Table VI 2.1 Main Feature of the Recent four (4) Eruptions and Their Precursors

Eruption Event	1968	1978	1984	1993
Main Eruption Period	22-Apr	May 22-27	September 23-25	Feruary 2 (March 20-21)
Eruption Type	Vulcanian	Strombolian	Vulcanian	Vulcanian (-Strombolian)
Start of Eruption	20-Apr	3-May	9-Sep	Feruary 2
End of Eruption	20-May	4-Jul	6-Oct	Beginning of April
VEI	3	2	3	2
Volume of Ejecta (million m^3)	35	20	70	45
Height of smoke column (km)	3-10	2.5-3 (May.15)	16 (September 23-25)	4.5 (February 2), 5 (March 21)
Pyroclastic Flow(PF) and Pyroclastic Blast	Pyroclastic Blast occured, Pyroclastic Flow 7km SW	No Pyroclastic Blast occurred	Pyroclastic Blast occured, Pyroclastic Flow 6km SE	Pyroclastic Flow 6km SE(Feb. 1), 5km SE(Feb. 21)
Lava Flow	3.5km SW	4.2km SW	4.2km SW (2 million m^3)	5.4km SSE (6 million m^3)
Lahar (Volcanic Mud Flow)	During and After Eruption	After 2 years from Eruption	After Eruption	Small Scale
Precursor Earthquake	Since November, 1967	An Increase in the frequency of volcanic earthquakes	A slight increase in seismicity	Stable
Precursor Rumbling	From April 21	From May 1		No Precursor
Crater Glow	From April 20	From November 6	Crater Glow	No Precursor
Increase in the volume of Steam Emission		From December 22	Increase in the volume of Steam in the Plume	No Precursor
Blue Colored Gas	Blue Colore Smoke	Blue Colored Gas		No Precursor
Ash-laden Clouds		Brown colored Clouds	Brown coloured Clouds	No Precursor
Collapse from near the Summit	Landslides and Rockfall		Rockfall	No Precursor
Well Level			dried up	5-10 feet down
Others	Decrease in magnetic field strength	New Crater Appeared	New Dome in a Crater	
Casualities	Death toll 6	Death toll 40 (1980)	No Casualities	Death toll 70-75 (By PF)
Evacuated People		8,000-15,000	16,000-73,000	About 60,000

Data: Ramos et al., 1985 and PHIVOLCS, 1990

Table VI 2.2 Emplacement Parameters of Geomorphologic Major Pyroclastic Deposit Area

Pyroclastic Deposit Area (PF)	River Incising Down in PF	Quadrant Direction from Summit	Linear Distance from Crater to Marginal Area (Max in km)	Lowest Elevation (m)	Width of PF (km)	Slope Angle of Depositional Surface(?)	Break-in-Slope(?)
Camalig PF	Quirangay	S	5.5	480	0.2	7	-
Miisi PF	Anuling, Budiao	S	5.8	300	4.2	10	-
Misericordia PF	Basud	E	8.8	90	1.6	12	-
Bonga PF	Pawa-Burabod	SE	6.0	200	1.3	7	-
Maoapo PF	San-Vicente	N	8.5	120	1.5	12	-
Oson PF	San-Vicente	N	7.0	240	1.3	12	-
Matang PF	Padang	E	7.5	120	1.5	11	-
Matnog PF	Pawa-Burabod, Budiao	SE	5.0	360	1.3	6	-
Masarawag PF	Maninila, Masarawag	S	5.2	420	1.5	8	-
Balaigang PF	Nasisi	W	6.0	360	1.0	7	-

1) Pyroclastic deposit area is named from the nearest barangay.
2) Break-in-slope is unknown.

Table VI 2.3 Emplacement Parameters of Geomorphologic Major 1984 Pyroclastic Fans

Pyroclastic Deposit Fan Area (PF)	River Incising Down in PF	Quadrant Direction from Summit	Linear Distance from Crater to Marginal Area (in km)	Lowest Elevation (m)	Width of PF (km)	Slope Angle of Depositional Surface(?)	Break-in-Slope(?)
Camalig PF	Quirangay	S	4.2 to 5.5	480	0.2	7	19
Miisi PF	Anuling, Budiao	S	3.2 to 3.9	580	1.2	10	19
Misericordia PF	Basud	E	3.8 to 4.6	400	0.7	8	20
Bonga PF	Pawa-Burabod	SE	4.0 to 6.0	200	1.3	6	20

Data: Punongbayan and Ruelo, 1986.

Table VI 2.4 Maximum Distance Reached by Mayon Volcano Lava Flow Units

Linear Distance from Summit of Lava Flow per Quadrant (km)					
No.	NW	NE	SW	SE	Eruption Year
1	3.7	3.0	3.5	4.2	
2	3.8	3.3	3.5	4.5	NE - 1928
3	4.0	4.1	3.8	4.5	SW - 1968
4	4.3	4.3	4.1	4.6	
5	4.5		4.1	4.8	SE - 1993
6			4.3	5.3	SW - 1978
7			4.5	5.5	SW - 1984
8			5.5	5.6	
9				5.7	
10				5.8	
11				5.9	
Average	4.1	3.7	4.2	5.1	

Data: R. Punongbayan, 1986 and Magalit & Ruelo, 1986

Table VI 2.5 Emplacement Parameters of Geomorphologic Debris Flow Deposit Area Identified by the 1982 Air Photographs

River Sysytem	River	Inundation of Debris Flow	Linear Distance from Crater to Marginal Area (Max in km)	Lowest Elevation (m)	Maximum Width of Debris Flow (m)	Approximate Depth of Debris Flow Deposit (m)	Deposit Area (m^2)	Deposit Volume (m^3)
Yawa River	Yawa	×						
	Pawa-Burabod	○	8.2	100	620	2.0	875,000	1,750,000
	Budiao	○	9.5	60	500	2.0	1,000,000	2,000,000
	Anuling	○	8.0	100	800	1.8	1,062,500	1,912,500
Quinali (A) River	Quirangay	○	7.0	220	150	3.0	93,750	281,250
	Tumpa	○	8.0	150	850	-	3,375,000	-
	Maninila	○	9.2	90	250	0.5	1,875,000	937,500
	Masarawag	○	8.5	160	900	0.7	1,625,000	1,137,500
	Ogsong	○	10.4	110	800	1.5	1,875,000	2,812,500
	Nasisi	○	10.8	100	750	2.5	875,000	2,187,500
Quinali (B) River	Buang	○	8.1	170	200	2.5	250,000	625,000
	Quinali(B)	○	18.0	0	150	-	437,500	-
	San Vicente	○	13.5	10	1,500	0.3	2,500,000	750,000
Arimbay System	Arimbay	○	10.5	0	400	0.5	250,000	125,000
Padang System	Padang	○	10.5	0	100	1.4	562,500	787,500
Basud System	Basud	○	9.7	0	300	1.8	875,000	1,575,000
Bulawan System	Bulawan	○	10.2	0	1,200	2.0	1,687,500	3,375,000

Table VI 2.6 Historical Lahar Event of Mayon Volcano (Since 1616 to 1992)

Year	Month Day	Affected Area and Direction by Lahar		Eruption before Lahar Occurrence and the Lag Year		Casualty	Discription
1766	Oct. 23 - 24	Malinao, Cagsawa, Budiao, Guinobatan, Ligao, Polangui	N, S	Oct.23, 1766	0		
1814	Feb. 1	Bubulusan, Cagsawa, Budiao	S	Feb. 1, 1814	0	Death toll 1,200	
1875	Nov.	Unknown		Sep. 5, 1872	3	Death toll 1,500	Trigered by heavy rain
1881-82		Unknown		June 6, 1881 - Aug. 1882	0		High-frequency occurences
1887	Mar.	Unknown		July 8, 1886 - Mar. 10, 1887	0		Occurences of Lahar continued during a year
1893	Oct.	Unknown		Oct. 1893	0		
1895	July and Nov.	Unknown		July and Nov. 1895	0		
1896	Sep.	Unknown		Sep. 1896	0		Small scale Lahar
1897	June 4 - July 23	Basud River, Camalig, ENE slope	ENE, E, S	June 4 - July 23, 1897	0		Hot Lahar flowed down Basud river and ENE slope
1900	Mar.1-6	Basud River	E	Mar. 1- 6, 1900	0		Hot Lahar
1902		Unknown		Mar. 1 - 6, 1900	1		
1915		Camalig, Tabaco(Bongabong)	NE, S	Mar. 1 - 6, 1900	15		Large scale Lahar
1930	Mar.	Unknown		Jun. - Aug., 1928	2		
1968	From Apr.	Unknown		Apr. 1968	0		Lahar occurred during and after lahar
1981	30-Jun	Unknown	N, S, E, W	May - July, 1978	3	Death toll 40	Triggered by Typhoon
1984	From Sep. 9	Unknown	E,SE,S	Sep. - Oct., 1984	0	None	

Data: Ramos et al., 1985 and PHIVOLCS, 1990

Table VI 2.7 Comparative Casualty of the 1993 Eruption and the Following Typhoons

Casualty		Unit	Eruption Feb - 1993	Typhoon "AKANG" Jan-1994	Typhoon "ROSING" Dec-1995
Population	Death	People	77	45	7
	Injure	People	5	111	2
	Missing	People	0	10	0
	Victim	Barangay	75	104	-
		Family	12,139	4,501	7,743
		People	-	25,172	38,395
	Evacuation	Family	12,139	-	4,917
		People	65,928	-	23,716
		Area	52	40	-
Agriculture	Crop Loss	ha	11,916	1,419	-
		PhP'000	71,073	28,320	-
	Livestock	ha	1,688	-	-
		PhP'000	2,198	727	-
	Fishery	ha	7,285	-	-
		PhP'000	19	10	-
	Forest	ha	350	0	-
		PhP'000	4,380	0	-
Public Facility		PhP'000	-	70,350	233,900

* "—": unknown

Source: PDCC/PDMO

Table VI 2.8 Disaster Caused by Typhoon and Often Heavy Rainfall

Year	Month	Type of Disaster	Number Affected		Affected Area (Province/City/Municipality)	Affected Area (Barangay around Mayon)
			Families	Persons		
1992		Typoon "Ditang"	78,754	399,456		
1992		Bulsan, Sorsogon Conflagration	643	-		
1993	February 2	Mayon Volcano Eruption	12,139	65,928	Legazpi, Albay	
1993	December 5	Typoon "Monang"	233,115	1,145,985	Legazpi, Albay	
1993	December 10	Typoon"Naning"	50,316	245,775	Legazpi, Albay	
1993	December	Landslide	-	-	Tiwi, Albay	
1994	January 6	Typoon"Akang"	7,497	38,509	Manito, Albay, Legazpi and Camalig	Legazpi(Padang) and Camalig(Miti)
1994		Typoon"Garding"	1,491	6,223		
1995		Typoon"Mameng"	4,235	17,916		
1995		Flash Flood/Landslide	1,494	8,824	Camarines Sur, Camarines Norte and Sorsogon	
1995		Typoon"Sendang"	735	4,055		
1995		Flash Flood/Landslide	3,704	19,286	Albay and Sorsogon	
1995		Typoon"Trining"	25	150		
1995	November 2	Typoon"Rosing"	450,299	2,316,872	Daraga, Jovellar, Libon, Ligao, Malilipot, Malinao, Polaangui, Tabaco, Tiwi, Legazpi	Daraga(Budiao), Ligao(Tinago, Abolla), Malilipot(Canaway), Malinao(Ogob), Tabaco(Buang), Legazpi(Imalnod, Baybay, Buyuan, Sabang, Padang)
1996		Landslide	192	1,014	Pandan, Bagamanoc and Catanduanes	
1996		Legazpi City Conflagration	529	2,486		
1997		Pilar, Sorsogon Conflagration	301	862		
1997	November	Typoon"Pining"	-	-	Libon, Oas, Pioduran, Polangui and Liga	Ligao(Cavasi, Bubunsuran, Mahaba)
1997-1998		El Nino Phenomenon	900	5,400	Gainza, Camarines Sur, Panganiban, Camarines Norte	
1998		Typoon"Eliang"	2,351	12,321	Camarines Sur, Camarines Norte, Sorsogon and Naga City	
1998	October 21	Typoon"Loleng"	398,233	2,018,795	Province Wide	

-': Unknown

Source: Disaster Report, PDM, ALBAY and DSWD Region V

Table 2.9 Calamities and Casualities in the Study Area, 1993 ~ 1994

December 5, 1993 Typhoon Monang

Province/City	Target River	Total Population		Affected Population				Casualities			Damaged Houses	
		Families	Persons	Families	(%)	Persons	(%)	Dead	Injured	Missing	Totally	Partially
Legazpi	Arimbay, Padan, Pawa-Byrabod, Yawa	22,222	121,116	22	0%	132	0%	-	-	-	-	-
Bacacay		8,864	49,202	1,735	20%	10,410	21%				155	1,580
Camalig	Maninila, Tumpa, Quirangay	9,216	49,975	194	2%	1,159	2%				1	138
Daraga	Budiao, Anuling	15,551	83,928	191	1%	960	1%				8	-
Guinobatan	Masarawag	10,884	58,926	6	0%	24	0%				6	-
Ligao	Nasisi, Ogson	13,070	72,560	625	5%	3,330	5%				26	529
Malilipot	Bulawan	4,555	24,160	2,076	46%	11,806	49%				248	1,828
Malinao	Quinali(B)	5,492	31,349	3,425	62%	19,124	61%				1,260	2,165
Sto.Domingo	Basud	4,186	22,939	386	9%	1,854	8%				37	349
Tabaco	Buang, San-Vicente, Quinali(B)	15,140	85,697	2,450	16%	9,800	11%		3		250	2,200
Total		109,180	599,852	11,110	10%	58,599	10%	0	3	0	1,991	8,789

December 10, 1993 Typhoon Naning

Province/City	Target River	Total Population		Affected Population				Casualities			Damaged Houses	
		Families	Persons	Families	(%)	Persons	(%)	Dead	Injured	Missing	Totally	Partially
Legazpi	Arimbay, Padan, Pawa-Byrabod, Yawa	22,222	121,116	1,257	6%	5,808	5%	-	-	-	-	-
Bacacay		8,864	49,202	1,735	20%	10,410	21%	-	-	-	-	-
Camalig	Maninila, Tumpa, Quirangay	9,216	49,975		0%		0%	-	-	-	-	-
Daraga	Budiao, Anuling	15,551	83,928	232	1%	1,185	1%	-	-	-	-	-
Guinobatan	Masarawag	10,884	58,926	95	1%	398	1%	-	-	-	-	-
Ligao	Nasisi, Ogson	13,070	72,560		0%		0%	-	-	-	-	-
Malilipot	Bulawan	4,555	24,160	2,096	46%	11,414	47%	-	-	-	-	-
Malinao	Quinali(B)	5,492	31,349		0%		0%	-	-	-	-	-
Sto.Domingo	Basud	4,186	22,939	290	7%	1,521	7%	-	-	-	-	-
Tabaco	Buang, San-Vicente, Quinali(B)	15,140	85,697	633	4%	3,269	4%	-	-	-	-	-
Total		109,180	599,852	6,338	6%	34,005	6%	-	-	-	-	-

January 6, 1994 Typhoon Akang

Province/City	Target River	Total Population		Affected Population				Casualities			Damaged Houses	
		Families	Persons	Families	(%)	Persons	(%)	Dead	Injured	Missing	Totally	Partially
Legazpi	Arimbay, Padan, Pawa-Byrabod, Yawa	22,222	121,116	1,248	6%	6,296	5%	1	4	-	236	1,012
Bacacay		8,864	49,202	102	1%	408	1%	-	-	-	-	-
Camalig	Maninila, Tumpa, Quirangay	9,216	49,975	252	3%	1,169	2%	2	-	-	32	220
Daraga	Budiao, Anuling	15,551	83,928	166	1%	703	1%	-	-	-	3	-
Guinobatan	Masarawag	10,884	58,926	35	0%	215	0%	-	-	-	10	-
Ligao	Nasisi, Ogson	13,070	72,560	99	1%	432	1%	2	2	-	16	68
Malilipot	Bulawan	4,555	24,160	193	4%	986	4%	-	-	-	-	177
Malinao	Quinali(B)	5,492	31,349		0%		0%	-	-	-	-	-
Sto.Domingo	Basud	4,186	22,939	293	7%	1,593	7%	1	-	-	-	-
Tabaco	Buang, San-Vicente, Quinali(B)	15,140	85,697	443	3%	2,556	3%	-	-	-	201	135
Total		109,180	599,852	2,831	3%	14,358	2%	6	6	0	498	1,612

Source: DSWD Region V

Record: As of February 3, 1994

-': Unknown

Table VI 2.10 Hazard Inventory on Each Municipality Caused by Typhoon "Ditang"on 1992

Municipalities/City	Total Number of Affected Barangays			
	Flooded	Landslide	Mudflow	Storm Surge
Bacacay	5	0	0	25
Camalig	20	5	4	0
Daraga	18	4	1	0
Guinobatan	32	10	9	0
Jovellar	16	3	0	0
Legazpi City	40	8	6	2
Libon	27	7	0	1
Ligao	43	8	6	2
Malilipot	8	0	2	3
Malinao	24	4	2	2
Manito	7	6	0	2
Oas	34	8	4	0
Pioduran	0	0	0	9
Polangui	19	2	0	0
Rapu-rapu	9	0	※	28
Sto.Domingo	13	3	3	5
Tabaco	35	5	8	9
Tiwi	17	6	0	1
Total	367	79	45	89

Source: PDMO

*: Not indicated

Table VI 3.1 Mud and Debris Disaster Affected Area on the Geomorphological Classification Map in 1999

River Basin	Disaster Affected Area (km^2)	Average Deposit Depth (m)	Lahar and Debris Deposit Volume (m^3)
Yawa	-	-	-
Pawa-Burabod	2.77	2.0	5,540,000
Budiao	0.76	2.0	1,520,000
Anoling	1.42	2.0	2,840,000
Quirangay	1.40	1.0	1,400,000
Tumpa	2.90	0.5	1,450,000
Maninila	1.98	0.5	990,000
Masarawag	1.86	1.2	2,230,000
Ogsong	2.62	1.2	3,140,000
Nasisi	1.16	2.0	2,320,000
Buang	-	2.2	-
Quinali (B)	-	-	-
San Vicente	-	1.0	-
Arimbay	2.43	1.0	2,430,000
Padang	0.95	1.5	1,430,000
Basud	2.63	1.0	2,630,000
Bulawan	-	0.5	-

Table VI 3.2 Disaster Record of Mud and Debris Flow on the Recent Eruption

River Basin	The 1984 Eruption	The 1993 Eruption	The 1998 Typhoon Loleng
Yawa			
Pawa-Burabod	Mud Flow	Mud Flow	
Budiao	Mud Flow		
Anoling	Mud Flow		Downcutting of Riverbed
Quirangay			
Tumpa			
Maninila			
Masarawag	Mud Flow		Downcutting of Riverbed
Ogsong			
Nasisi			
Buang	Mud Flow		
Quinali (B)			
San Vicente	Mud Flow		
Arimbay	Mud Flow	Mud Flow	
Padang	Mud Flow	Mud Flow	Debris Flow
Basud	Mud Flow		Debris Flow
Bulawan	Mud Flow		Debris Flow

Table VI 3.3 Summary of Assumed Sedimentation Range

No.	Name of River	By Equilibrium Concentration Formula	By Unbalanced Point of Traction Force	By river bed Change Analysis	Range of Assumed Sediment
1	YAWA	-	-	-	-
2	PAWA-BURABOD	4.5, 7.5	4.5 - 6.5	4.5 - 5.5, 7.5	4.5 - 7.5 (5.0 k)
3	BUDIAO	4.0, 6.5	4.0 - 5.0, 6.5	4.0 - 5.0, 6.5	4.0 - 6.5 (4.5 k)
4	ANULING	4.5, 6.5	4.5, 5.5, 6.5	4.0 - 5.0, 5.5, 6.5	4.0 - 6.5 (4.5 k)
5	QUIRANGAY	6.5	8.5, 9.5	5.5, 7.5, 8.5, 9.5	8.5 - 9.5 (9.5 k)
6	TUMPA	6.0	6.0	6.0, 8.0	6.0 - 8.0 (6.0 k)
7	MANINILA	5.0, 6.0	6.0 - 7.0	5.0, 6.0, 7.0	5.0 - 7.0 (6.0 k)
8	MASARAWAG	5.0, 6.0	5.0, 6.0	5.0, 6.0	5.0 - 6.0 (5.0 k)
9	OGSONG	6.0	6.0 - 7.5	6.0, 9.0	6.0 - 7.5 (6.0 k)
10	NASISI	4.5, 5.5	7.5, 8.5	7.5	4.5 - 8.5 (7.5 k)
11	BUANG	5.5, 6.5	5.5 - 6.5, 7.5	6.5, 7.5 - 8.0	5.5 - 8.0 (7.5 k)
12	QUINALI (B)	-	-	-	-
13	SAN VINCENTE	6.5	6.5 - 9.5	4.5, 6.5, 7.5, 8.5, 9.5	4.5 - 9.5 (6.5 k)
14	ARIMBAY	6.5	5.5 - 7.5	5.5, 6.5	5.5 - 7.5 (6.5 k)
15	PADANG	4.5, 5.5, 6.5	4.5, 5.5, 6.5	4.5, 5.5, 6.5	4.5 - 6.5 (6.5 k)
16	BASUD	4.0, 5.0, 6.5, 7.0	4.0, 5.0 - 9.0	3.5 - 4.5, 5.0, 7.0, 8.0, 9.0	3.5 - 9.0 (4.0 k)
17	BULAWAN	3.5, 4.5, 6.0	4.5 - 6.5	3.5, 6.0, 8.0	3.5 - 8.0 (6.0 k)

Notes: The value indicates distance in km from the crater in above table.

Table VI 3.4 Maximum Distance Reached by Mayon Volcano Lava Flow Units

Linear Distance from Summit of Lava Flow per Quadrant (km)					
No.	NW	NE	SW	SE	Eruption Year
1	3.7	3.0	3.5	4.2	
2	3.8	3.3	3.5	4.5	NE - 1928
3	4.0	4.1	3.8	4.5	SW - 1968
4	4.3	4.3	4.1	4.6	
5	4.5		4.1	4.8	SE - 1993
6			4.3	5.3	SW - 1978
7			4.5	5.5	SW - 1984
8			5.5	5.6	
9				5.7	
10				5.8	
11				5.9	
Average	4.1	3.7	4.2	5.1	

Data: R. Punongbayan, 1986 and Magalit & Ruelo, 1986

Table VI 3.5 Emplacement Parameters of Geomorphologic Major 1984 Pyroclastic Fans

Pyroclastic Deposit Fan Area (PF)	River Incising Down in PF	Quadrant Direction from Summit	Linear Distance from Crater to Marginal Area (in km)	Lowest Elevation (m)	Width of PF (km)	Slope Angle of Depositional Surface(°)	Break-in-Slope(°)
Camalig PF	Quirangay	S	4.2 to 5.5	480	0.2	7	19
Miisi PF	Anuling, Budiao	S	3.2 to 3.9	580	1.2	10	19
Misericordia PF	Basud	E	3.8 to 4.6	400	0.7	8	20
Bonga PF	Pawa-Burabod	SE	4.0 to 6.0	200	1.3	6	20

Data: Punongbayan and Ruelo, 1986.