,167,411	2,743,829	2,180,440	2,187,249	2,194,262	2,201,486	1,530,899	51,871,425	
	Meter		130,911	129,595	128,240	126,844	125,406	139,000	122,399	120,828	119,209	117,542	137,265	1,709,774	32.3%
			141,438	140,122	138,766	137,370	135,932	149,526	132,925	131,354	129,736	128,069	147,791	1,878,519	34.9%

5.2 Least Cost Evaluation (Year 2005)

Power Sources		type		1	2	3	4	5	6	7	8	9	10
Existing Grant Aid	PV	1	Revenue	1,050,000	305,210	305,210	305,210	305,210	305,210	305,210	305,210	305,210	305,210
			Cost	2,909,200	14,546	14,546	14,546	14,546	14,546	14,546	569,546	14,546	14,546
			Cash Flow	-1,859,200	290,664	290,664	290,664	290,664	290,664	290,664	-264,336	290,664	290,664
Existing Grant Aid	PV&WI	2	Revenue	585,000	180,200	180,200	180,200	180,200	180,200	180,200	180,200	180,200	180,200
			Cost	1,325,360	6,624	6,624	6,624	6,624	6,624	6,624	126,624	6,624	6,624
			Cash Flow	-740,360	173,576	173,576	173,576	173,576	173,576	173,576	53,576	173,576	173,576
Diesel	PV	3	Revenue	915,000	257,346	257,346	257,346	257,346	257,346	257,346	257,346	257,346	257,346
			Cost	2,479,240	12,397	12,397	12,397	12,397	12,397	12,397	501,397	12,397	12,397
			Cash Flow	-1,564,240	244,949	244,949	244,949	244,949	244,949	244,949	-244,051	244,949	244,949
Diesel	PV&WI	4	Revenue	300,000	99,449	99,449	99,449	99,449	99,449	99,449	99,449	99,449	99,449
			Cost	752,050	3,757	3,757	3,757	3,757	3,757	3,757	84,757	3,757	3,757
			Cash Flow	-452,050	95,692	95,692	95,692	95,692	95,692	95,692	14,692	95,692	95,692
Diesel	Hydro	5	Revenue	225,000	48,710	48,710	48,710	48,710	48,710	48,710	48,710	48,710	48,710
			Cost	911,000	28,748	28,748	28,748	28,748	28,748	28,748	28,748	28,748	28,748
			Cash Flow	-686,000	19,962	19,962	19,962	19,962	19,962	19,962	19,962	19,962	19,962
	Grid	6	Revenue	510,000	105,213	105,213	105,213	105,213	105,213	105,213	105,213	105,213	105,213
			Cost	1,284,000	43,556	43,766	43,982	44,205	44,435	44,671	44,915	45,166	45,424
			Cash Flow	-774,000	61,657	61,447	61,230	61,008	60,778	60,541	60,298	60,047	59,789
Diesel	Diesel	7	Revenue	1,492,500	230,351	230,351	230,351	230,351	230,351	230,351	230,351	230,351	230,351
			Cost	43,200	271,035	271,665	272,314	272,983	273,672	274,381	275,112	275,865	276,640
			Cash Flow	1,449,300	-40,683	-41,313	-41,963	-42,631	-43,320	-44,030	-44,760	-45,513	-46,288

5.2 Least Cost Evaluation (Year 20(

Power Sources		type	11	12	13	14	15	16	17	18	19	20	21	NPV	IRR
Existing Grant Aid	PV	1	830,210	305,210	305,210	305,210	305,210	305,210	305,210	305,210	305,210	305,210	305,210	¥6,344,421	
			14,546	14,546	14,546	14,546	569,546	14,546	14,546	14,546	14,546	14,546	−130,914	¥3,875,430	
			815,664	290,664	290,664	290,664	−264,336	290,664	290,664	290,664	290,664	290,664	436,124	2,468,990	13.1%
Existing Grant Aid	PV&WI	2	472,700	180,200	180,200	180,200	180,200	180,200	180,200	180,200	180,200	180,200	180,200	¥3,697,529	
			6,624	6,624	6,624	6,624	126,624	6,624	6,624	6,624	6,624	6,624	−59,644	¥1,553,419	
			466,076	173,576	173,576	173,576	53,576	173,576	173,576	173,576	173,576	173,576	239,844	2,144,110	23.2%
Diesel	PV	3	714,846	257,346	257,346	257,346	257,346	257,346	257,346	257,346	257,346	257,346	257,346	¥5,390,483	
			12,397	12,397	12,397	12,397	501,397	12,397	12,397	12,397	12,397	12,397	−111,565	¥3,328,265	
			702,449	244,949	244,949	244,949	−244,051	244,949	244,949	244,949	244,949	244,949	368,911	2,062,218	13.1%
Diesel	PV&WI	4	249,449	99,449	99,449	99,449	99,449	99,449	99,449	99,449	99,449	99,449	99,449	¥2,009,011	
			3,757	3,757	3,757	3,757	84,757	3,757	3,757	3,757	3,757	3,757	−33,846	¥902,039	
			245,692	95,692	95,692	95,692	14,692	95,692	95,692	95,692	95,692	95,692	133,295	1,106,971	20.5%
Diesel	Hydro	5	198,710	48,710	48,710	48,710	48,710	48,710	48,710	48,710	48,710	48,710	48,710	¥1,122,082	
			253,748	28,748	28,748	28,748	28,748	28,748	28,748	28,748	28,748	28,748	−2,756	¥1,514,165	
			−55,038	19,962	19,962	19,962	19,962	19,962	19,962	19,962	19,962	19,962	51,465	−392,083	−5.1%
	Grid	6	457,713	105,213	105,213	105,213	105,213	105,213	105,213	105,213	105,213	105,213	105,213	¥2,470,149	
			45,424	45,965	46,247	46,538	46,837	47,146	47,464	47,791	48,128	48,476	−22,610	¥1,945,378	
			412,289	59,248	58,966	58,675	58,375	58,067	57,749	57,422	57,084	56,737	127,823	524,772	7.9%
Diesel	Diesel	7	1,175,351	230,351	230,351	230,351	230,351	230,351	230,351	230,351	230,351	230,351	230,351	¥5,915,987	
			1,221,640	278,261	279,108	279,981	280,879	281,805	282,759	283,741	284,752	285,794	284,707	¥5,252,230	
			−46,288	−47,909	−48,757	−49,629	−50,528	−51,454	−52,407	−53,389	−54,401	−55,443	−54,356	663,757	−3.5%

5.3 Financial Evaluation (Year 2005)

Power Sources		type		1	2	3	4	5	6	7	8	9	10
Existing Grant Aid	PV	1	Revenue	0	93,385	96,187	99,072	102,044	105,106	108,259	111,507	114,852	118,297
			Cost	3,463,300	27,157	27,157	27,157	27,157	27,157	27,157	582,157	27,157	27,157
			Cash Flow	-3,463,300	66,228	69,030	71,915	74,887	77,949	81,102	-470,650	87,695	91,140
Existing Grant Aid	PV&WI	2	Revenue	0	51,773	53,326	54,926	56,574	58,271	60,019	61,820	63,674	65,584
			Cost	1,628,676	13,976	13,976	13,976	13,976	13,976	13,976	133,976	13,976	13,976
			Cash Flow	-1,628,676	37,797	39,350	40,950	42,598	44,295	46,043	-72,156	49,698	51,608
Diesel	PV	3	Revenue	0	668,935	689,003	709,673	730,963	752,892	775,479	798,743	822,705	847,387
			Cost	8,698,764	828,519	830,358	832,251	834,202	836,211	838,280	1,329,412	842,607	844,868
			Cash Flow	-8,698,764	-159,584	-141,355	-122,579	-103,239	-83,319	-62,802	-530,669	-19,902	2,518
Diesel	PV&WI	4	Revenue	0	170,845	175,970	181,249	186,686	192,287	198,056	203,997	210,117	216,421
			Cost	2,921,075	301,703	302,596	303,515	304,463	305,439	306,444	388,479	308,545	309,644
			Cash Flow	-2,921,075	-130,858	-126,626	-122,266	-117,776	-113,152	-108,388	-184,482	-98,428	-93,223
Diesel	Hydro	5	Revenue	0	44,287	45,615	46,984	48,393	49,845	51,341	52,881	54,467	56,101
			Cost	1,003,800	41,427	41,532	41,640	41,752	41,867	41,985	42,107	42,232	42,361
			Cash Flow	-1,003,800	2,860	4,083	5,344	6,642	7,979	9,356	10,774	12,235	13,740
	Grid	6	Revenue	0	91,093	93,826	96,641	99,540	102,526	105,602	108,770	112,033	115,394
			Cost	1,415,800	45,534	45,744	45,960	46,183	46,413	46,649	46,893	47,144	47,402
			Cash Flow	-1,415,800	45,560	48,082	50,681	53,357	56,113	58,953	61,877	64,889	67,992
Diesel	Diesel	7	Revenue	0	199,951	205,950	212,128	218,492	225,047	231,798	238,752	245,915	253,292
			Cost	1,940,720	274,622	275,252	275,901	276,570	277,259	277,968	278,699	279,452	280,227
			Cash Flow	-1,940,720	-74,670	-69,302	-63,773	-58,078	-52,212	-46,170	-39,947	-33,537	-26,935

5.3 Financial Evaluation (Year 2005)

Power Sources		type	11	12	13	14	15	16	17	18	19	20	21	NPV	IRR
Existing Grant Aid	PV	1	121,846	125,502	129,267	133,145	137,139	141,253	145,491	149,856	154,351	158,982	163,751	¥1,972,631	
			27,157	27,157	27,157	27,157	582,157	27,157	27,157	27,157	27,157	27,157	-146,008	¥4,602,551	
			94,689	98,345	102,110	105,988	-445,018	114,096	118,334	122,699	127,194	131,825	309,759	-2,629,921	-7.3%
Existing Grant Aid	PV&WI	2	67,552	69,579	71,666	73,816	76,030	78,311	80,661	83,080	85,573	88,140	90,784	¥1,093,634	
			13,976	13,976	13,976	13,976	133,976	13,976	13,976	13,976	13,976	13,976	-67,458	¥1,958,640	
			53,576	55,603	57,690	59,840	-57,946	64,335	66,685	69,104	71,597	74,164	158,242	-865,006	-3.9%
Diesel	PV	3	872,808	898,992	925,962	953,741	982,353	1,011,824	1,042,179	1,073,444	1,105,647	1,138,817	1,172,981	¥14,130,334	
			3,659,697	849,596	852,067	854,612	1,346,233	859,933	862,714	865,579	868,529	871,568	439,760	¥24,877,872	
			-2,786,889	49,396	73,895	99,129	-363,880	151,891	179,464	207,865	237,118	267,249	733,222	-10,747,538	-13.0%
Diesel	PV&WI	4	222,913	229,601	236,489	243,583	250,891	258,418	266,170	274,155	282,380	290,851	299,577	¥3,608,858	
			1,165,775	311,940	313,140	314,376	396,649	316,961	318,312	319,703	321,136	322,612	178,078	¥8,572,535	
			-942,861	-82,339	-76,651	-70,793	-145,758	-58,543	-52,141	-45,548	-38,756	-31,761	121,499	-4,963,677	-32.4%
Diesel	Hydro	5	57,784	59,518	61,303	63,142	65,037	66,988	68,997	71,067	73,199	75,395	77,657	¥935,500	
			117,494	42,631	42,773	42,918	43,068	43,222	43,381	43,545	43,713	43,887	-6,124	¥1,693,267	
			-59,710	16,886	18,531	20,224	21,969	23,766	25,617	27,523	29,486	31,509	83,782	-757,767	-6.9%
	Grid	6	118,856	122,422	126,094	129,877	133,774	137,787	141,920	146,178	150,563	155,080	159,733	¥1,924,222	
			47,668	47,943	48,225	48,516	48,815	49,124	49,442	49,769	50,106	50,454	-19,979	¥2,106,947	
			71,188	74,479	77,869	81,361	84,958	88,663	92,479	96,409	100,457	104,627	179,711	-182,726	0.8%
Diesel	Diesel	7	260,891	268,718	276,779	285,083	293,635	302,444	311,518	320,863	330,489	340,404	350,616	¥4,223,697	
			1,226,025	281,848	282,695	283,568	284,466	285,392	286,346	287,328	288,339	289,381	193,418	¥7,108,092	
			-965,134	-13,130	-5,916	1,515	9,169	17,052	25,172	33,535	42,150	51,023	157,197	-2,884,394	-15.8%