

# ANNEX B.7

CLIMATE AND METEOROLOGY

## B.7 CLIMATE AND METEOROLOGY

### B.7.1 OBSERVATION NETWORK AND DATA AVAILABILITY

#### (1) Observation Network

The Slovakia Hydrometeorological Institute (SHMI), which was established in 1969, is the responsible organization for obtaining quantitative and qualitative information on the state and regime of air and water in Slovakia. SHMI has a climate and meteorological observation network consisting of 25 professional stations with a further 607 precipitation and 320 phenomenological stations in the whole country. Among those stations, 35 precipitation and 6 phenomenological stations are located in the Morava River Basin in the Slovakian Territory, of which 19 precipitation and 3 climatologic are within the Study Area.

#### (2) Data Availability

The climatic data of the last 20 years are obtained in parallel with historical processed data in the Study.

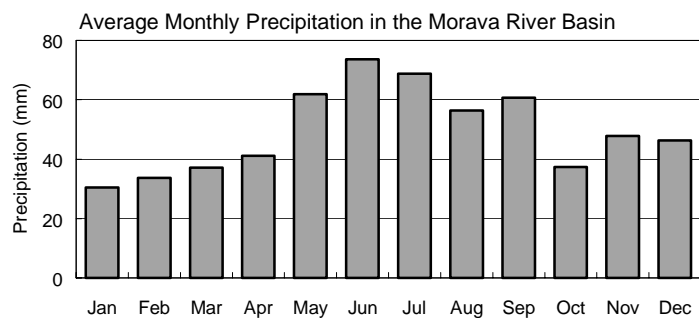
### B.7.2 CLIMATIC REVIEW OF THE MORAVA RIVER BASIN

#### (1) Precipitation

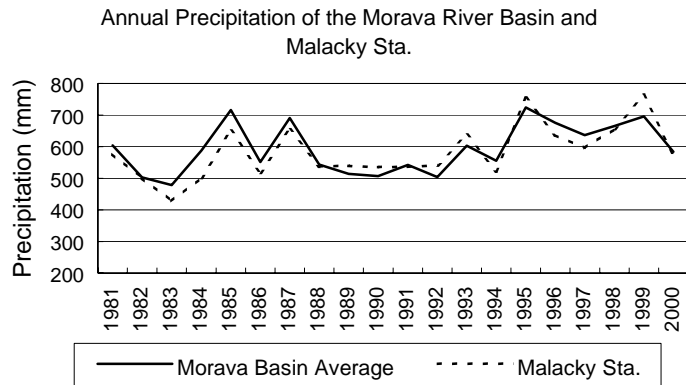
##### 1) Precipitation of the Morava River Basin

The spatial variation of the precipitation is caused by the relief character such as altitude, land coverage, orientation of mountains, etc. and the prevailing flow of the air. The monthly and annual precipitation as an average of the last 20 years is shown in Table B.7.2. In the Morava River Basin, the annual precipitation of each station varies from 545mm to 682mm, which is 91% to 115% of the average of 596mm. Even the Basin has some variation of relief from flat to hilly or semi-mountainous land, the variation of precipitation is rather small. Due to its flat and non-mountainous relief the spatial variation of the Study Area is from 94% (562mm) to 109% (648mm), which is considered uniform.

The Morava River Basin has precipitation constantly through the year, of which monthly precipitation varies from 31mm to 74mm in average. High precipitation appears from May to July in general, and around 60% of the annual precipitation is given in the vegetation period, i.e., from April to September.



The annual precipitation of the Morava River Basin varies from 479mm in 1983 to 724mm in 1995 and the average of these 20 years was 558mm as shown in Table B.7.3 The precipitation from 1993 to 2000 is considered a wet period during these 20 years.

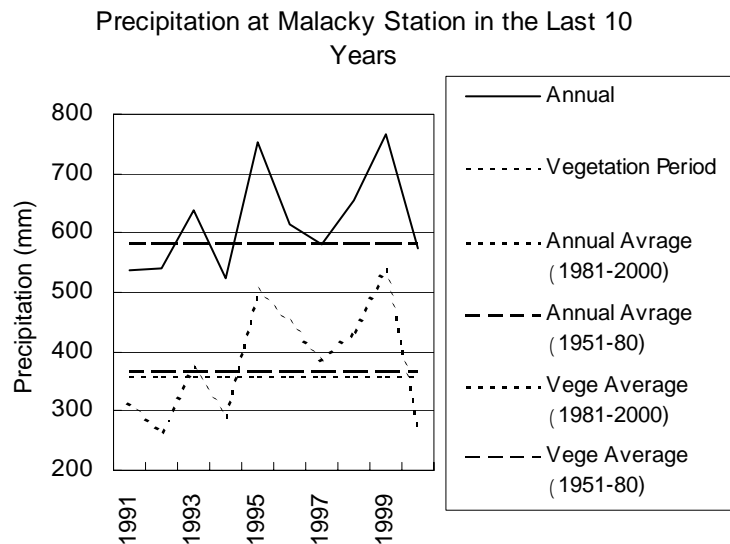


## 2) Drought Condition of the Study Area

The drought condition of the Study Area can be represented by the observed data of the Malacky Station, which is located at the center of the Study Area and has the predominant precipitation value and pattern.

The average annual precipitation of Malacky in these 10 years (1991~2000) was 618mm, which is greater than the 583mm average of the 30 years from 1951 to 1980 or the 583mm average of the 20 years from 1981 to 2000. The average precipitation during the vegetation period, from April to September, was 383mm, and this also exceeds the historical average of 368mm from 1951-1980, or of 360mm from 1981-2000. Under those precipitation conditions, these 10 years were considered to be a relatively wet period in annual precipitation, even the 2~3-year frequency drought had 523mm annual precipitation in 1994.

However, the precipitation during the vegetation period varies dramatically from 264~536mm, and several droughts occurred, i.e., 10-year frequency drought in 1992 (264mm) and 2000 (269mm), 3~5-year frequency drought in 1994 (290mm), 2~3-year frequency drought in 1991 (313mm). The fluctuation in precipitation during the vegetation period makes agricultural production unstable because the farmers rely on water from rainfall for crops.



## 3) Snow Coverage

In the Study Area, snow coverage occurs mainly from December to March, and also in December and April in a few cases (2 times in these 20 years). The average number of snow coverage days of these 20 years is shown below, and it varies from 6.2 days to 10.2 days from December to February while the peak occurs in January.

Average Days with Snow Coverage More Than 1.0 cm and Their Occurrence at Malacky (1981-2000)

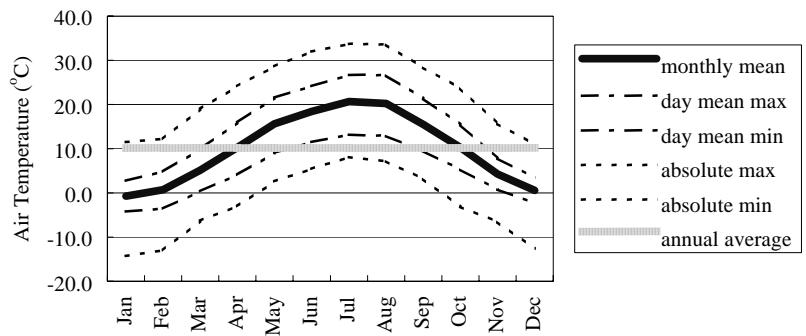
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average (day)	10.2	8.0	2.6	0.3	-	-	-	-	-	-	1.4	6.2	28.6
Occurrence (year in 20 years)	17	17	9	2	-	-	-	-	-	-	10	15	20

(2) Other Climatic Conditions

The monthly average or summary of climatic conditions such as air temperature, humidity, cloudy ratio, sunshine duration, wind velocity, air pressure and evaporation, are summarized in Table B.7.5.

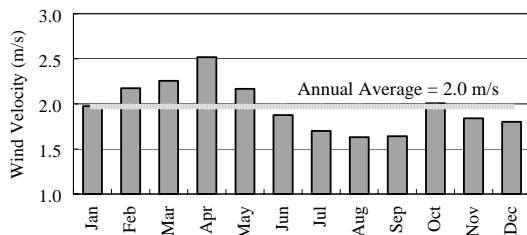
The average temperature at Malacky for 1981-2000 is shown below. The annual average is 10.0°C and the day-mean minimum goes below freezing from December to February, and the absolute minimum temperature below freezing occurs from October to April.

Average Air Temperature at Malacky (Average of 1981-2000)

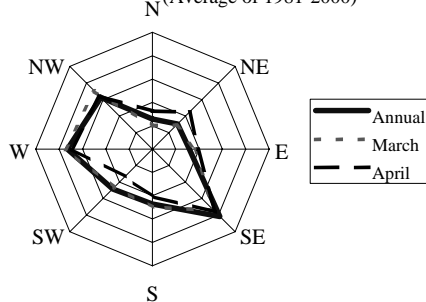


Average wind velocity and direction at Malacky for 1981-2000 are shown below. The average wind velocity is 2.0 m/s and a strong wind period occurs from February or March to May while the peak appears in April. The north-west to west and the south-west wind directions are predominant through the year.

Average Wind Velocity at Malacky (Average of 1981-2000)



Wind Direction at Malacky (Average of 1981-2000)



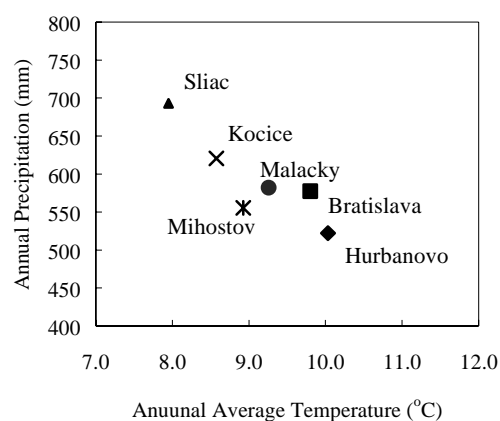
### (3) Regional Comparison of Climatic Condition

In order to understand the climatic condition of the Zahorska Lowland in the country, the conditions in major agricultural production areas, i.e., the Danube Lowland and the Eastern Slovak Lowland, were compared in Table B.7.6.

The precipitation of the Zahorska Lowland represented by Malacky is rather higher than the Danube Lowland represented by Hurbanovo and the eastern Slovak Lowland represented by Mihostov, and that situation is the same for the precipitation during the vegetation period. For air temperature, Malacky is positioned between Hurbanovo and Mihostov for the annual average, however, the monthly mean of March and April, which influences the growth condition of winter crops such as wheat, is rather lower than both of them.

Location	Elevation	Remarks
Bratislava	131m	As for reference
Hurubanovo	115m	Representing the Danube Lowland
Sliac	313m	Central Slovakia
Kosice	230m	Eastern Slovakia
Mihostov	105m	Representing the Eastern Slovak Lowland
Malacky	165m	Representing the Zahorska Lowland

Regional Comparison of Climatic Condition



### B.7.3 LONG-TERM CHANGE OF CLIMATIC CONDITION

The long-term change of the climate has been pointed out and set as an important subject of climatic research by several institutes in Slovakia. In spite of year to year variation, the decreasing trend for precipitation and the increasing trend for air temperature can be seen in Slovakia. This situation is also observed in the Zahorska Lowland and the Study Area. By comparing the long-term average value between of 1951-1980 and that of 1971-2000, the annual precipitation has fallen to 97% of the previous value and the average air temperature has increase to 106% of the previous value at Malacky.

Difference of Long-term Average of Precipitaion and Air Temperature at Malacky

	Precipitation (mm)		Air Temperature (°C)	
	Annual	Apr-Sep	Annual	Apr-Sep
Average of 1951-1980 (a)	583	368	9.3	15.7
Average of 1971-2000 (b)	566	353	9.9	16.3
Ratio (a)/(b)	97.2%	96.0%	105.9%	104.0%

Source: Based on data provided by SHMI

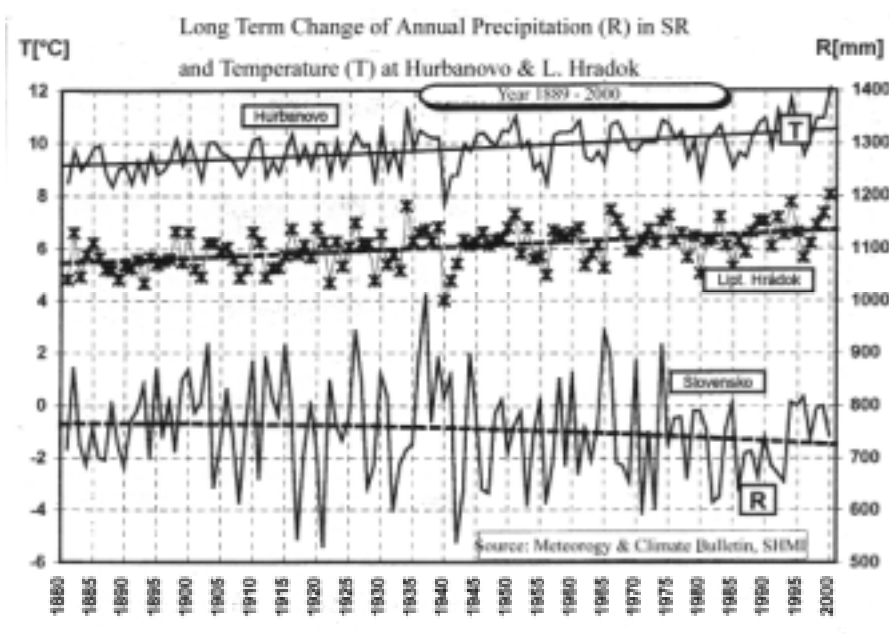


Table B.7.1 List of Observation Stations Data Obtained

ID for Precipitation	ID for Climatology	Station Name	Latitude	Longitude	Altitude [m]	Precipitation Data	Climatologic Data
14040		Skalica	48-50-54	17-13-47	178		
14050	11800	Holic	48-48-44	17-09-49	180	O	O
15020	11806	Myjava	48-45-14	17-33-42	349	O	O
15140	11805	Senica	48-40-15	17-22-28	218	O	O
15180		Mikulasov	48-34-19	17-12-50	236	O	
15220		Borske Svor Jur	48-36-50	17-02-53	172	O	
16040		Solosnica	48-28-07	17-13-30	213	O	
16060		Studienka	48-30-46	17-07-36	177	O	
16080		Velke Levare	48-30-05	17-00-20	150	O	
16100		Zahorska Ves	48-22-54	16-51-16	140	O	
16120		Kuchyna	48-24-23	17-08-51	236	O	
16160	11804	Malacky	48-27-07	17-01-58	165	O	O
16200		Lozorno	48-19-52	17-02-33	187	O	
16220		Zohor	48-19-18	16-59-21	148	O	
16250	11811	Stupava	48-16-48	17-01-33	179	O	O
17320	11816	Bratislava - Airport	48-10-18	17-12-00	131	O	O

: within the Study Area

Table B.7.2 Monthly Average Precipitation (1981-2000)

ID	Station	Month												Annual Precip		Sum Apr. to Sep.			
		1	2	3	4	5	6	7	8	9	10	11	12		%		%		
14040	Skalica																		
14050	Holic	20.2	26.4	34.1	41.8	59.8	68.7	71.2	42.7	50.5	38.7	49.4	41.4	545	91%	335	92%		
15020	Myjava	45.7	45.5	46.0	46.5	68.0	83.8	69.3	54.3	62.3	46.5	55.6	62.9	682	115%	384	106%		
15140	Senica	31.8	32.7	34.6	36.1	56.9	65.5	67.5	52.6	57.2	38.1	44.6	49.7	567	95%	336	93%		
15180	Mikulasov	33.1	33.5	36.0	40.4	63.7	72.4	68.9	60.8	61.4	38.2	44.7	46.8	605	102%	374	103%		
15220	Borske Svor Jur	29.7	28.4	31.5	37.9	60.4	71.3	66.6	58.1	56.7	33.4	44.9	42.8	562	94%	351	97%		
16040	Solosnica	32.7	38.2	41.1	44.9	71.5	77.3	74.3	60.4	65.4	40.3	52.2	49.8	648	109%	394	109%		
16060	Studienka	32.4	33.9	39.1	41.1	65.2	72.6	76.4	60.7	58.9	34.9	48.7	48.8	618	104%	375	103%		
16080	Velke Levare	30.4	33.1	36.1	39.7	55.2	73.8	68.0	55.7	58.0	33.4	46.1	44.9	574	96%	350	97%		
16100	Zahorska Ves	27.9	29.7	35.7	37.5	56.9	68.9	67.8	57.9	57.3	33.5	46.2	40.4	560	94%	346	95%		
16120	Kuchyna	32.7	37.2	39.0	43.6	65.6	75.0	70.2	61.0	64.3	37.6	50.0	47.9	624	105%	380	105%		
16160	Malacky	27.9	31.1	35.6	39.2	62.1	76.0	67.8	55.4	60.0	35.4	48.4	44.3	583	98%	360	99%		
16200	Lozorno	28.6	35.4	36.9	41.8	59.4	73.5	65.1	56.0	64.7	38.0	47.3	44.4	591	99%	361	99%		
16220	Zohor	28.0	32.1	37.3	40.2	59.8	76.2	62.9	61.2	63.1	35.9	45.6	43.2	585	98%	363	100%		
16250	Stupava	25.5	34.3	36.6	44.6	62.3	76.0	66.5	52.5	69.0	39.6	46.4	41.4	595	100%	371	102%		
<b>Average of Morava Basin</b>		<b>30.5</b>	<b>33.7</b>	<b>37.1</b>	<b>41.1</b>	<b>61.9</b>	<b>73.6</b>	<b>68.7</b>	<b>56.4</b>	<b>60.6</b>	<b>37.4</b>	<b>47.9</b>	<b>46.3</b>	<b>596</b>	<b>100%</b>	<b>363</b>	<b>100%</b>		
17320	Bratislava - Airport	38.2	38.7	36.6	35.7	56.6	56.6	50.9	52.1	55.0	37.9	49.8	49.5	558		307			

Source: Based on the data provided by SHMI

: within the Study Area

Table B.7.3 Annual Precipitation of the Morava River Basin from 1981 to 2000

**Annual Precipitation (mm)**

ID	Station	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
14040	Skalica																			
14050	Holic									424	473	450	442	569	470	591	635	656	605	605
15020	Myjava	769	609	585	705	820	693	825	664	457	563	510				740	752	743	708	766
15140	Senica	608	488	439	617	696	575	639	520	423	500	451	509	566	612	676	624	638	650	548
15180	Mikulasov	676	498	514	623	728	547	660	566	524	513			595	635	697	662	608	657	
15220	Borske Svor Jur	562	477	433	570	662	523	625	432	479	463	490	495	576	496	704	750	618	631	627
16040	Solosnica	637	563	512	731	782	614	744	617	539	522	622	586	663	631	830	703	619	704	728
16060	Studienka	700	452		582	760	530	752	537	563	514	608	525	613	565	759	676	655	648	705
16080	Velke Levare	537	470	451	534	691	564	694	497	523	480	544	502	629	491	702	674	621	660	667
16100	Zahorska Ves	497	478	444	526	705	497	700	496	536	487	499	478	559	471	675	653	615	695	653
16120	Kuchyna	627	538	532	603	773	549	711	581	538	516	577	524	619	636	777	649	662	678	790
16160	Malacky	576	501	429	502	651	518	655	537	540	535	536	541	638	522	755	637	596	656	764
16200	Lozorno	552	500	455	522	645	504	643	540	552	515	571	514	616	555	726	673	660	719	793
16220	Zohor	513	459	473	544	686	509	671	529	595	523	579	461	619	545	737	698	628	700	710
16250	Stupava							662	545	502	494	612	475	572	591	767	672	594	615	698
<b>Average of the Study Area</b>		<b>578</b>	<b>493</b>	<b>466</b>	<b>568</b>	<b>706</b>	<b>534</b>	<b>686</b>	<b>531</b>	<b>537</b>	<b>505</b>	<b>564</b>	<b>510</b>	<b>610</b>	<b>550</b>	<b>743</b>	<b>678</b>	<b>627</b>	<b>670</b>	<b>713</b>
<b>Average of the Morava Basin</b>		<b>604</b>	<b>503</b>	<b>479</b>	<b>588</b>	<b>717</b>	<b>552</b>	<b>691</b>	<b>543</b>	<b>514</b>	<b>507</b>	<b>542</b>	<b>504</b>	<b>603</b>	<b>555</b>	<b>724</b>	<b>675</b>	<b>637</b>	<b>666</b>	<b>696</b>
17320	Bratislava - Airport	559	527	501	561	613	447	598	546	433	507	596	499	527	582	820	605	518	557	624

**Precipitation in Vegetation Period, April to September (mm)**

ID	Station	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
14040	Skalica																			
14050	Holic									312	254	273	221	344	283	399	467	417	386	374
15020	Myjava	346	366	324	352	479	396	478	305	275	332	270				463	503	477	421	488
15140	Senica	313	313	238	382	421	342	390	262	280	284	225	244	315	358	474	444	412	414	354
15180	Mikulasov	387	318	311	392	440	314	389	297	397	298			333	385	457	495	409	441	407
15220	Borske Svor Jur	313	324	273	353	430	322	376	206	362	256	276	240	357	292	490	589	409	416	433
16040	Solosnica	356	336	318	425	473	352	446	324	394	288	397	267	376	395	570	525	424	476	469
16060	Studienka	425	279	342	354	485	302	452	262	439	290	373	239	341	327	506	504	432	410	474
16080	Velke Levare	302	305	288	314	421	322	405	244	416	255	334	240	368	287	456	500	412	435	457
16100	Zahorska Ves	296	287	292	328	432	286	408	263	413	257	298	230	334	264	454	480	397	500	445
16120	Kuchyna	365	334	328	339	465	310	398	303	396	305	359	235	346	392	534	470	461	444	538
16160	Malacky	354	315	260	322	386	328	391	282	427	302	312	265	372	290	502	469	402	433	531
16200	Lozorno	309	296	280	303	377	286	345	289	444	293	347	235	335	330	495	496	447	486	544
16220	Zohor	292	269	290	328	416	302	379	274	483	299	362	190	364	322	503	527	424	488	502
16250	Stupava						394	280	391	275	380	191	341	357	528	506	401	409	476	
<b>Average of the Study Area</b>		<b>335</b>	<b>305</b>	<b>297</b>	<b>341</b>	<b>431</b>	<b>312</b>	<b>400</b>	<b>273</b>	<b>417</b>	<b>282</b>	<b>344</b>	<b>233</b>	<b>353</b>	<b>325</b>	<b>504</b>	<b>507</b>	<b>421</b>	<b>450</b>	<b>487</b>
<b>Average of the Morava Basin</b>		<b>338</b>	<b>312</b>	<b>295</b>	<b>349</b>	<b>435</b>	<b>322</b>	<b>404</b>	<b>276</b>	<b>388</b>	<b>285</b>	<b>324</b>	<b>233</b>	<b>348</b>	<b>329</b>	<b>488</b>	<b>498</b>	<b>423</b>	<b>440</b>	<b>464</b>
17320	Bratislava - Airport	291	292	234	314	305	198	266	234	316	257	307	209	255	329	586	450	323	351	412

Source: Based on data provided by SHMU

□ within the Study Area

Table B.7.4 Drought Condition of Precipitation of Malacky Station from 1991 to 2000

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Sum 4-9
1991	7 ddd	13 dd	39 n	29 n	97 hh	70 n	58 n	29 d	30 d	17 d	88 hh	60 h	537 n	313 n
1992	19 d	22 d	75 hhh	31 n	23 dd	136 hh	27 d	8 ddd	39 d	54 hh	53 n	55 h	542 n	264 d
1993	23 d	38 n	36 n	11 dd	47 n	72 n	112 hhh	99 hh	31 d	55 hh	32 d	82 hh	638 h	372 h
1994	32 n	19 d	33 n	77 hhh	70 n	45 d	28 d	40 d	30 d	62 hhh	41 n	46 n	523 n	290 d
1995	37 n	32 n	55 hh	59 hh	67 n	137 hh	20 dd	73 h	147 hhh	10 dd	62 h	55 h	754 hh	503 hhh
1996	47 hh	28 n	19 d	86 hhh	125 hhh	54 n	44 n	81 h	59 n	30 n	21 dd	21 dd	615 h	449 hh
1997	12 dd	18 d	29 n	32 n	46 n	68 n	195 hhh	24 dd	20 dd	18 d	81 hh	37 n	580 n	385 h
1998	18 d	4 ddd	25 d	53 h	26 dd	98 h	74 h	34 d	149 hhh	121 hhh	28 d	24 d	654 h	434 hh
1999	20 d	58 hh	31 n	79 hhh	56 n	164 hhh	119 hhh	68 n	50 n	19 d	68 h	35 n	767 hh	536 hhh
2000	39 h	40 n	73 hhh	9 ddd	44 n	19 dd	84 hh	66 n	47 n	43 h	68 h	44 n	574 n	269 d
Avg 1976-95	31	32	35	38	56	72	54	55	55	30	49	43	551	332

Classification for monthly precipitation

Class	Criteria
ddd	extreme dry
dd	very dry
d	dry
n	normal
h	humid
hh	very humid
hhh	extreme humid

The average amount of 20 years from 1976 to 1995 is set as "normal".

Classification for annual and vegetation period precipitation

Class	Criteria
ddd	extreme dry
dd	very dry
d	dry
n	normal
h	humid
hh	very humid
hhh	extreme humid

Probable annual precipitation (calculated by data of 1976-95)

Probable value (mm)	Observed value
Average	551
70% (3.33-year)	520
80% (5-year)	502
90% (10-year)	469

Probable vegetation period (Apr-Sep) precipitation (calculated by data of 1976-95)

Probable value (mm)	Observed value
Average	332
70% (3.33-year)	297
80% (5-year)	286
90% (10-year)	269

Source: Original data is prepared by SHMI and RIMLE



Table B.7.5 Monthly Average of Climatic Data (1981 - 2000)

**Average Monthly Air Temperature (°C)**

ID	Station	1	2	3	4	5	6	7	8	9	10	11	12	Average
11800	Holic	0.4	2.3	5.9	10.9	15.9	18.9	20.7	20.8	15.5	10.6	4.7	0.6	10.6
11804	Malacky	-0.7	0.7	5.1	10.3	15.6	18.4	20.6	20.2	15.5	10.3	4.2	0.6	10.0
11805	Senica	-1.4	0.1	4.5	9.8	14.9	17.6	19.7	19.5	15.0	9.9	3.7	0.0	9.4
11806	Myjava	-2.1	-0.8	3.5	8.8	13.8	16.3	18.4	18.1	13.9	9.1	2.9	-0.8	7.9
11811	Stupava	0.2	2.4	5.4	10.5	15.3	18.2	20.3	20.1	15.6	10.7	4.5	0.9	10.3
11816	Bratislava Airport	-0.4	1.0	5.4	10.7	15.8	18.7	21.0	20.6	15.8	10.2	4.3	0.8	10.3

**Average Monthly Humidity (%)**

ID	Station	1	2	3	4	5	6	7	8	9	10	11	12	Sum
11800	Holic	83	78	73	66	65	68	67	67	74	77	83	84	74
11804	Malacky	84	80	74	67	68	69	67	69	76	78	84	86	75
11805	Senica	87	82	77	70	72	73	70	70	77	79	86	89	78
11806	Myjava	86	82	77	68	71	72	71	72	78	80	85	87	78
11811	Stupava	84	78	74	68	68	71	69	68	76	77	84	86	75
11816	Bratislava Airport	81	76	72	64	66	66	64	65	73	78	83	84	73

**Average Monthly Cloudy Ratio (10-grade system)**

ID	Station	1	2	3	4	5	6	7	8	9	10	11	12	Average
11800	Holic	7.2	6.7	6.6	6.2	5.5	5.9	5.3	5.1	5.9	6.2	7.9	7.9	6.4
11804	Malacky	7.0	6.1	6.2	5.2	5.0	5.3	4.6	4.2	5.0	5.2	7.0	7.3	5.7
11805	Senica	6.9	6.1	5.8	5.0	4.4	4.6	4.1	3.9	4.7	5.1	7.0	7.5	5.4
11806	Myjava	7.6	6.7	6.3	5.6	5.3	5.4	4.9	4.5	5.5	5.5	7.3	8.0	6.1
11811	Stupava	7.2	6.2	6.5	5.8	5.2	5.4	4.9	4.5	5.6	5.7	7.6	7.6	6.0
11816	Bratislava Airport	7.3	6.4	6.4	5.9	5.5	5.7	5.1	4.8	5.5	5.7	7.3	7.7	6.1

**Montly Summary of Sunshine Duration (hours)**

ID	Station	1	2	3	4	5	6	7	8	9	10	11	12	Sum
11800	Holic	58.9	96.4	136.3	189.2	264.2	259.3	270.5	264.5	174.3	142.7	59.6	45.6	1962
11804	Malacky	37.2	60.3	131.0	171.7	205.0	198.1	235.8	227.3	167.5	116.6	61.5	34.8	1736
11805	Senica													
11806	Myjava	50.9	88.8	131.8	177.2	248.1	244.3	264.5	263.3	159.4	134.4	47.1	37.7	1850
11811	Stupava	60.5	100.6	138.1	186.3	256.5	248.4	262.4	266.3	175.0	137.0	62.7	44.9	1939
11816	Bratislava Airport	56.1	96.3	131.4	183.2	238.5	238.3	265.4	252.3	178.4	134.4	63.6	42.8	1881

**Average Monthly Wind Velocity (m/s)**

ID	Station	1	2	3	4	5	6	7	8	9	10	11	12	Average
11800	Holic	2.7	2.9	3.0	3.1	2.8	2.6	2.4	2.4	2.7	2.9	2.8	2.7	2.7
11804	Malacky	2.0	2.2	2.3	2.5	2.2	1.9	1.7	1.6	1.6	2.0	1.8	1.8	2.0
11805	Senica	2.4	2.4	2.5	2.7	2.3	1.9	1.7	1.7	1.8	2.3	2.5	2.4	2.2
11806	Myjava	2.5	2.7	2.7	3.0	2.4	2.3	2.1	2.0	2.1	2.4	2.4	2.5	2.4
11811	Stupava	2.8	2.9	3.0	3.1	2.8	2.5	2.3	2.1	2.3	2.7	2.6	2.4	2.6
11816	Bratislava Airport	3.3	3.4	3.5	3.7	3.2	3.2	3.0	2.8	2.8	2.9	3.2	3.2	3.2

**Average Monthly Airpressure (hPa)**

ID	Station	1	2	3	4	5	6	7	8	9	10	11	12	Average
11800	Holic													
11804	Malacky													
11805	Senica													
11806	Myjava													
11811	Stupava													
11816	Bratislava Airport	1004	1003	1001	997	998	999	999	1000	1000	1002	1002	1002	1001

**Montly Summary of Evaporation (mm)**

ID	Station	1	2	3	4	5	6	7	8	9	10	11	12
11800	Holic				55.0	81.7	89.6	95.5	94.7	55.9	35.8		
11804	Malacky				58.9	85.3	100.7	113.8	113.3	70.7	48.1		
11805	Senica												
11806	Myjava				52.2	71.4	80.4	81.3	88.1	51.8	33.2		
11811	Stupava												
11816	Bratislava Airport												

Source: Based on data prepared by SHMI

Table B.7.6 Regional Comparioson of Climatic Conditions of SR

Station	Air Temperature (°C) - Montly Mean - Average of 1961-1990														Remarks
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average		
Bratislava	-1.5	0.9	5.0	10.2	15.1	18.3	20.1	19.3	15.4	9.9	4.4	0.5	9.8		
Hurbanovo	-1.5	1.0	5.4	10.7	15.6	18.7	20.2	19.5	15.5	10.2	4.7	0.4	10.0	Danube Plain Area	
Nitra															
Sliač	-3.9	-1.1	3.1	8.6	13.6	16.6	18.1	17.3	13.5	8.4	3.1	-1.9	8.0	Central Part	
Košice	-3.5	-0.9	3.6	9.5	14.4	17.4	19.0	18.3	14.4	9.0	3.2	-1.5	8.6	East Part	
Mihostov	-3.4	-0.9	3.9	10.0	15.0	17.9	19.4	18.8	14.8	9.1	3.6	-1.1	8.9	East Slovakia Lowland	
Malacky	-1.7	0.2	4.1	9.5	14.2	17.8	19.2	18.5	14.9	9.4	4.6	0.4	9.3	Zahorska Lowland Average of 1951-80	

Station	Precipitation (mm) - Monthly - Average of 1961-1990														Remarks
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Sum		
Bratislava	43.0	43.0	37.0	35.3	56.1	65.9	53.8	61.9	40.0	37.0	54.1	50.2	577		
Hurbanovo	34.1	33.9	26.9	38.8	55.2	58.8	50.9	58.6	39.1	31.8	53.9	40.0	522	Danube Plain Area	
Nitra															
Sliač	44.1	43.9	42.0	47.9	65.3	85.8	58.8	72.1	57.6	48.9	68.2	58.2	693	Central Part	
Košice	27.8	26.9	31.9	42.1	71.6	84.3	84.0	74.0	53.1	41.7	48.1	34.9	620	East Part	
Mihostov	29.8	26.1	31.0	40.9	57.1	69.9	73.9	62.7	43.9	43.3	41.1	35.9	556	East Slovakia Lowland	
Malacky	30.0	30.0	32.0	47.0	55.0	85.0	85.0	61.0	35.0	41.0	45.0	36.0	582	Zahorska Lowland Average of 1951-80	

Source: Monthly Bulletin of Climate and Meterology, SHMU

Table B.7.7 Various Climatic Characteristics Average of 1951 - 1980

Source : SHMU Collection of Papers 33/1

**1. Location of Stations**

Sta.	EL(m)	Latitude	Longitude
Bratislava AP	131	48-10-18N	17-12-0E
Holíč	178	48-48-44N	17-09-49E
Kuchyňa	206	48-25-05N	17-08-52E
Malacky	165	48-27-07N	17-01-58E
Myjava	375	48-45-14N	17-33-42E
Senica	218	40-40-15N	17-22-28E
Skalica	178	48-51-N	17-14-E
Zohor	148	48-19-N	16-59-E

**2. Radiation**

2.1 Global Radiation Mean monthly global radiation, average of 1951-80 (kwh/m<sup>2</sup>)

Sta.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual sum	Sum of Apr-Sep
Bratislava AP	26	44	83	129	166	176	173	151	108	65	28	20	1,169	903
Kuchyňa	26	48	86	132	166	175	171	149	110	66	31	21	1,181	903
Malacky	30	53	92	136	171	172	174	149	116	71	35	24	1,223	918
Myjava	29	51	91	138	165	176	171	149	116	70	33	22	1,211	915
Senica	29	52	95	138	172	180	179	155	120	73	34	30	1,257	944

2.1 Photosynthetic Act Mean monthly photosynthetic active radiation, average of 1951-80 (kwh/m<sup>2</sup>)

Sta.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual sum	t>=5°C	t>=10°C
Bratislava AP	14	23	45	66	84	88	89	78	54	35	16	12	604	526	447
Kuchyňa	14	22	44	64	84	86	87	76	53	34	16	11	591	508	428
Malacky	16	24	46	66	86	84	88	76	56	36	18	12	608	520	434
Myjava	15	24	46	67	83	86	87	76	56	35	16	11	602	502	409
Senica	15	24	48	67	86	87	90	78	58	37	17	15	622	528	441

**3. Air Temperature**

3.1 Air Temperature Mean monthly air temperature, average of 1951-80 (°C)

Sta.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual mean	Mean of Apr-Sep
Bratislava AP	-1.5	0.7	4.6	9.9	14.7	18.4	19.8	19.1	15.2	9.7	4.8	0.7	9.7	16.2
Holíč	-1.5	0.5	4.3	9.4	14.4	18.0	19.5	18.7	14.8	9.5	4.6	0.4	9.4	15.8
Kuchyňa	-1.8	0.0	4.1	9.1	14.0	17.6	19.0	18.4	14.7	9.5	4.5	0.3	9.1	15.5
Malacky	-1.7	0.2	4.1	9.5	14.2	17.8	19.2	18.5	14.9	9.4	4.6	0.4	9.3	15.7
Myjava	-2.8	-0.9	3.0	8.3	13.0	16.5	17.8	17.4	13.6	8.7	3.5	-0.7	8.1	14.4
Senica	-2.3	-0.1	4.0	9.2	14.0	17.4	18.8	18.4	14.6	9.5	4.2	0.0	9.0	15.4

3.2 Average number of days f which day mean temperature is 10oC or more / 0oC or less, average of 1951-80 (days)

Sta.	10°C or more			0°C or less		
	mean	10%	90%	mean	10%	90%
Bratislava AP	181	196	170	48	68	28
Holíč	177	191	163			
Kuchyňa	175	191	161	54	73	34
Malacky	177	191	166			
Myjava	165	182	152	67	88	45
Senica	176	193	164			

3.3 Absolute Maximu average of 1951-80 (°C)

Sta.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual max	10%	90%
Bratislava AP	14.0	18.5	25.0	28.6	32.4	34.3	38.2	37.3	32.6	28.0	21.6	15.7	38.2	36.3	32.0
Kuchyňa	13.3	17.4	24.0	29.4	31.1	34.3	38.4	37.1	32.6	27.0	20.6	16.7	38.4	36.4	31.5
Myjava	11.5	16.0	25.0	28.5	30.0	33.0	35.0	35.5	31.5	25.3	19.5	14.0	35.5	33.7	30.0

3.4 Absolute Minimu average of 1951-80 (°C)

Sta.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual max	10%	90%
Bratislava AP	-23.0	-24.6	-16.4	-5.0	-1.6	2.7	4.4	4.8	-1.7	-7.6	-12.2	-18.6	-24.6	-19.1	-11.5
Kuchyňa	-26.1	-29.9	-24.0	-8.2	-4.3	-1.0	2.5	2.3	-2.9	-7.6	-16.8	-24.2	-29.9	-25.9	-14.7
Myjava	-25.6	-27.3	-20.1	-7.0	-4.0	0.0	3.0	1.5	-0.8	-4.5	-15.0	-20.0	-27.3	-20.6	-12.5

**4. Air Humuduty**

4.1 Relative Humidity Mean monthly relative humidity, average of 1951-80 (%)

Sta.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual mean
Bratislava AP	83	80	75	69	69	70	70	71	74	78	83	84	76
Kuchyňa	83	80	73	68	69	70	70	72	74	77	82	85	75
Myjava	87	85	79	71	72	74	74	75	79	82	88	89	79

4.2 Relative Humidity Monthly average relative humidity at 14:00, average of 1951-80 (%)

Sta.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual mean
Bratislava AP	77	72	61	52	52	54	53	53	55	61	75	79	62
Kuchyňa	77	70	59	50	51	54	52	53	55	62	74	80	61
Myjava	83	77	68	57	57	59	59	59	62	69	82	86	68

## 5. Cloudiness and Sunshine

### 5.1 Monthly mean cloudy ratios average of 1951-80

Sta.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual mean
Bratislava AP	7.4	7.1	6.4	5.8	5.6	5.7	5.3	4.9	5.1	5.4	7.5	7.6	6.2
Kuchyňa	7.3	6.9	6.3	5.8	5.8	5.9	5.5	5.1	4.9	5.4	7.4	7.5	6.2
Myjava	7.6	7.1	6.3	5.5	5.5	5.5	5.2	4.8	4.8	5.3	7.6	7.9	6.1

### 5.2 Average number of bright days with cloud ratio 0.0-1.9, average of 1951-80 (days)

Sta.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual sum
Bratislava AP	2.5	2.1	3.1	3.7	3.3	2.6	4.7	5.1	5.6	5.8	1.3	1.6	41.4
Kuchyňa	2.0	2.5	3.1	4.0	2.7	2.4	4.4	5.2	6.1	6.5	1.3	1.8	42.0
Myjava	2.5	2.8	4.9	6.6	5.4	5.1	6.1	7.5	8.2	7.6	1.9	1.8	60.4

### 5.3 Average number of cloudy days with cloud ratio 8.1-10.0, average of 1951-80 (days)

Sta.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual sum
Bratislava AP	16.2	12.9	10.6	7.6	6.9	6.1	5.6	4.0	6.1	8.0	15.6	17.5	117.1
Kuchyňa	15.2	12.8	10.7	8.2	7.3	7.2	7.0	5.1	5.5	7.8	15.1	15.8	117.7
Myjava	17.7	14.3	11.7	8.5	7.6	7.4	7.1	5.5	6.5	9.6	18.4	19.0	133.3

## 6. Precipitation

### 6.1 Mean monthly precipitation, average of 1951-80 (mm)

Sta.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual sum	Sum of Apr-Sep
Bratislava AP	38	37	38	39	53	75	67	61	36	42	53	49	587	330
Kuchyňa	39	42	40	53	63	99	96	68	41	50	56	46	694	421
Malacky	30	30	32	47	55	85	85	61	35	41	45	36	583	368
Myjava	40	43	41	51	59	83	76	64	42	50	59	56	664	375
Senica	34	33	35	46	55	77	73	62	38	41	47	44	585	351
Skalica	27	30	33	46	59	83	78	60	35	37	43	39	569	361
Zohor	32	35	35	50	56	75	76	61	40	44	47	39	589	358

### 6.2 Monthly precipitation of 10%-exceedance frequency (mm)

Sta.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual sum	Sum of Apr-Sep
Bratislava AP	70	71	60	69	96	126	114	110	64	83	92	91	719	439
Kuchyňa	66	78	63	95	106	176	176	117	71	110	108	84	818	545
Malacky	51	57	50	83	96	150	142	95	63	89	84	66	691	475
Myjava	72	81	69	84	96	133	136	107	76	104	100	99	780	465
Senica	56	62	57	80	92	126	128	106	67	82	84	81	691	444
Skalica	46	56	52	75	100	136	139	98	67	77	78	71	696	478
Zohor	56	68	59	94	107	128	126	99	72	93	89	67	695	461

### 6.3 Monthly precipitation of 90%-exceedance frequency (mm)

Sta.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual sum	Sum of Apr-Sep
Bratislava AP	12	8	15	14	18	27	24	25	12	6	19	17	469	239
Kuchyňa	13	11	16	17	23	28	33	34	12	5	17	15	582	311
Malacky	11	6	12	14	17	28	31	30	10	4	15	11	477	269
Myjava	16	8	16	20	26	34	27	24	12	7	23	18	548	292
Senica	14	6	14	18	22	31	28	27	12	6	14	12	487	266
Skalica	14	7	13	20	20	37	28	28	8	4	15	11	460	277
Zohor	11	6	11	11	12	26	28	31	10	7	14	13	495	267

### 6.4 Average number of rainy days with precipitation of 1.0mm or more (days), average of 1951-80

Sta.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual sum
Bratislava AP	8	7	6	7	8	9	8	8	6	6	9	8	88
Kuchyňa	8	7	7	8	9	10	9	8	6	6	9	8	94
Malacky	6	6	6	7	9	10	9	8	6	6	8	7	88
Myjava	8	8	8	8	9	10	9	8	7	7	10	10	102
Senica	8	6	7	8	9	10	9	8	7	6	8	9	93
Skalica	7	7	7	8	9	10	10	8	6	6	8	8	94
Zohor													

### 6.4 Average number of rainy days with precipitation of 5.0mm or more (days), average of 1951-80

Sta.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual sum
Bratislava AP	3	3	2	3	3	5	4	4	2	3	3	3	37
Kuchyňa	2	3	2	3	4	5	5	4	3	3	3	3	41
Malacky													
Myjava	3	3	3	3	4	5	4	4	3	3	4	4	43
Senica	2	2	2	3	4	5	4	4	3	3	3	3	37
Skalica	2	2	3	3	4	5	5	4	3	3	3	3	40
Zohor													

### 6.5 Average number of rainy days with precipitation of 10.0mm or more (days), average of 1951-80

Sta.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual sum
Bratislava AP	1	1	1	1	2	3	2	2	1	1	1	1	17
Kuchyňa	1	1	1	2	2	3	3	2	1	2	2	1	21
Malacky	1	1	1	1	2	3	3	2	1	1	1	1	17
Myjava	1	1	1	1	2	3	2	2	1	1	2	1	19
Senica	1	1	1	1	2	2	2	2	1	1	1	1	16
Skalica	0	1	1	2	2	3	2	2	2	1	1	1	15
Zohor													

6.6 Average number of snow cover days with depth of 1cm or more (days), average of 1951/52-80/81

Sta.	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Annual sum
Bratislava AP			1	8	15	9	3	0					37
Kuchyňa		0	2	10	19	10	6	0					47
Malacky													
Myjava		0	4	15	25	17	9	1					71
Senica			2	9	18	10	5	0					43
Skalica			2	10	16	11	7	0					46
Zohor													

6.7 Average number of snow cover days with depth of 5cm or more (days), average of 1951/52-80/81

Sta.	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Annual sum
Bratislava AP			0	3	9	6	2	0					20
Kuchyňa		0	1	5	13	7	3	0					28
Malacky													
Myjava			2	9	17	13	5	0	0				46
Senica			1	5	11	6	3						25
Skalica			1	5	10	7	4	0					26
Zohor													

7. Wind

7.1 Wind direction in winter season (Dec-Feb) (%), average of 1961-80

Sta.	N	NE	E	SE	S	SW	W	NW	no wind
Bratislava AP	10.4	15.8	12.7	11.9	4.1	4.4	9.4	23.1	8.2
Kuchyňa	9.5	4.6	4	18	16.1	8.6	6.6	13.1	19.5
Myjava	13.7	3.6	9.8	20.3	9.6	3	8	14.9	17.1
Senica	6.2	5.4	5	37.2	2.7	3.3	9.9	13.5	16.8

7.2 Wind direction in summer season (Jun-Aug) (%), average of 1961-80

Sta.	N	NE	E	SE	S	SW	W	NW	no wind
Bratislava AP	13.5	12.4	5.3	6.8	7	3.8	11.7	28.9	10.6
Kuchyňa	10.8	6.8	3.2	11.7	14.4	7.8	7.1	15.3	22.9
Myjava	16.6	5.1	6.8	8.2	6.3	4.8	10.6	15.5	26.1
Senica	9.5	10	3.6	18.2	5.4	4.7	11.1	16.1	21.4

7.3 Wind direction (whole year) (%), average of 1961-80

Sta.	N	NE	E	SE	S	SW	W	NW	no wind
Bratislava AP	11.9	14.6	8	9.6	6.2	4.4	10.4	25.9	9
Kuchyňa	10.4	6	3.5	15.4	15.6	8.1	6.8	13.5	20.7
Myjava	15.5	4.2	8.6	13.9	9	4.2	9.2	14.9	20.5
Senica	8.8	7.8	4.2	27.5	4.4	4.2	10.5	14.1	18.5

7.4 Wind velocity in winter season (Dec-Feb), average speed (m/s) and frequency (%), 1961-80

Sta.	Average speed		Frequency (%)					
	(m/s)	no wind	1-2	3-5	6-10	11-15	16-20	>20
Bratislava AP	3.9	8.3	38.0	34.2	17.6	1.8	0.1	0.0
Kuchyňa	3.8	19.6	35.5	28.7	14.6	1.6	0.0	
Myjava	2.4	18.0	57.3	20.0	4.7	0.0	0.0	
Senica	4.2	17.4	29.3	31.2	18.6	3.3	0.2	

7.5 Wind velocity in summer season (Jun-Aug), average speed (m/s) and frequency (%), 1961-80

Sta.	Average speed		Frequency (%)					
	(m/s)	no wind	1-2	3-5	6-10	11-15	16-20	>20
Bratislava AP	3.5	9.7	38.7	34.8	15.9	0.9	0.0	
Kuchyňa	2.8	21.9	38.6	29.3	9.7	0.5	0.0	
Myjava	2.1	23.2	56.4	16.9	3.5	0.0	0.0	
Senica	3.2	19.6	34.2	33.4	12.0	0.8		

7.6 Wind velocity (whole year), average speed (m/s) and frequency (%), 1961-80

Sta.	Average speed		Frequency (%)					
	(m/s)	no wind	1-2	3-5	6-10	11-15	16-20	>20
Bratislava AP	3.8	9.0	38.4	34.4	16.7	1.5	0.0	0.0
Kuchyňa	3.4	20.8	37.1	29.0	12.1	1.0	0.0	
Myjava	2.3	20.5	56.9	18.6	4.0	0.0	0.0	
Senica	3.8	18.6	31.8	32.3	15.3	2.0	0.0	0.0

8. Evapotranspiration

8.1 Potential evapotranspiration, mean monthly of 1951-80, (mm)

(Evapotranspiration is estimated by Budyko method.)

Sta.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual sum	Sum of Apr-Sep
Bratislava AP	2	14	38	68	103	118	126	108	68	36	13	7	701	591
Kuchyňa	2	6	38	63	101	113	123	103	65	36	13	5	668	568
Malacky	2	16	40	59	104	112	125	103	73	38	15	5	692	576
Myjava	1	4	28	61	91	105	111	96	61	21	8	1	588	525

8.2 Real evapotranspiration, mean monthly of 1951-80, (mm)

Sta.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual sum	Sum of Apr-Sep
Bratislava AP	2	10	28	56	78	87	76	58	36	21	8	5	465	391
Kuchyňa	2	6	29	50	85	91	90	70	46	24	10	4	507	432
Malacky	2	10	27	40	76	80	99	68	42	22	9	3	478	405
Myjava	1	4	22	51	79	89	82	64	40	15	6	1	454	405

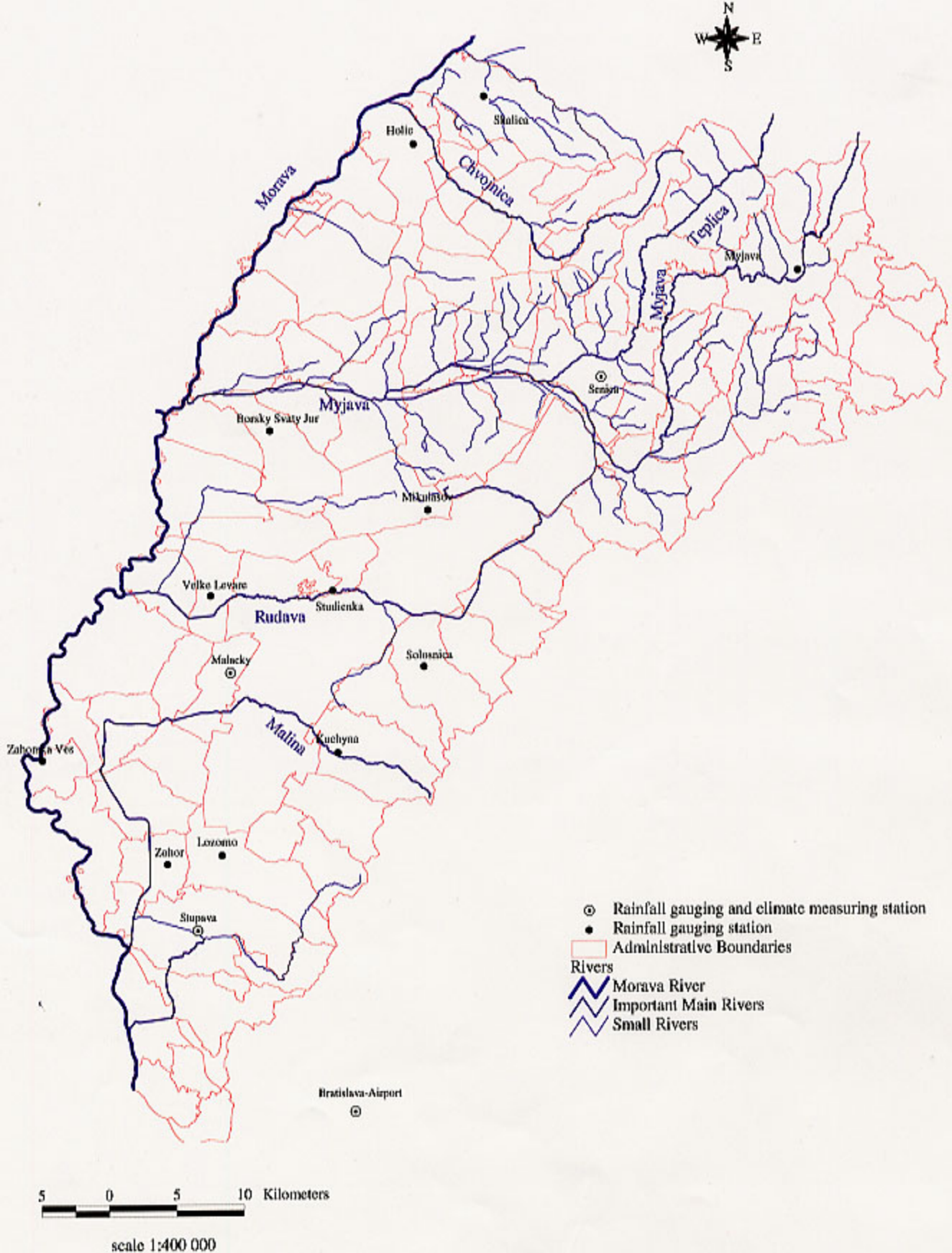
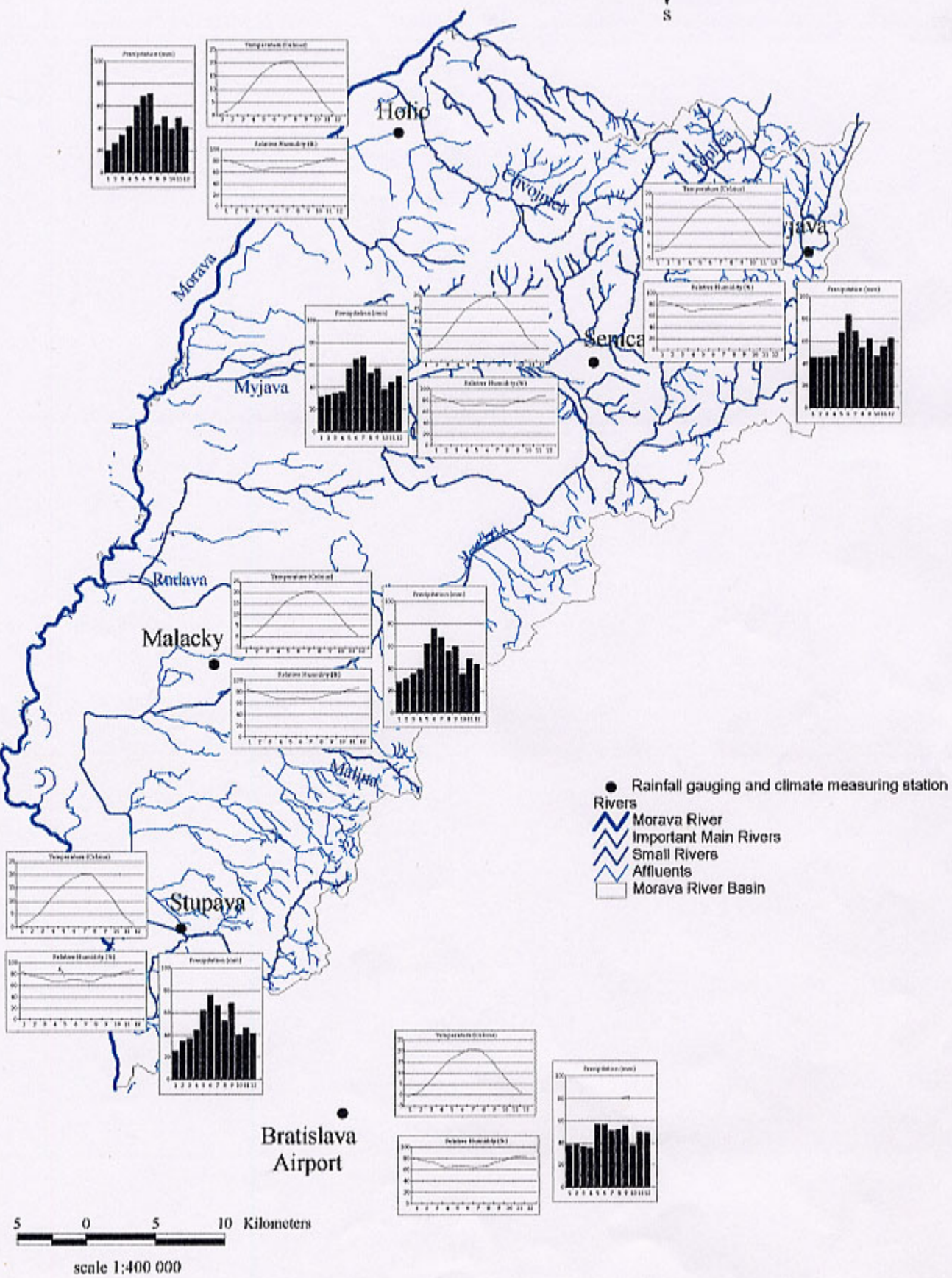


Figure B.7.1 Meteorological Observation Network in the Morava River Basin

Source: SHMI



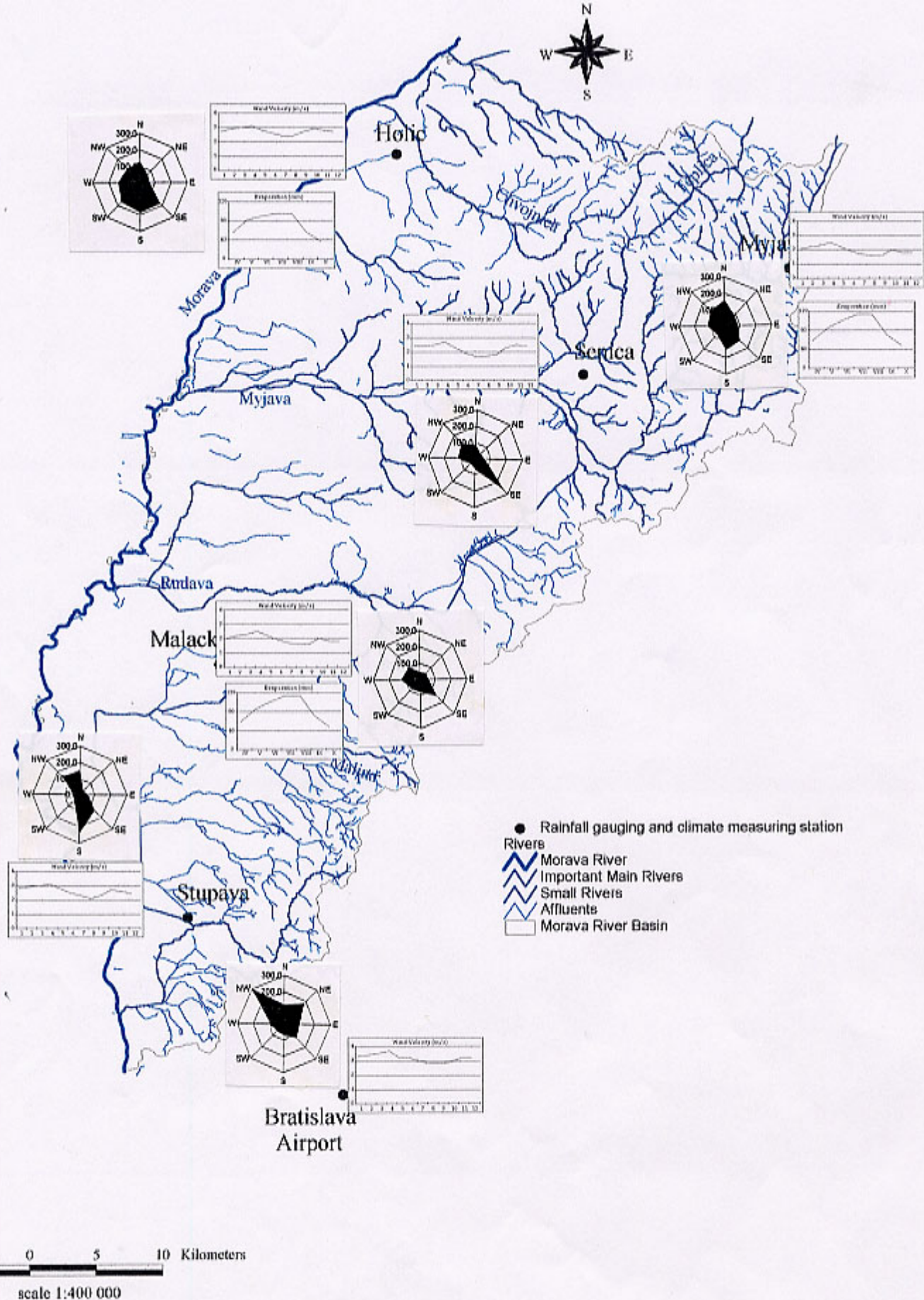


Average of 1981-2000

Figure B.7.2 Map of Climate Conditions (Precipitation, Temperatures and Humidity)

Source: SHMI





Average of 1981-2000

Figure B.7.3 Map of Climate Conditions (Evaporation and Winds)

Source: SHMI