TITLE

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1. 0 DATASET OVERVIEW

1.1 Introduction

Intensive meteorological observations in the Khumbu Valley, Nepal Himalayas, have been conducted since the middle 90's (Ueno et al., 1996; Tartari et al., 1999; Bertolani et al., 2000; Ueno et al., 2001; Bollasina et al., 2002; Ueno and Pokhrel, 2002) in order to provide long-term monitoring of the monsoon at high altitude. This area, being located on the windward side of the Range with respect to the Indian monsoon, is well exposed to the summer winds. The studies conducted have demonstrated that the region is a significant point of observation both of local climate and large-scale circulation. A network of Automated Weather Stations (AWSs) has been established in the Eastern Himalayas: the AWSs are located at different altitudes, over a 40 km stretch oriented approximately south to north.

1.2 Time period covered by the data

Start: 1 October 2003, 00:00
End: 31 December 2004, 23:00

1.3 Temporal characteristics of the data

All parameters are recorded hourly. Hour is UTC.

1.4 Physical location of the measurement

Latitude: 27° 41' 44" N
Longitude: 86° 43' 23" E
Elevation: 2660 m a.s.l.

1.5 Data source

Original data provided by the Ev-K^2-CNR Committee.

1.6 WWW address references

http://www.evk2cnr.org

2.0 INSTRUMENTATION DESCRIPTION

2.1 Platform

The sensors are mounted on a 2-m and a 5-m masts.

2.2 Description of the instrumentation

Parameter	Model	Manifacturer
Air Temperature	DMA570	Lsi-Lastem (Italy)
Precipitation	DQA035	Lsi-Lastem (Italy)
Relative Humidity	DMA570	Lsi-Lastem (Italy)
Atmospheric Pressure	CX115P	Lsi-Lastem (Italy)
Wind Speed	DNA022	Lsi-Lastem (Italy)
Wind Direction	DNA022	Lsi-Lastem (Italy)
Downward Shortwave Radiation	CM6B	Kipp&Zonen (The Netherlands)

2.3 Instrumentation specification

Parameter	Sensor Type	Height of sensor (m)	Accuracy	Resolution
Air Temperature	Thermoresistance	2	0.1°C	0.025°C
Precipitation	Tipping Bucket	1.5	1% (0-1 mm/min); 2% (1-3 mm/min)	0.2 mm
Relative Humidity	Capacitive Plate	2	2.5%	0.2%
Atmospheric Pressure	Slice of Silica	2	1 hPa	0.1 hPa
Wind Speed	3-cup anemometer	5	0.1 m/s	0.05 m/s
Wind Direction	Potentiometer	5	1%	0.1°
Downward Shortwave Radiation	Temperature Difference	2	5% (daily total)	-

3.0 DATA COLLECTION AND PROCESSING

3.1 Description of data collection

Data are downloaded from the AWS twice every year, in spring and autumn. Then, data are sent to Italy, where they are processed.

3.2 Description of derived parameters and processing techniques used

Temperature, relative humidity and solar radiation are instantaneous values. Precipitation is accumulated on the previous hour. Atmospheric pressure is averaged over the previous hour. Wind speed and direction are the *resulting* average speed and direction over the previous hour (calculated by the datalogger by means of data recorded every 5 seconds):

this to minimize data unreliability due to sudden gusts. Both of them are calculated weighting the frequency distribution of both variables within each hour.
The three parameters indicated below were computed by using “CEOP Derived Parameter Equations” available at: http://www.joss.ucar.edu/ghp/ceopdm/refdata_report/eqns.html. These data have the flag “I”. In the case of calculated by using dubious value flagged “D”, the data flag was put D”.

Dew Point Temperature was computed by using (Bolton 1980):

es = 6.112 * exp((17.67 * T)/(T + 243.5));
e = es * (RH/100.0);
Td = log(e/6.112)*243.5/(17.67-log(e/6.112));
where:
T = temperature in deg C;
es = saturation vapor pressure in mb;
e = vapor pressure in mb;
RH = Relative Humidity in percent;
Td = dew point in deg C

Specific Humidity was computed by using (Bolton 1980):

e = 6.112*exp((17.67*Td)/(Td + 243.5));
q = (0.622 * e)/(p - (0.378 * e));
where:
e = vapor pressure in mb;
Td = dew point in deg C;
p = surface pressure in mb;
q = specific humidity in kg/kg.

U,V Components were computed by using (GEMPAK):

U = -sin(direction) * wind_speed;
V = -cos(direction) * wind_speed;

4.0 QUALITY CONTROL PROCEDURES

For all parameters, the data has been visually checked, looking for extremely and unusual low/high values and/or periods with constant values. Nocturnal radiation data has been checked for non-zero values; wind speed and direction for sensor freezing and/or unusual high values. Where possible, cross-checking among the variation of different measured parameters (e.g., precipitation with relative humidity) was also performed to assure the consistency among the variations of different variables under the same conditions.
The quality control flags follow the CEOP data flag definition document.

5.0 GAP FILLING PROCEDURES

No gap filling procedure was applied.

6.0 DATA REMARKS

6.1 PI's assessment of the data

6.1.1 Instruments problems

The relative humidity sensor was found to be damaged (flag B), and it has been replaced on 12 October 2004.

6.1.2 Quality issues

Due to sensor freezing, in some cases wind speed and direction were recorded as 0 and 360, respectively, and, thus, considered bad. Sometimes, unusual high values were recorded and they were classified as bad. Due to slow melting of solid precipitation in the not-heated rain gauge, precipitation is sometimes recorded with delay in case of below-zero air temperature. Zero-precipitation is also recorded during snowfall if air temperature is below 0°C. All these data were considered dubious. There is a general tendency of the sensor to over-estimate relative humidity and to reach saturation conditions.

6.2 Missing data periods

Data are missing from 5:00 to 7:00 during 8 November 2003 due to operations on the datalogger.
All data are missing from 6 April 2004 at 6:00 to 12 October at 5:00 due to software problems.

7.0 REFERENCE REQUIREMENTS

Original data was collected and is provided within the framework of the Ev-K^2-CNR/RONAST Joint Scientific and Technological Research Project, funded by Italian Ministries and National Research Council through the Ev-K^2-CNR Committee.

8.0 REFERENCES

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