
ATMOSPHERIC
SCIENCES

Study of Meteorological Parameter at Maitri, Antarctica during 24th Indian Antarctic Expedition, 2004–2006

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INTRODUCTION

Meteorology has been the integral part of all the Indian scientific expedition to Antarctica. India Meteorological Department (IMD) is implementing its program starting from first expedition to Antarctica. The aim of meteorological program is to study Antarctic weather, and its impact on global climate. India Meteorological Department is also studying of depletion of Ozone over Antarctic region. During 24th Expedition IMD team installed APT receiver to enable to receive cloud imaginary from NOAA satellite. IMD is also collecting synoptic data during both outward and return journey and transmitting main synoptic hour data to IMD Headquarters at New Delhi. The various data collected at Maitri (WMO station index 89514) are forwarded to IMD HQs, New Delhi on real time bases.

OBJECTIVE

Scientific objective for Meteorological program during 24th Expedition are continue of ongoing program at Maitri for study of Antarctic meteorology.

1. Daily, Seasonal and annual variation of Atmospheric pressure, surface wind, Atmospheric temperature at surface and cloud cover. Recording of three hours synoptic data and transmission of main synoptic hour data (6 hourly) to IMD New Delhi. These data are further transmitted on Global Telecommunication Network on real time bases.
2. Measurement of Global and Diffused solar radiation.
3. Measurement of surface ozone.
4. Study of total ozone, SO₂ and NO₂ using Brewer Spectrophotometer.

5. Measurement of solar turbidity using sun photometer for Aerosol Study.
6. Balloon borne measurement of ozone for its vertical profile over (Maitri) for the Ozone hole study.
7. Monitoring of weather system approaching station and affecting the station.
8. Study of analyzed chart received from Pretoria (South Africa)
9. Reception of regular APT from NOAA satellite. APT Receiver was installed during the 24th Expedition.

MAIN METEOROLOGICAL PARAMETER

Temperature

Antarctica is the coldest and chilliest continent of the earth. It is also extremely dry continent. The **lowest temperature** ever recorded on Earth was “89.2° C at Vostok Satation (Antarctica) on July 21, 1983. The coast of antarctica is comparatively warmer. The mean annual temperature of the interior is “57°C. Severe low temperatures vary with latitude, elevation, and distance from the ocean. East Antarctica is colder than West Antarctica because of its higher elevation. The Antarctic Peninsula has the most moderate climate. Higher temperatures occur in January along the coast and average slightly below freezing. Although the temperature does not affect animals like adelic penguins.

During 2005 the minimum temperature recorded at Maitri was -35.3° C on July 21st 2005 and highest temperature recorded was +8.5° C on January 22, 2005. Mean Temperature for the year 2005 was recorded was -9.8° C and Mean Maximum and minimum temperature recorded was -6.7° C and -13.2° C respectively. January was the warmest month with average temperature 1.6° C and July was the coldest month with -17.9 ° C Average temperatures. Calibrated dry bulb thermometer, maximum and minimum is placed at IMD observatory. A thermoliner thermister is installed for continuous recording of temperature and its display inside laboratory.

Atmospheric Pressure

Atmospheric pressure is important parameter for weather system. Station level pressure at Maitri recoded by Precision Aneroid Barometer

(PAB). Belford Marine daily barograph is used for continuous recording of station level pressure. The highest pressure 1008.0 hPa on December 08, 2005 and minimum 930.0 hPa on August 09, 2005 recorded. The mean atmospheric pressure for the year 2005 was 984.8 hPa.

Wind

Antarctica is windiest continent of the earth. DIWE is installed for recording of wind speed and direction. June was the windiest month with average wind speed of 20 Knot. Maximum win speed recorded was 50 Knot and maximum gusting was 80 knot. December was the relatively calm with average wind speed of 07 knot. Total 173 days was there when maximum wind speed was more than 23 knot and 79 days was there when mean speed was more than 23 Knot the annual mean wind speed was 14knot.

Blizzard

A blizzard is a severe winter storm condition characterized by low temperature, strong winds, and heavy blowing snow. Blizzards are formed when a high pressure system, also known as a ridge, interacts with a low pressure system; this results in the advection of air from the high pressure zone into the low pressure area. When there are blizzard conditions but no snow falling, meteorologists call this a ground blizzard because all the snow is already present at the surface of the earth and is simply being blown by high winds. Ground blizzards require large expanses of open and relatively flat land with a sufficient amount of accumulated and loosely packed powdery snow to be blown around. The origin of the word "blizzard" is believed to be a German settler describing a storm to an Estherville, Iowa. The weather phenomenon is defined as a blizzard when wind speed exceeds or equals 23 knot and surface visibility is reduced to less than one kilometer. Total 16 blizzards were experienced during 2005, and the longest duration of a blizzard was 95 hours. The highest wind speed was 50 knot and gusting to 80 knot was recorded during a blizzard. Total 5 blizzards were observed during the July month.

Snowfall

Maitri received snow in the form of blowing snow. During 2005 190.0 mm snow was received. July month gave maximum snowfall 53.9 mm snowfall and lowest snowfall was during the month of September, October and December month. On 33 days snowfall was recorded.

Sky Condition

Generally medium and high cloud can be observed over Antarctic sky. Altostratus and Cirrus are the forms of medium cloud and Cirrus, cirrostratus and cirrocumulus are the forms of high cloud frequently observed over the sky. Three Octa was average cloud seen during 2005. Thunderstorm, lightning is not observed. During the month of December fog was observed for two days. February was the most cloudy day with average of 5 Octa cloud. Sky was completely overcast on 09 days, obscured 11 days and clear sky for 34 days during 2005.

Aurora

Aurora is natural colored light displays in the Sky, usually observed at night particularly at polar region. In northern latitude the effect known as aurora borealis, named after Roman goddess of Dawn (Aurora) and Greek name for north wind, Boreas. The aurora borealis is also called the northern polar lights, as it is only visible in the North sky from the Northern hemisphere. Its southern counterpart, the aurora australis/southern polar lights, has similar properties. *Australis* is the Latin word for "of the South".

Auroras are produced by the collision of charged particles from Earth's magnetosphere, mostly electrons but also protons and heavier particles, with atoms and molecules of Earth's upper atmosphere (at altitudes above 80 km). The particles have energies of 1 to 100 keV. They originate from the Sun and arrive at the vicinity of Earth in the relatively low-energy solar wind. When the trapped magnetic field of the solar wind is favourably oriented (principally southwards) it reconnects with Earth's magnetic field, and solar particles enter the magnetosphere and are swept to the magnetotail. Further magnetic reconnection accelerates the particles towards Earth.

The collisions in the atmosphere electronically excite atoms and molecules in the upper atmosphere. The excitation energy can be lost by light emission or collisions. Most aurorae are green and red emission from atomic oxygen. Molecular nitrogen and nitrogen ions produce some low level red and very high blue/violet aurorae. The light blue colors are produced by ionic nitrogen and the neutral nitrogen gives off the red and purple color with the rippled edges. Different gases interacting with the upper atmosphere will produce different colors, caused by the different compounds of oxygen and nitrogen. The level of solar wind activity from

the Sun can also influence the color of the aurorae. Total 46 Aurora observed during 2005 with the maximum 15 during september

Ozone

Ozone is one of several gases that make up the earth's atmosphere. The diatomic molecule of oxygen (O_2), the form of oxygen we breathe, makes up approximately 20 per cent of the atmosphere. Ozone (O_3), the tri-atomic molecule of oxygen, is much less abundant, making up only one part in three million of all gases in the atmosphere. Ozone is concentrated in the lower stratosphere between 15 and 30 km above the earth's surface, called 'ozone layer'. Ozone can be produced by numerous chemical reactions, but the main mechanism in the atmosphere for its production and removal is absorption of ultra-violet (UV) radiant energy from the sun. Ozone is produced when O_2 absorbs UV radiation at wavelengths of less than 242 nanometers, and is removed by photo-dissociation from sunlight for wavelengths greater than 290nm. O_3 is also the major absorber of UV sunlight between 200 and 330nm. The combination of these processes is effective in maintaining a relatively constant amount of ozone in the layer, and in absorbing 90% of UV sunlight. UV is linked to the formation of skin cancer and genetic damage. Increased levels of UV are known to have adverse effects on animal immune systems, aquatic organisms at the bottom of the food chain, terrestrial plants and food crops. The maintenance of enough stratospheric ozone to absorb harmful UV sunlight is therefore vitally important to all life forms on earth.

Threat from CFCs

A known threat to this ozone balance is the introduction of man-made chlorofluorocarbons (CFCs) which increase the rate of ozone removal, resulting in a gradual decline in the global ozone levels. CFCs are used by modern society in a myriad of ways, in refrigerants, as propellants in spray cans, in foam manufacture and in solvents, particularly for the electronics industry. The long lifetimes of CFCs means that a single molecule released today can exist 50 to 100 years in the atmosphere before it is eliminated. Over periods of approximately five years, CFCs move slowly up into the stratosphere (10-50 km). Above the main body of the ozone layer, centred in the height range 20 –25 km, less UV is absorbed by ozone. The CFC molecules break down after reaction with UV, and release free chlorine atoms. These chlorine atoms are then able to destroy ozone.

Radiation

The Sun is the main source of energy for processes at the Earth's surface and is the driving force behind the weather, climate, life, ocean currents, hydrologic cycle, etc. Radiation emitted by the Sun and received on Earth.

9% ultraviolet radiation (not visible to our eyes; causes tanning, burns and cancer in skin)

41% visible radiation (this form of radiation enables us to see the world around us)

50% infrared radiation (sensible on the skin as heat; used by reptiles for body temperature regulation).

Approximately one third of all incoming radiation is reflected directly back into space. Infrared and Ultraviolet radiation are absorbed by the Earth and reemitted as infrared radiation. Radiation is lost to space on both the night side and day side of the sphere.

Global Solar Radiation

Global radiation is a measure of all incoming radiation incident on the earth's surface. The measurement includes both direct sunlight radiation and diffuse radiation from scattering processes in the earth's atmosphere. For continuous recording of Global Solar radiation Thermo Pyranometer is installed at roof of Maitri. Total global solar radiation was maximum for the month of December and its value was 585.8 MJ/M². Total Global Solar Radiation for the year 2005 was 2864.9 MJ/M².

Net Solar Radiation

Net radiation is a measure of incoming radiation incident on the earth's surface minus the outgoing energy radiated by the earth itself. Net radiation will usually therefore has a negative value at night. During 2004 diffused solar radiation unit was installed at Maitri for the study of diffuse solar radiation.

Apart from above, total 780 turbidity observations were taken with Microtop II Sun photometer.

Daily Weather Summary for January 2005

Date	Temperature ° C			Pressure hPa			Wind Speed Knot				Max Gust (Knot)	PPT in mm
	Max	Min	Ave	Max	Min	Ave	Max		Average			
							Dir	Speed	Dir	Speed		
01	06.3	-01.6	03.2	984.8	980.1	982.4	ESE	23	ESE	14	037	0.0
02	08.0	-01.9	03.7	989.8	985.2	987.9	ENE	23	ESE	18	038	0.0
03	07.5	-01.0	04.2	989.4	982.4	985.9	SSE	18	SE	09	030	0.0
04	06.4	-01.7	02.9	985.6	981.0	983.1	SSE	21	SE	14	032	0.0
05	06.1	-01.0	02.9	989.8	987.0	989.0	ESE	24	ESE	13	037	0.0
06	07.2	-02.1	03.0	988.0	986.0	986.9	SSE	22	SE	11	033	0.0
07	06.0	-02.2	02.7	986.8	984.9	985.9	SSE	22	SE	08	034	0.0
08	07.0	-02.9	02.5	987.8	984.7	986.1	SSE	18	SE	11	031	0.0
09	07.7	-00.2	03.6	989.2	986.6	988.2	SE	23	SE	13	032	0.0
10	07.0	-00.1	03.6	990.8	987.8	989.6	SSE	21	ESE	09	035	0.0
11	06.6	00.1	03.6	995.9	991.8	994.4	E	15	ESE	07	034	0.0
12	06.5	-03.0	03.3	995.7	994.2	995.2	SSE	14	ESE	03	022	0.0
13	07.2	-03.0	02.8	979.7	978.0	992.4	ESE	20	ENE	11	036	0.0
14	05.4	-00.5	02.2	979.9	977.6	994.1	SE	16	NNE	06	030	0.0
15	05.2	-02.7	00.0	977.8	977.2	989.6	SSE	25	ESE	11	047	0.0
16	04.2	-03.2	00.8	987.0	973.0	982.6	ESE	32	SE	24	035	0.0
17	02.0	-03.0	00.2	988.3	972.8	987.5	ESE	15	SE	14	030	0.0
18	04.6	-02.0	00.8	987.0	986.3	986.6	SSE	18	SE	13	032	0.0
19	04.4	-01.4	01.9	987.9	986.2	987.1	ESE	14	ESE	10	032	0.0
20	04.6	-02.4	01.9	992.0	980.5	987.1	SSE	05	NE	02	013	0.0
21	03.6	-02.5	01.2	992.3	991.7	992.0	SE	05	NNE	01	015	0.0
22	08.5	-03.5	00.2	992.2	991.5	991.8	E	10	ENE	05	020	0.0
23	01.5	-04.6	-00.3	991.9	991.2	991.6	ESE	12	ENE	06	015	0.0
24	07.2	-06.7	-01.2	995.4	991.8	993.6	SSE	15	SE	09	025	0.0
25	02.0	-07.0	-01.8	995.1	994.8	995.0	S	18	ESE	08	029	0.0
26	04.4	-06.8	00.4	995.5	994.7	995.0	SSE	16	ESE	09	028	0.0
27	02.8	-05.0	-00.4	994.5	991.9	992.9	ESE	10	NNE	04	015	0.0
28	06.0	-05.6	-00.2	995.0	987.5	992.4	ESE	20	SNE	08	046	8.0
29	01.0	-02.6	-00.1	984.1	982.4	983.1	ESE	34	ESE	27	062	5.0
30	03.2	-01.8	01.1	987.9	984.4	986.6	ESE	24	ESE	17	048	0.0
31	03.0	-03.7	-00.5	987.6	978.7	983.7	E	28	ESE	19	044	0.0
Total	163.1	-85.6	48.2	30664.7	30543.9	30659.3		581		332	997	13.0
Mean	05.3	-02.8	01.6	989.2	985.3	989.0		19		11	032	
High	08.5	00.1	04.2	995.9	994.8	995.2		34		27	062	
Low	01.0	-07.0	-01.8	977.8	972.8	982.4		05		01	013	

Daily Weather Summary for February 2005

Date	Temperature ° C			Pressure hPa			Wind Speed Knot				Max Gust (Knot)	PPT in mm
	Max	Min	Ave	Max	Min	Ave	Max		Average			
							Dir	Speed	Dir	Speed		
01	02.6	-04.6	-01.9	976.6	966.7	970.5	SE	32	ESE	24	058	0.0
02	02.7	-02.3	00.9	973.2	960.2	967.1	ESE	30	SSE	26	042	0.0
03	03.2	-03.0	00.1	975.5	972.2	973.7	SE	21	SSE	17	042	0.0
04	03.8	-03.8	00.6	980.9	975.4	979.4	SE	27	ENE	14	042	0.0
05	02.2	-04.0	-01.5	985.6	980.7	982.8	SSE	22	E	09	032	0.0
06	01.3	-03.5	-01.3	989.1	985.7	987.5	SSE	15	ESE	10	026	0.0
07	01.8	-05.0	-01.4	991.8	989.4	990.1	NE	15	ESE	10	035	0.0
08	01.7	-06.4	-02.1	991.3	987.5	989.8	S	21	SE	10	032	0.0
09	02.0	-06.8	-02.2	985.0	982.2	983.6	ESE	15	ENE	06	038	0.0
10	03.5	-02.6	00.7	980.8	979.0	979.8	SE	18	00	00	030	0.0
11	04.2	-02.6	00.4	979.4	978.5	978.9	SSE	18	00	00	034	0.0
12	01.0	-03.2	-00.7	976.5	969.0	973.2	SSE	15	ESE	10	030	0.0
13	02.4	-05.5	-02.8	972.2	969.1	970.3	ESE	22	SSE	15	035	0.0
14	02.0	-05.5	-01.5	976.6	971.8	973.7	SE	21	SSE	09	028	0.0
15	-00.8	-05.8	-02.9	979.7	974.3	977.9	E	31	ESE	18	043	0.0
16	-04.1	-05.7	-04.8	971.9	970.4	971.2	E	39	ESE	30	062	0.0
17	00.0	-04.5	-01.9	970.8	966.3	969.4	SE	22	SE	21	040	0.0
18	02.7	-02.6	-02.5	973.0	965.3	967.7	SE	18	ENE	09	032	0.0
19	03.2	-03.5	-01.4	977.9	975.2	976.8	SE	18	SE	16	029	3.5
20	01.2	-06.2	-02.9	975.4	974.5	974.9	SE	20	SE	16	036	0.0
21	-01.5	-05.2	-03.4	974.5	973.7	974.2	SE	22	SE	15	034	0.0
22	-01.6	-05.6	-03.1	979.4	974.3	976.3	SE	25	SE	15	038	0.0
23	-01.2	-05.8	-02.7	986.4	979.8	983.4	SE	25	SE	23	040	0.0
24	00.2	-05.4	-03.0	985.6	979.1	983.4	SSE	27	SE	21	040	0.0
25	02.5	-04.9	-00.5	974.7	957.3	966.1	SE	34	SSE	29	062	0.0
26	03.5	-02.4	01.0	990.7	951.9	974.9	SE	32	SE	25	058	0.0
27	00.7	-07.2	-03.2	995.2	991.2	993.4	SE	22	SE	15	038	0.0
28	-03.8	-07.8	-06.1	989.7	987.0	988.2	SE	28	SE	23	051	0.0
Total	35.4	-131.4	-50.1	27459.4	27287.7	27378.2		655		432	1107	3.5
Mean	01.3	-04.7	-01.8	980.7	974.6	977.8		23.4		15.4	39.5	
High	04.2	-02.3	01.0	995.2	991.2	993.4		39		30	062	
Low	-04.1	-07.8	-06.1	970.8	951.9	966.1		15		00	026	

Daily Weather Summary for March 2005

Date	Temperature ° C			Pressure Hpa			Wind Speed Knot				Max Gust (Knot)	PPT in mm
	Max	Min	Ave	Max	Min	Ave	Max		Average			
							Dir	Speed	Dir	Speed		
01	-05.1	-12.6	-09.2	989.4	985.7	986.6	SE	24	E	07	033	0.0
02	-05.0	-13.2	-08.7	992.7	987.0	990.5	SE	30	SE	17	054	0.0
03	-02.8	-10.1	-05.7	983.8	972.8	977.6	SE	30	SE	25	058	0.0
04	-01.0	-04.8	-03.1	976.7	971.8	974.0	SE	35	SE	26	055	0.0
05	-03.8	-06.7	-04.8	984.8	976.8	981.4	SE	38	SE	27	065	0.0
06	-02.5	-06.5	-04.5	992.9	984.5	989.4	SE	40	SE	37	076	3.4
07	-01.5	-04.5	-02.8	994.7	992.7	993.8	SE	24	ESE	13	054	0.0
08	01.4	-05.6	-01.4	993.1	980.0	988.1	SSE	28	SE	16	046	0.0
09	00.3	-06.4	-02.9	982.7	978.0	980.0	SE	31	SE	22	052	0.0
10	00.8	-03.8	-00.9	983.9	982.2	983.0	SE	25	SE	24	054	0.0
11	00.0	-06.5	-02.2	980.5	973.7	975.9	S	28	SE	20	038	0.0
12	00.0	-07.1	-03.8	988.2	974.4	982.0	SSE	18	SSE	13	031	0.0
13	-02.0	-10.8	-05.7	989.3	982.8	986.6	SE	06	00	00	020	0.0
14	-04.6	-12.2	-08.3	981.4	972.1	978.1	SE	24	E	11	038	0.0
15	-00.8	-09.2	-03.6	974.8	969.3	971.5	SE	42	SE	35	068	0.0
16	00.2	-07.8	-02.0	987.2	976.7	983.5	SE	32	SSE	19	061	0.0
17	-01.7	-08.8	-05.5	985.1	976.5	981.2	SE	28	SE	18	042	0.0
18	-01.0	-06.1	-02.7	974.2	965.5	968.9	SE	28	SE	25	050	0.0
19	-00.7	-03.4	-01.9	982.6	975.5	980.2	SE	28	SE	24	050	0.0
20	-02.9	-04.6	-03.8	982.6	975.5	980.2	SE	26	ESE	21	045	0.0
21	-02.7	-12.3	-06.8	979.6	959.3	967.5	SSE	20	SE	12	043	0.0
22	-05.2	-13.0	-08.2	979.4	960.4	968.3	S	18	SE	09	030	0.0
23	-05.2	-13.2	-09.8	990.8	981.8	987.6	SSE	19	E	08	039	0.0
24	-04.0	-14.8	-09.4	997.1	991.0	993.7	00	00	00	00	000	0.0
25	-05.2	-13.8	-10.3	996.6	993.5	995.6	E	13	NE	04	040	0.0
26	-05.2	-12.8	-08.8	997.6	995.7	996.4	E	15	NE	04	039	0.0
27	-05.6	-12.9	-10.0	997.7	992.6	995.9	00	00	00	00	000	0.0
28	-06.6	-15.8	-13.0	989.9	985.6	987.5	SE	08	SE	02	012	0.0
29	-09.3	-15.2	-12.2	990.2	989.3	989.6	SSE	22	SE	11	034	0.0
30	-09.4	-16.2	-12.7	992.9	989.8	991.6	SSE	20	SSE	12	035	0.0
31	-07.8	-17.2	-12.7	991.4	987.3	989.2	SE	23	NE	09	040	0.0
Total	-98.9	-307.9	-197.4	30603.8	30379.8	30495.4		723		471	1302	3.4
Mean	-03.2	-09.9	-06.4	987.2	980.0	983.7		23		15	042	
High	01.4	-03.4	-00.9	997.7	995.7	996.4		42		37	076	
Low	-09.4	-17.2	-13.0	974.2	959.3	967.5		00		00	000	

Daily Weather Summary for April 2005

Date	Temperature ° C			Pressure hPa			Wind Speed Knot				Max Gust (Knot)	PPT in mm
	Max	Min	Ave	Max	Min	Ave	Max		Average			
							Dir	Speed	Dir	Speed		
01	-07.2	-15.0	-12.0	995.4	988.2	992.2	SE	18	SE	06	037	0.0
02	-03.3	-18.0	-11.6	996.5	993.7	995.0	S	20	E	05	029	0.0
03	-06.6	-16.3	-13.2	992.6	984.9	987.6	E	05	0	00	012	0.0
04	-11.8	-16.8	-13.1	983.5	978.2	980.8	SE	33	E	19	052	0.0
05	-08.7	-13.0	-10.5	979.3	976.2	978.4	SE	28	SE	23	047	0.0
06	-06.7	-10.7	-09.1	973.7	966.3	969.0	SE	23	SE	21	044	0.0
07	-09.1	-12.1	-10.6	965.9	964.0	964.9	SE	32	ESE	16	050	0.0
08	-08.4	-15.4	-11.1	981.6	967.0	974.9	SE	27	SE	15	041	0.0
09	-10.1	-18.0	-13.8	990.5	981.9	986.8	S	12	SE	07	023	0.0
10	-10.3	-21.8	-16.0	990.3	988.1	989.2	S	08	N	01	022	0.0
11	-13.8	-19.7	-16.0	988.0	983.8	986.1	SE	11	NE	04	030	0.0
12	-11.4	-17.2	-14.5	982.1	979.4	980.8	SE	29	ENE	12	048	0.0
13	-08.3	-12.4	-10.0	977.4	970.7	974.5	SE	42	SE	34	066	0.0
14	-04.0	-13.2	-08.4	969.4	964.1	966.7	SE	28	ESE	16	058	0.0
15	-11.8	-17.8	-15.5	979.9	968.4	974.2	S	12	NNE	03	016	0.0
16	-11.4	-17.8	-14.4	989.2	980.6	984.3	SSE	20	SE	14	035	35.0
17	-10.6	-18.3	-14.6	990.0	987.3	989.2	SSE	10	NNE	02	026	0.0
18	-08.8	-13.3	-10.3	984.9	974.4	979.1	S	42	SSE	30	064	0.0
19	-09.2	-18.8	-14.3	989.9	985.5	988.1	W	12	NE	03	038	0.0
20	-07.8	-17.6	-11.6	991.1	983.0	987.5	E	40	NE	12	062	0.0
21	-08.3	-14.8	-12.3	988.0	979.9	982.6	SE	30	ESE	25	055	0.0
22	-07.2	-12.2	-09.3	991.4	982.0	986.8	SE	20	SE	14	034	0.0
23	-06.4	-08.8	-07.5	991.6	986.0	989.8	SE	30	SE	20	045	0.0
24	-04.5	-07.2	-05.6	982.2	978.5	980.7	SE	35	SE	32	064	0.0
25	-01.2	-06.8	-03.5	987.6	974.3	978.8	SE	27	ESE	20	046	0.0
26	-05.8	-14.6	-08.4	997.4	986.3	994.6	S	15	NE	04	024	0.0
27	-07.6	-15.2	-09.0	997.4	991.7	995.7	SE	20	ENE	07	030	0.0
28	-06.8	-11.8	-08.6	999.2	995.6	997.5	SSE	18	SE	14	038	0.0
29	-06.7	-11.7	-09.1	994.5	980.8	987.3	SE	33	ESE	27	062	0.0
30	-06.2	-11.6	-08.8	977.8	973.1	974.7	SE	42	SE	33	076	0.0
Total	-240.0	-437.9	-332.7	29598.3	29393.9	29497.8		722		439	1274	35.0
Mean	-08.0	-14.6	-11.1	986.6	979.8	983.3		24.1		14.6	42.5	
High	-01.2	-06.8	-03.5	999.2	995.6	997.5		42		34	076	
Low	-13.8	-21.8	-16.0	965.9	964.0	964.9		05		00	012	

Daily Weather Summary for May 2005

Date	Temperature °C			Pressure hPa			Wind Speed Knot				Max Gust (Knot)	PPT in mm
	Max	Min	Ave	Max	Min	Ave	Max		Average			
							Max	Min	Ave	Max		
01	-08.2	-12.8	-11.2	982.8	976.3	980.7	ESE	20	SE	17	039	0.0
02	-11.8	-16.4	-14.2	982.5	977.2	980.1	SE	20	SE	12	032	0.0
03	-07.8	-17.0	-12.8	976.4	961.5	969.1	SE	25	SSE	21	037	0.0
04	-06.1	-11.0	-09.2	981.0	959.0	969.1	SE	34	SE	25	060	0.0
05	-05.8	-10.4	-07.2	984.6	980.0	982.6	SE	42	SE	33	066	0.0
06	-06.2	-07.2	-06.7	977.4	971.8	973.6	SE	38	SE	31	065	0.0
07	-05.6	-07.2	-06.2	980.5	974.0	977.4	SE	42	SE	36	070	0.0
08	-05.9	-08.0	-07.0	988.6	979.7	985.8	SE	42	SE	27	070	0.0
09	-06.6	-12.4	-09.8	990.9	987.6	988.8	S	24	SE	15	037	0.0
10	-08.4	-18.4	-14.1	991.2	988.4	989.8	S	15	NNE	03	030	0.0
11	-12.2	-20.4	-17.5	996.4	988.6	992.4	SSE	15	NE	05	035	0.0
12	-14.4	-17.1	-15.7	998.6	996.5	997.7	SSE	22	SSE	20	033	0.0
13	-11.9	-15.5	-13.8	998.9	997.9	998.5	SE	18	SE	12	030	0.0
14	-14.0	-19.8	-17.5	996.9	983.4	991.8	S	15	E	06	038	0.0
15	-08.1	-16.8	-11.1	987.2	982.3	985.2	SE	28	SE	16	042	0.0
16	-08.0	-11.6	-09.3	989.3	986.0	987.4	SSE	25	SSE	20	042	0.0
17	-06.8	-12.5	-10.1	991.7	988.8	990.5	SE	25	SSE	21	045	0.0
18	-09.2	-13.3	-11.6	988.5	981.7	985.4	SSE	22	ESE	10	040	0.0
19	-12.7	-19.9	-17.0	987.2	982.3	984.7	SE	20	SE	09	037	0.0
20	-17.4	-20.2	-18.6	988.0	985.4	986.5	SSE	18	SSE	15	023	0.0
21	-19.2	-25.0	-22.3	984.8	980.3	982.8	SSE	15	CALM	07	029	0.0
22	-19.8	-25.6	-21.6	980.8	978.8	979.4	SE	18	SE	09	028	0.0
23	-18.3	-21.8	-19.9	983.4	981.0	982.2	SSE	25	SSE	21	040	0.0
24	-09.0	-21.8	-14.7	981.3	971.9	975.8	S	25	S	18	046	0.0
25	-09.8	-17.9	-15.1	975.7	968.9	972.2	SSE	22	SSE	15	037	0.0
26	-15.7	-22.0	-18.6	990.1	978.7	985.0	SSE	24	SSE	17	037	0.0
27	-16.3	-21.3	-18.4	996.1	990.3	993.9	SE	20	SSE	12	033	0.0
28	-11.0	-16.5	-13.3	992.1	983.7	986.3	SE	42	SE	28	056	0.0
29	-11.4	-20.4	-15.0	989.3	985.0	987.8	S	18	SE	10	030	0.0
30	-15.7	-21.8	-17.7	989.2	983.0	986.8	SE	25	CALM	12	041	0.0
31	-15.8	-24.1	-20.0	988.6	983.0	985.6	SE	24	CALM	11	038	1.7
Total	-349.1	-526.1	-437.2	30610.0	30413.0	30514.9		768		515	1286	1.7
Mean	-11.3	-17.0	-14.1	987.4	981.1	984.4		25		17	041	
High	-05.6	-07.2	-06.2	998.9	997.9	998.5		42		36	070	
Low	-19.8	-25.6	-22.3	975.7	959.0	969.1		15		03	023	

Daily Weather Summary for June 2005

Date	Temperature °C			Pressure hPa			Wind Speed Knot				Max Gust (Knot)	PPT in mm
	Max	Min	Ave	Max	Min	Ave	Max		Average			
							Max	Min	Ave	Max		
01	-23.0	-30.2	-28.9	993.2	990.3	992.1	SSE	15	CALM	03	019	0.8
02	-25.8	-32.3	-29.7	990.2	989.2	989.5	CALM	00	CALM	00	00	0.0
03	-14.8	-32.0	-24.6	988.2	974.2	982.0	SSE	04	CALM	00	038	0.0
04	-07.1	-16.1	-09.5	980.5	972.1	975.6	S	24	SE	16	037	0.0
05	-07.0	-09.4	-08.1	986.5	981.1	984.5	SE	24	SE	20	040	0.0
06	-06.7	-12.0	-09.2	988.3	985.9	987.1	SSE	20	SSE	14	032	0.0
07	-06.8	-18.0	-11.7	991.4	988.9	990.0	SSE	27	CALM	11	032	0.0
08	-06.3	-16.4	-11.5	993.4	989.5	991.4	SE	30	SE	23	055	0.0
09	-08.6	-14.0	-11.8	989.8	984.0	987.1	SSE	25	SE	22	047	0.0
10	-13.2	-22.2	-17.0	986.1	980.8	983.2	SE	19	CALM	04	030	0.0
11	-10.0	-19.8	-15.6	992.3	987.9	990.4	SSE	36	SE	28	055	0.0
12	-05.5	-15.4	-07.7	996.6	991.6	994.6	SE	35	SE	24	054	0.0
13	-17.0	-23.2	-19.3	991.1	987.0	988.9	SE	14	CALM	03	028	0.0
14	-11.4	-22.8	-14.7	999.7	991.0	993.8	SE	30	ESE	20	050	0.0
15	-10.0	-18.2	-12.4	1003.6	999.3	1001.7	SE	22	ESE	12	041	0.0
16	-15.0	-20.0	-18.4	1000.6	999.1	999.7	SE	18	CALM	04	042	0.0
17	-13.3	-16.7	-14.4	1006.2	993.0	1003.3	SE	23	SE	19	046	0.0
18	-11.8	-16.2	-14.2	1005.0	996.3	1001.0	SE	32	SE	20	057	0.0
19	-07.9	-13.4	-10.5	993.0	979.3	986.5	SE	36	SE	31	058	0.0
20	-06.9	-12.3	-08.7	978.6	975.7	977.0	SE	42	SE	33	062	0.0
21	-07.9	-09.4	-08.7	976.6	975.5	976.0	ESE	30	ESE	25	060	0.0
22	-08.9	-13.2	-11.3	990.7	977.7	985.4	ESE	25	ESE	21	044	0.0
23	-13.1	-15.7	-14.0	995.5	992.0	994.7	SE	20	ESE	13	040	0.0
24	-14.3	-16.7	-15.5	995.3	993.1	994.2	SE	37	SE	28	056	0.0
25	-11.0	-15.0	-12.6	991.4	989.4	990.5	SE	40	SE	31	058	0.0
26	-09.8	-13.1	-10.7	993.8	988.2	990.6	ESE	32	ESE	26	056	0.0
27	-07.7	-13.0	-10.2	992.8	979.0	987.6	ESE	50	ESE	35	080	0.0
28	-08.7	-10.2	-09.7	988.3	978.8	983.6	E	48	ESE	38	080	0.0
29	-09.3	-15.0	-11.2	996.4	987.1	992.0	E	46	ESE	25	075	18.6
30	-09.3	-14.4	-12.1	994.3	965.4	980.7	ESE	50	ESE	40	076	12.3
Total	-328.1	-516.3	-413.9	29769.4	29562.4	29674.7		854		589	1448	31.7
Mean	-10.9	-17.2	-13.8	992.3	985.4	989.2		28.5		19.6	48.3	
High	-05.5	-09.4	-07.7	1006.2	999.3	1003.3		50		40	080	
Low	-25.8	-32.3	-29.7	976.6	965.4	975.6		04		03	019	

Daily Weather Summary for July 2005

Date	Temperature °C			Pressure hPa			Wind Speed Knot				Max Gust (Knot)	PPT in mm
	Max	Min	Ave	Max	Min	Ave	Max		Average			
							Max	Min	Ave	Max		
01	-09.3	-10.7	-10.2	969.1	958.9	961.4	SE	50	SE	42	080	31.5
02	-07.6	-13.8	-10.4	985.9	974.0	982.4	SE	27	SE	22	045	0.0
03	-12.9	-14.9	-13.9	981.7	973.5	978.6	SE	48	SE	39	080	0.0
04	-09.8	-12.8	-10.8	973.4	968.9	970.4	SE	38	SE	30	080	0.0
05	-14.1	-19.8	-15.1	971.5	969.1	969.9	SE	22	SSE	13	043	0.0
06	-14.1	-21.8	-18.7	982.7	973.0	978.2	SE	23	SE	14	036	0.0
07	-17.5	-28.3	-22.3	982.6	980.9	981.8	CALM	00	CALM	00	027	0.0
08	-16.0	-28.2	-20.2	984.1	978.4	981.7	SE	34	SE	24	055	0.0
09	-07.8	-16.4	-12.3	976.4	968.1	971.4	SE	38	SE	36	065	14.0
10	-06.7	-16.5	-11.1	968.0	966.5	966.9	SE	30	SE	17	055	0.0
11	-13.2	-23.2	-16.9	979.7	969.4	974.7	SSE	32	CALM	17	055	0.0
12	-10.9	-15.9	-13.8	990.0	981.3	986.3	S	08	CALM	02	020	5.5
13	-15.0	-21.0	-17.8	990.0	979.6	985.9	S	15	ESE	10	026	0.0
14	-17.0	-22.8	-20.2	984.9	974.1	977.9	SE	18	CALM	07	028	0.0
15	-12.3	-24.2	-16.1	997.6	986.9	994.0	SE	28	CALM	11	040	0.0
16	-11.0	-12.9	-11.9	995.7	990.3	992.7	ESE	33	ESE	29	055	0.0
17	-10.9	-11.8	-11.1	987.1	984.7	985.8	ESE	35	ESE	30	064	0.0
18	-10.9	-20.4	-13.7	982.0	975.1	978.4	ESE	40	SE	23	072	0.0
19	-20.4	-24.4	-23.0	994.4	982.9	990.3	S	08	SSE	05	014	0.0
20	-23.1	-34.4	-29.2	994.1	990.1	992.2	S	10	CALM	03	018	0.0
21	-28.8	-35.3	-30.9	1001.9	990.1	994.9	CALM	00	CALM	00	000	0.0
22	-25.0	-31.2	-28.2	1006.8	1003.1	1005.2	CALM	00	CALM	00	020	0.0
23	-19.8	-27.7	-21.5	1001.6	990.8	996.2	SSE	28	SSE	22	038	0.0
24	-16.0	-21.8	-19.1	989.8	987.9	988.9	S	25	SSE	23	040	0.0
25	-12.3	-17.4	-13.5	989.9	987.9	989.0	SE	33	SE	26	054	2.9
26	-10.9	-20.8	-15.0	991.3	989.4	990.8	ESE	22	ESE	12	046	0.0
27	-18.0	-21.8	-20.3	995.2	990.4	992.6	SSE	22	SSE	19	032	0.0
28	-19.2	-21.4	-20.2	996.3	991.2	993.9	SSE	30	SSE	25	047	0.0
29	-15.2	-20.4	-17.7	989.7	984.2	986.7	SSE	28	SSE	23	046	0.0
30	-17.0	-25.3	-21.7	984.2	982.5	983.1	S	23	CALM	05	038	0.0
31	-23.8	-28.9	-26.7	987.3	982.9	985.1	E	16	CALM	07	022	0.0
Total	-466.5	-666.2	-553.5	30604.9	30406.1	30507.3		764		536	1341	53.9
Mean	-15.0	-21.5	-17.9	987.3	980.8	984.1	Mean	25		17	043	
High	-06.7	-10.7	-10.2	1006.8	1003.1	1005.2		50		42	080	
Low	-28.8	-35.3	-30.9	968.0	958.9	961.4	Low	00		00	000	

Daily Weather Summary for August 2005

Date	Temperature °C			Pressure hPa			Wind Speed Knot				Max Gust (Knot)	PPT in mm
	Max	Min	Ave	Max	Min	Ave	Max		Average			
							Max	Min	Ave	Max		
01	-19.9	-31.5	-27.0	989.1	985.0	987.6	ESE	15	CALM	04	034	0.0
02	-16.2	-22.2	-18.7	985.7	976.2	980.4	SE	45	ESE	33	070	15.5
03	-15.8	-20.5	-16.9	980.6	971.6	974.6	SE	48	ESE	33	076	21.1
04	-15.4	-21.8	-19.1	989.5	983.5	987.7	SSE	26	CALM	09	033	0.0
05	-10.0	-18.2	-14.7	985.2	980.5	982.8	SSE	30	SSE	26	045	0.0
06	-09.9	-14.9	-11.8	984.5	982.2	983.6	SE	37	SSE	25	052	0.0
07	-14.2	-19.9	-17.3	983.9	979.9	981.6	S	20	SE	14	033	0.0
08	-17.0	-22.0	-19.4	979.4	961.8	969.9	S	27	SSE	23	040	0.0
09	-11.1	-23.3	-18.7	960.0	930.0	950.4	S	30	CALM	15	050	0.0
10	-06.4	-11.4	-07.6	959.6	936.4	944.3	SE	44	SE	38	070	5.2
11	-07.5	-20.4	-16.7	986.8	969.0	981.2	ESE	24	CALM	06	055	0.0
12	-13.4	-16.9	-15.5	985.7	983.9	984.7	SE	15	CALM	08	032	0.0
13	-14.4	-20.6	-18.0	992.4	983.4	987.9	S	14	CALM	04	023	0.0
14	-17.8	-24.6	-21.2	995.2	991.6	992.6	S	15	CALM	07	028	0.0
15	-14.0	-23.8	-19.8	990.2	987.8	989.0	S	30	CALM	08	048	0.0
16	-12.0	-15.3	-22.4	990.7	988.5	989.8	SSE	28	SSE	22	042	0.0
17	-13.0	-16.4	-15.0	989.4	988.5	988.9	SSE	25	SSE	18	034	0.0
18	-15.2	-22.4	-18.9	997.0	989.4	993.1	S	20	CALM	08	032	0.0
19	-17.8	-22.7	-20.0	998.6	993.8	997.2	ESE	20	CALM	08	030	0.0
20	-17.0	-21.0	-18.5	992.5	987.0	989.1	SE	16	ESE	11	027	0.0
21	-17.3	-20.6	-19.6	988.8	986.0	987.3	SSE	25	SE	18	036	0.0
22	-16.2	-20.8	-18.0	986.9	985.3	986.1	SE	29	SSE	23	040	0.0
23	-17.0	-23.0	-19.3	989.7	987.4	988.7	S	26	CALM	11	028	0.0
24	-11.2	-14.2	-13.8	987.9	979.8	984.7	SE	36	SE	30	054	0.0
25	-06.8	-11.8	-09.1	976.0	964.6	969.0	SE	28	SE	23	054	0.0
26	-08.1	-12.3	-10.5	992.1	969.7	980.8	SE	30	SE	21	043	0.0
27	-10.2	-15.0	-13.7	996.9	983.4	992.9	SE	30	SE	26	048	0.0
28	-09.2	-14.8	-12.4	977.7	962.7	967.2	SSE	32	SSE	27	050	0.0
29	-08.8	-12.8	-11.2	981.7	963.3	971.6	SE	32	SE	29	052	Tr
30	-11.8	-21.4	-17.7	986.9	983.6	985.6	SSE	20	CALM	08	040	0.0
31	-15.8	-23.8	-20.5	981.3	968.2	973.3	S	16	CALM	05	029	0.0
Total	-410.4	-600.3	-523.0	30561.9	30284.0	30423.6		833		541	1328	41.8
Mean	-13.2	-19.4	-16.9	985.9	976.9	981.4		27		17	043	
High	-06.4	-11.4	-07.6	998.6	993.8	997.2		48		38	076	
Low	-19.9	-31.5	-27.0	959.6	930.0	944.3		14		04	023	

Daily Weather Summary for September 2005

Date	Temperature °C			Pressure hPa			Wind Speed Knot				Max Gust (Knot)	PPT in mm
	Max	Min	Ave	Max	Min	Ave	Max		Average			
							Max	Min	Ave	Max		
01	-12.5	-18.7	-16.2	981.6	968.2	975.5	SE	32	SE	17	044	0.0
02	-13.7	-20.0	-18.1	987.3	984.4	985.7	SE	20	SSE	15	045	0.0
03	-17.5	-22.6	-21.1	990.8	987.3	989.3	SSE	20	SSE	16	034	0.0
04	-19.3	-23.4	-21.2	989.6	987.8	988.7	SSE	24	SE	18	040	0.0
05	-18.2	-22.2	-20.2	994.8	988.9	992.5	SE	24	ESE	22	045	0.0
06	-16.9	-20.6	-19.4	993.3	983.4	989.3	SE	28	SE	20	050	0.0
07	-13.3	-17.7	-15.8	984.1	981.4	983.0	SE	38	ESE	29	059	0.0
08	-14.2	-18.7	-16.2	980.5	953.8	964.2	SSE	38	SSE	26	053	0.0
09	-11.0	-17.3	-14.3	967.4	956.1	964.0	SE	38	ESE	29	058	0.0
10	-06.0	-14.5	-10.7	975.4	963.3	972.0	SE	35	SE	26	059	TR
11	-08.3	-12.7	-10.6	981.2	977.0	978.2	SE	26	SE	21	045	0.0
12	-08.0	-11.6	-10.3	989.2	983.1	987.0	SE	26	SSE	22	043	0.0
13	-07.3	-14.2	-10.4	988.8	981.9	985.7	ESE	39	SE	34	060	0.0
14	-10.7	-15.2	-12.0	980.4	977.8	979.1	ESE	48	ESE	37	070	0.0
15	-09.8	-11.7	-10.9	985.3	982.3	984.2	SE	44	SE	36	069	0.0
16	-10.8	-17.4	-13.3	986.3	982.1	985.1	SE	27	SE	20	045	0.0
17	-12.7	-22.0	-15.9	980.3	974.0	976.1	S	18	CALM	06	030	0.0
18	-17.6	-25.3	-21.5	981.5	975.1	978.1	S	17	CALM	04	024	0.0
19	-13.9	-24.2	-17.5	984.4	982.3	983.3	SSE	22	CALM	08	033	0.0
20	-11.2	-17.4	-14.8	981.4	971.0	975.5	SSE	18	CALM	07	030	0.0
21	-12.2	-16.4	-15.3	972.1	968.3	969.6	SE	26	ESE	16	047	0.0
22	-12.9	-17.4	-15.5	978.4	974.6	976.7	E	27	CALM	13	050	0.0
23	-13.0	-20.8	-16.7	980.9	978.7	980.2	CALM	00	CALM	00	010	0.0
24	-14.5	-23.0	-18.5	983.3	981.2	982.1	E	10	CALM	03	024	0.0
25	-15.8	-20.4	-18.8	983.9	974.5	980.5	SE	24	CALM	14	039	0.0
26	-15.0	-19.0	-17.2	975.8	971.0	972.8	ESE	30	ESE	24	060	0.0
27	-13.7	-20.6	-17.1	978.6	975.7	976.8	SE	23	SSE	18	037	0.0
28	-14.8	-23.8	-18.1	977.9	974.8	976.1	S	16	CALM	04	030	0.0
29	-17.9	-23.0	-20.5	979.1	977.2	978.5	CALM	00	CALM	00	013	0.0
30	-16.9	-21.5	-18.8	978.8	977.3	978.1	ESE	27	ESE	16	043	TR
Total	-399.6	-573.3	-486.9	29472.4	29294.5	29387.9		765		521	1289	0.0
Mean	-13.3	-19.1	-16.2	982.4	976.5	979.6		26		17	43	
High	-06.0	-11.6	-10.3	994.8	988.9	992.5		48		37	070	
Low	-19.3	-25.3	-21.5	967.4	953.8	964.0		00		00	010	

Daily Weather Summary for October 2005

Date	Temperature °C			Pressure hPa			Wind Speed Knot				Max Gust (Knot)	PPT in mm
	Max	Min	Ave	Max	Min	Ave	Max		Average			
							Max	Min	Ave	Max		
01	-11.6	-17.6	-15.3	981.8	979.0	980.2	ESE	26	ESE	14	043	0.0
02	-12.8	-19.1	-16.5	981.2	976.9	979.5	S	16	CALM	06	026	0.0
03	-08.8	-18.3	-13.7	976.6	967.1	973.9	S	17	CALM	06	028	0.0
04	-11.5	-22.3	-14.7	978.2	962.1	968.4	SSE	26	CALM	15	048	0.0
05	-13.2	-19.5	-16.5	975.9	967.9	971.2	ESE	14	CALM	03	020	0.0
06	-15.1	-23.4	-19.7	967.9	964.9	966.1	W	06	CALM	01	015	0.0
07	-18.5	-25.6	-23.2	975.3	969.4	973.5	ESE	05	CALM	01	010	0.0
08	-15.7	-26.2	-19.6	988.7	977.1	983.1	CALM	00	CALM	00	022	0.0
09	-10.2	-21.6	-15.3	999.5	993.8	997.4	S	14	CALM	03	024	0.0
10	-01.6	-18.3	-09.6	1002.7	999.0	999.4	SSE	30	CALM	13	046	0.0
11	-03.2	-15.2	-06.3	1004.0	992.1	998.6	SSE	29	CALM	17	041	0.0
12	-03.7	-13.6	-08.8	990.5	986.9	988.7	SSE	16	CALM	02	034	0.0
13	-04.0	-14.0	-10.0	991.4	986.0	988.1	SE	12	CALM	03	040	0.0
14	-10.6	-17.2	-13.0	995.6	992.0	994.3	SE	10	CALM	03	017	0.0
15	-11.6	-17.4	-14.4	995.2	984.2	990.4	SSE	16	CALM	07	043	0.0
16	-08.6	-14.9	-11.5	979.7	970.7	974.1	SE	30	SE	17	051	0.0
17	-11.9	-18.1	-14.7	982.0	974.7	978.2	E	26	CALM	14	045	0.0
18	-12.4	-17.8	-14.6	986.1	982.0	984.0	ESE	20	E	12	030	0.0
19	-11.2	-15.4	-13.2	994.5	987.6	991.5	SE	15	ESE	12	024	0.0
20	-07.2	-13.3	-09.5	994.7	988.8	992.3	SE	24	SE	18	045	0.0
21	-04.0	-08.4	-06.5	994.7	988.7	992.1	SE	33	SE	22	055	0.0
22	-04.1	-10.1	-06.8	992.7	988.3	990.6	S	24	SSE	18	040	0.0
23	-04.4	-11.4	-07.1	990.4	982.6	987.1	SE	18	SE	11	035	0.0
24	-03.2	-10.7	-06.1	985.6	981.4	982.7	SE	20	SE	17	034	0.0
25	-04.6	-10.8	-07.7	989.0	985.9	987.6	SE	20	SE	17	034	0.0
26	-05.8	-12.6	-09.6	990.2	988.0	989.1	SE	24	SE	18	030	0.0
27	-07.6	-12.5	-09.8	987.6	984.4	986.4	SE	20	SE	15	032	0.0
28	-08.0	-11.9	-09.6	983.0	976.3	979.4	SE	16	CALM	10	030	TR
29	-07.0	-12.2	-09.9	977.3	974.7	976.2	SE	16	CALM	07	024	TR
30	-06.1	-10.6	-08.2	973.7	971.2	972.5	SE	25	ESE	18	039	0.0
31	-07.3	-12.2	-09.6	978.2	972.6	975.1	SE	19	ESE	12	035	0.0
Total	-265.5	-492.2	-371.0	30583.9	30396.3	30491.7		587		332	1040	0.0
Mean	-08.6	-15.9	-12.0	986.6	980.5	983.6		19		11	034	
High	-01.6	-08.4	-06.1	1004.0	999.0	999.4		33		22	055	
Low	-18.5	-26.2	-23.2	967.9	962.1	966.1		00		00	010	

Daily Weather Summary for November 2005

Date	Temperature °C			Pressure hPa			Wind Speed Knot				Max Gust (Knot)	PPT in mm
	Max	Min	Ave	Max	Min	Ave	Max		Average			
							Max	Min	Ave	Max		
01	-08.1	-17.1	-11.3	985.5	979.5	983.4	ESE	10	SE	09	030	0.0
02	-10.1	-16.8	-13.5	985.6	983.6	984.5	SSE	20	SSE	11	032	0.0
03	-10.0	-18.4	-13.9	983.2	979.5	981.3	SE	12	CALM	04	022	0.0
04	-14.1	-19.2	-16.4	978.9	978.4	978.6	SE	14	CALM	05	025	TR
05	-13.8	-16.4	-15.0	977.1	968.5	972.3	SE	30	SE	27	050	6.0
06	-06.8	-18.0	-13.8	980.0	969.3	974.4	SSE	25	CALM	09	046	0.0
07	-06.1	-17.8	-12.4	982.7	977.3	979.7	ESE	15	CALM	06	037	0.0
08	-09.1	-16.3	-12.7	978.7	976.8	978.0	SE	15	CALM	06	024	0.0
09	-10.0	-18.4	-13.7	985.9	979.1	983.2	SSE	08	CALM	01	016	0.0
10	-09.2	-16.2	-12.6	984.7	979.7	982.1	NNE	17	VRB	09	025	0.0
11	-09.1	-16.6	-12.5	978.8	972.9	975.1	N	10	VRB	02	018	0.0
12	-08.4	-15.4	-11.3	980.8	974.4	977.2	S	17	CALM	07	025	0.0
13	-06.1	-14.5	-09.0	985.7	981.5	983.2	ESE	24	SE	19	037	0.0
14	-01.1	-09.0	-03.9	997.6	986.9	992.6	ESE	20	ESE	13	034	0.0
15	00.5	-05.2	-02.6	1002.2	992.4	996.2	SSE	28	CALM	14	042	0.0
16	-01.6	-07.2	-03.9	994.5	991.3	992.5	ESE	30	ESE	26	046	0.0
17	-04.0	-07.2	-05.9	995.5	990.1	993.0	ESE	33	ESE	25	051	0.0
18	-03.1	-07.4	-05.0	988.9	986.4	987.4	ESE	30	ESE	24	055	0.0
19	-03.0	-08.5	-04.8	988.1	986.1	986.6	SSE	20	ESE	14	036	0.0
20	-02.7	-08.7	-04.8	993.4	988.5	991.5	ESE	20	SE	16	035	0.0
21	-00.6	-10.2	-04.7	993.6	992.1	992.9	SSE	18	SE	11	032	0.0
22	-01.6	-10.9	-05.8	992.1	989.7	990.5	S	08	CALM	04	021	0.0
23	-04.0	-10.6	-06.4	994.7	992.7	993.8	SSE	15	E	05	023	0.0
24	-04.1	-11.0	-06.4	993.9	991.1	992.1	S	10	CALM	07	025	0.0
25	-02.3	-10.6	-05.8	997.9	994.6	996.8	SE	16	CALM	07	025	0.0
26	-02.4	-10.6	-05.0	998.9	997.4	998.0	SE	12	ESE	08	027	0.0
27	00.0	-09.3	-05.1	997.9	983.0	991.7	S	19	CALM	11	027	0.0
28	-00.2	-09.9	-04.9	981.2	973.2	976.8	SSE	18	SSE	07	025	0.0
29	-04.4	-08.6	-06.6	994.9	980.6	988.5	E	15	E	11	024	0.0
30	-01.0	-09.6	-04.2	995.2	990.1	993.6	SE	12	CALM	06	020	0.0
Total	-156.5	-375.6	-253.9	29668.1	29506.7	29587.5		541		324	935	6.0
Mean	-05.2	-12.5	-08.5	988.9	983.6	986.3		18.0		10.8	31.2	
High	00.5	-05.2	-02.6	1002.2	997.4	998.0		33		27	055	
Low	-14.1	-19.2	-16.4	977.1	968.5	972.3		08		01	016	

Daily Weather Summary for December 2005

Date	Temperature °C			Pressure hPa			Wind Speed Knot				Max Gust (Knot)	PPT in mm
	Max	Min	Ave	Max	Min	Ave	Max		Average			
							Max	Min	Ave	Max		
01	02.1	-06.0	-02.1	988.6	985.1	986.5	S	20	S	12	034	0.0
02	-01.7	-05.8	-03.6	994.1	989.9	992.5	SE	18	CALM	08	030	0.0
03	-01.0	-07.1	-02.9	1003.5	994.8	999.1	SE	10	ESE	07	015	0.0
04	00.3	-06.1	-02.0	1004.4	1003.6	1003.9	ESE	11	CALM	03	022	TR
05	04.1	-01.8	00.9	1004.1	997.6	1001.6	SSE	24	CALM	09	030	0.0
06	05.2	-03.3	01.8	994.7	987.8	990.0	S	25	SE	13	036	0.0
07	06.0	-02.4	02.0	991.8	983.7	988.1	E	17	CALM	08	026	0.0
08	03.3	-02.9	02.4	1008.0	993.6	1003.9	SE	28	CALM	08	043	0.0
09	03.0	-05.7	-01.3	1004.5	1000.6	1002.1	E	08	CALM	03	020	0.0
10	01.8	-03.8	-01.0	1004.2	1001.1	1003.0	SE	06	CALM	03	016	0.0
11	00.5	-04.0	-01.3	1003.4	1001.3	1002.7	CALM	00	CALM	00	CALM	0.0
12	00.0	-03.2	-01.4	1000.1	994.3	997.3	NE	04	CALM	00	012	0.0
13	-00.4	-03.2	-02.0	997.8	994.0	996.0	E	15	E	10	022	TR
14	-00.5	-03.6	-02.1	999.3	997.1	998.3	E	15	E	11	026	TR
15	03.2	-03.2	00.4	995.8	988.5	992.1	S	08	CALM	06	030	0.0
16	03.7	-02.2	01.5	992.5	987.4	989.3	SSE	14	E	08	029	0.0
17	02.9	-02.8	-00.3	1003.6	994.1	999.3	E	18	CALM	05	028	0.0
18	01.2	-04.8	-01.6	1004.1	998.8	1001.6	CALM	00	CALM	00	010	0.0
19	-01.0	-06.2	-02.7	1003.7	997.4	999.6	E	10	CALM	04	020	0.0
20	-00.5	-03.7	-01.9	1007.1	1004.7	1006.3	E	20	E	14	035	TR
21	-00.5	-04.1	-02.4	1007.7	1006.5	1007.0	E	14	E	10	028	TR
22	01.0	-03.8	-01.3	1007.0	1003.8	1005.4	NW	05	CALM	02	013	0.0
23	00.8	-04.0	-01.6	1003.6	1002.7	1003.2	E	12	CALM	06	016	0.0
24	00.8	-04.3	-01.1	1002.5	1001.5	1001.8	CALM	00	CALM	00	005	TR
25	02.6	-03.0	-00.9	1004.2	1002.1	1003.2	E	12	CALM	04	022	TR
26	02.2	-03.0	-00.5	1001.5	998.5	1000.7	NE	10	CALM	03	020	TR
27	04.4	-02.4	00.8	999.7	997.3	998.2	SE	14	CALM	08	036	0.0
28	01.6	-02.6	-00.5	997.7	995.0	996.5	SE	07	CALM	03	014	TR
29	02.2	-02.0	-00.1	994.5	992.3	993.4	SE	20	ESE	13	026	TR
30	01.2	-01.8	-00.3	992.6	991.4	992.0	ESE	24	ESE	17	036	0.0
31	04.0	-02.3	00.9	991.0	980.1	985.6	S	15	CALM	04	022	0.0
Total	52.5	-115.1	-24.2	31007.3	30866.6	30940.2		404		202	722	0.0
Mean	01.7	-03.7	-00.8	1000.2	995.7	998.1		13		07	023	
High	06.0	-01.8	02.4	1008.0	1006.5	1007.0		28		17	043	
Low	-01.7	-07.1	-03.6	988.6	980.1	985.6		00		00	005	

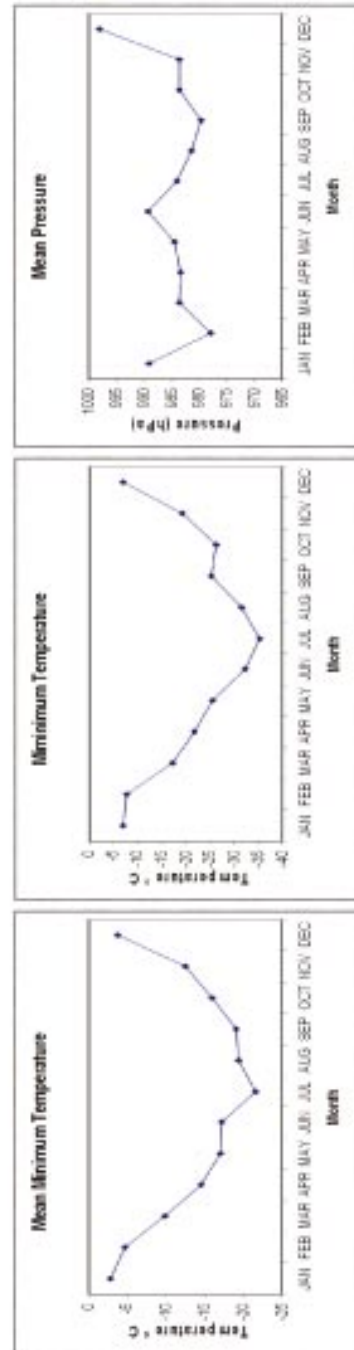
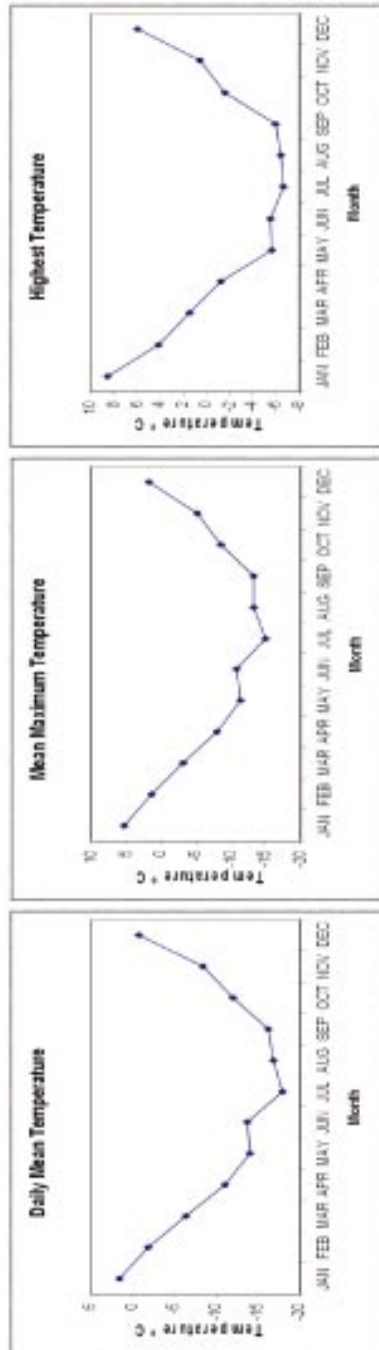
Weather Summary of Maitri, Antarctica for the year 2005 (LAT 70° 45' 53"S, LON 11° 45' 03"E)

Months	Temperature (° C)					Pressure (hPa)			Wind Speed (Kt)		Number of days with					Average cloud OCTA	Number of Blizzards	Snowfall (mm)	
	Daily Mean	Mean Max.	Mean Min.	T. Max./Date	T. Min./Date	Mean Pressure	Pr. Max./Date	Pr. Min./Date	Mean	Max/Gust	AVG/Max W. Speed>23 KT	Snow Fall	Fog	Blizzard	Clear Sky				Overcast Sky
JAN	1.6	5.3	-2.8	8.5 22	-7.0 25	989.0	995.9 11	972.8 17	11	62	02/09	02	00	2	03	02	4	1	13.0
FEB	-1.8	1.3	-4.7	4.2 11	-7.8 28	977.8	995.2 27	951.9 26	15	62	07/11	01	00	2	00	02	5	1	3.5
MAR	-6.4	-3.2	-9.9	1.4 08	-17.2 31	983.7	997.7 27	959.3 21	15	76	08/19	01	00	1	02	00	4	1	3.4
APR	-11.1	-8.0	-14.6	-1.2 25	-21.8 10	983.3	999.2 28	964.0 07	15	76	07/16	01	00	3	00	01	3	2	35.0
MAY	-14.1	-11.3	-17.0	-5.6 07	-25.6 22	984.4	998.9 13	959.0 04	17	70	06/16	01	00	2	02	00	3	1	1.7
JUNE	-13.8	-10.9	-17.2	-5.5 12	-32.3 02	989.2	1006.2 17	965.4 30	20	80	13/21	03	00	3	04	00	2	1	31.7
JULY	-17.9	-15.0	-21.5	-6.7 10	-35.3 21	984.1	1006.8 22	958.9 01	17	80	12/19	04	00	10	08	00	1	5	53.9
AUG	-16.9	-13.2	-19.4	-6.4 10	-31.5 01	981.4	998.6 19	930.0 09	17	76	12/21	04	00	5	06	00	2	3	41.8
SEP	-16.2	-13.3	-19.1	-6.0 10	-25.3 18	979.6	994.8 05	953.8 08	17	70	08/19	02	00	0	02	00	4	0	0.0
OCT	-1.2	-8.6	-15.9	-1.6 10	-26.2 08	983.6	1004.0 11	962.1 04	11	55	00/11	02	00	0	04	02	4	0	0.0
NOV	-8.5	-5.2	-12.5	0.5 10	-19.2 04	983.6	1002.2 15	968.5 05	11	55	04/07	02	00	2	03	02	3	1	6.0
DEC	-0.8	1.7	-3.7	6.0 07	-7.1 03	998.1	1008.0 08	980.1 31	07	43	00/04	10	02	0	0	02	6	0	0.0
YEAR 2005	-9.8	-6.7	-13.2	-1.0	-21.4	984.8	1000.6	960.5	14	67	07/14	21.1			03	01	3	16	

* One blizzard continues from June to July. It counted both in June and July. The total blizzard was 15.

History of blizzard over Maitri, Antarctica year 2005

S. No.	Date/Time UTC		Extreme values (with date/time)				
			MSL Pressure		Temperature		Wind
	Commencement	Cessation	Max. (hPa)	Min. (hPa)	Max. ($^{\circ}$ C)	Min. ($^{\circ}$ C)	Max. (Knot)
01	1815 28-01-05	0810 29-01-05	989.6	969.2	1.3	-2.2	25
			2100	0600	0300	0000	0300
			28-01-05	29-01-05	29-01-05	29-01-05	29-01-05
02	1035 19-02-05	0835 20-02-05	975.8	961.2	0.0	-4.6	36
			0000	0900	0900	0300	0600
			20-02-05	20-02-05	20-02-05	20-02-05	20-02-05
03	0830 06-03-05	1845 06-03-05	993.1	986.9	-03.0	-5.4	38
			1830	0830	1830	0830	1200
			06-03-05	06-03-05	06-03-05	06-03-05	06-03-05
04	1430 18-04-05	2030 UTC 18-04-05	975.7	973.9	-9.5	-10	36
			2030	1700	1730	1530	1500
			18-04-05	18-04-05	18-04-05	18-04-05	18-04-05
05	0745 21-04-05	1100 21-04-05	985.7	981.6	-13.2	-14.5	30
			0745	1130	1045	0815	0900
			21-04-05	21-04-05	21-04-05	21-04-05	21-04-05
07	0110 28-06-05	0030 02-07-05	980.9	944.0	-8.7	-15.0	58
			0015	08000	2105	0920	2200
			30-06-05	01-07-05	28-06-05	29-06-05	30-06-05
08	1920 03-07-05	2310 03-07-05	962.6	959.4	-12.8	-14.3	48
			1920	2310	2310	2040	2100
			03-07-05	03-07-05	03-07-05	03-07-05	03-07-05
09	1610 08-07-05	0200 09-07-05	965.7	962.0	-15.5	-18.6	36
			1610 UTC	0200	0030	1610	0100
			08-07-05	09-07-05	09-07-05	08-07-05	09-07-05
10	1730 16-07-05	1810 18-07-2005	976.8	959.8	-10.9	-15.0	40
			1730	1615	2100	1810	1000
			16-07-05	18-07-05	17-07-05	18-07-05	18-07-05
11	1205 25-07-05	0200 26-07-05	972.8	974.4	-12.5	-19.7	33
			1205	0200	1350	2300	1800
			25-07-05	26-07-05	25-07-05	23-07-05	25-07-05
12	0910 02-08-05	2115 03-08-05	968.2	957.3	-16.2	-20.0	48
			0620	0600	2010	1000	0600
			03-08-05	29-01-05	02-08-05	02-08-05	03-08-05
13	0100 05-08-05	0645 06-08-05	971.0	965.2	-10.0	-18.2	37
			0100	2000	2300	0455	0600
			05-08-05	05-08-05	05-08-05	05-08-05	06-08-05
14	0030 10-08-05	1830 10-08-05	921.0	934.5	-6.5	-10.1	44
			0600	1830	1800	0100	1800
			10-08-05	10-08-05	10-08-05	10-08-05	18-08-05
15	0205 05-11-05	0210 06-11-05	962.9	953.5	-13.8	-16.4	30
			0205	2200	1310	0445	1700
			05-11-05	05-11-05	05-11-05	05-11-05	05-11-05



Work Report of IMD Team

The IMD team, consisting of two members Sanjay Bist and Amalendu Barua, has performed the following work during the year 2005 as per ongoing programme of India Meteorological Department for 24th Indian Antarctic Expedition.

- 1) Taken and recorded 3 hourly Synoptic Ship Observations during onward and return Cruise including transmission of 6 hourly main synoptic observations to IMD New Delhi for GTS.
- 2) Taken and recorded 3 hourly synoptic observations at Maitri and transmitted main 6 hourly main synoptic (00, 06, 12 and 18 Hrs IST) observations to IMD New Delhi for further transmission on GTS.
- 3) Recorded continuously the various meteorological parameters with their computation and tabulation.
- 4) Taken 2 hourly Atmospheric Turbidity Observations through Sun-photometer on 193 days (780 observations) as and when sky conditions permitted.
- 5) Monitored the Facsimile charts received from Pretoria, South Africa, as part of logistic support to the expedition.
- 6) Provided meteorological support for helicopter operations as and when required.
- 7) Taken 43 Ozone Sonde Ascents for vertical profile and study of ozone.
- 8) Total number of 19 Radiometersonde ascents for study of radiation was taken.
- 9) Maintained and operated Brewer Spectrophotometer for measurement of Total Ozone, UVB, SO₂ and NO₂ as and when sky conditions permitted.

Salient Meteorological Features During the Year 2005

Warmest Month	January
(Average Temperature +01.6 °C)	
Highest Temperature during the year	+08.5 °C (January 22)

Coldest Month	July
(Average Temperature: -17.9 °C)	
Lowest Temperature during the year	-35.3 °C (July 21)
Total numbers of Blizzard during the year	16
Total numbers of days with Blizzard	30
Longest duration of Blizzard	95 Hours
(From June 28/ 0110 Hrs to July 02/0030 Hrs)	
Maximum Wind Speed	50 Knot (92.5 KMPH.)
	27 June & 01 July
Maximum Gust	80 Knot (148 KMPH)
	27, 28 June & 01, 03, 04 July
Total number of aurora observed	46
Snowfall/snow drifting days	33
Total snowfall during the year 2005	190.0 mm

ACKNOWLEDGEMENTS

We are very grateful to Shri B. Lal (Director General of Meteorology), India Meteorological Department, New Delhi for offering me the opportunity to work in Antarctica. We are also thankful to Mr Santosh and Mr. Surendra Singh of Indian Army for their support in various ways. Our special thanks to Shri Rajesh Asthana, Leader and Station Commander and all the members of 24th winter team who actively supported us throughout the expedition.