

## TITLE

CAMP\_Himalayas\_Pyramid\_20021001\_20030331.flx

## CONTACT

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## DATE OF THIS DOCUMENT

17 February 2004

## 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. The observation of surface and sub-surface parameters is crucial for studying the feedback mechanisms and the physical exchange processes between the land and the atmosphere, very important in the modulation of the monsoon.

### 1.2 Time period covered by the data

Start: 1 October 2002, 17:00  
End: 31 March 2003, 23:00

### 1.3 Temporal characteristics of the data

All parameters are recorded hourly. This data set includes soil heat flux at 5 cm depth.

The CO<sub>2</sub> flux, latent heat flux, and sensible heat flux are entirely missing.

### 1.4 Physical location of the measurement

Latitude: 27° 57' 32.5" N  
Longitude: 86° 48' 47.6" E  
Elevation: 5035 m a.s.l.

### 1.5 Data source

Original data provided by the Ev-K2-CNR Committee.

### 1.6 WWW address references

<http://news.epson-meteo.org>  
<http://www.montagna.org>

## 2.0 INSTRUMENTATION DESCRIPTION

### 2.1 Platform

Soil temperature and moisture sensors are mounted on rigid arms to keep them vertically.

### 2.2 Description of the instrumentation

Parameter	Model	Manufacturer
Soil Heat Flux	DPE260Lsi	Lastem (Italy)

### 2.3 Instrumentation specification

Parameter	Sensor Type	Depth of sensor (cm)	Accuracy	Resolution
Soil Heat Flux	Thermopile	-5	3%	-

## 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

### 3.3 Data format

These data are in the CEOP EOP-3 data format agreed to by the CEOP Scientific Steering Committee. This format is described in detail as part of the CEOP Reference Site Data Set Procedures Report which is available at the following URL:

[http://www.joss.ucar.edu/ghp/ceopdm/refdata\\_report/ceop\\_flux\\_format.html](http://www.joss.ucar.edu/ghp/ceopdm/refdata_report/ceop_flux_format.html)

## 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. Cross-checking with the variation of other measured parameters (soil temperature, snow cover, etc.) 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.

#### 4.2 UCAR/JOSS Quality Control Procedures

UCAR/JOSS conducted two primary quality assurance/control procedures on the reference site data. First the data has been evaluated by a detailed QA algorithm that verifies the format is correct, examines any QC flags, and conducts basic checks on data values. Second, JOSS conducts a manual inspection of time series plots of each parameter.

#### 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

None.

###### 6.1.2 Quality issues

None.

##### 6.2 Missing data periods

The soil heat flux sensor was installed on 1 October 2002 at 17:00, so values during the period 1 October 2002 00:00 - 16:00 are missing. Due to operations on the datalogger (i.e., channels configuration), data are missing on 21 October 2002 at 08:00 and on 22 October 2002 at 10:00. Due to a datalogger fault, soil moisture data are also missing on 27 October 2002 from 8:00 to 23:00.

#### 7.0 REFERENCE REQUIREMENTS

Original data was collected and is provided within the framework of the Ev-K2-CNR/RONAST Joint Scientific and Technological Research Project, funded by Italian Ministries and National Research Council through the Ev-K2-CNR Committee.

#### 8.0 REFERENCES

Ueno K., and A. P. Pokhrel, 2002: Intra-seasonal air temperature variation in the Nepal Himalayas, *Mausam*, 53, 281-288.

Bollasina, M., L. Bertolani, and G. Tartari, 2002: Meteorological observations in the Khumbu Valley, Nepal Himalayas, 1994-1999, *Bull. Glac. Res.*, 19, 1-11.

Ueno K., R. B. Kayastha, M. R. Chitrakar, O. R. Bajracharya, A. P. Pokhrel, H. Fujinami, T. Kadota, H. Iida, D. P. Manandhar, M. Hattori, T. Yasunari, and M. Nakawo, 2001: Meteorological observations during 1994-2000 at the Automatic Weather Station (GEN-AWS) in Khumbu region, Nepal Himalayas, *Bull. Glac. Res.*, 18, 23-30.

Bertolani, L., M. Bollasina, and G. Tartari, 2000: Recent biennial variability of meteorological features in the Eastern Highland Himalayas, *Geophys. Res. Lett.*, 17, 2185-2188.

Tartari, G., G. P. Verza, and L. Bertolani, 1999: Meteorological data at the Pyramid Laboratory. In: A. Lami, R. Mosello, G. Giussani (Eds), *Limnology of high altitude in the Khumbu Valley, Nepal*. Documenta Ist. Ital. Idrobiol.

Ueno K., H. Iida, H. Yabuki, K. Seko, A. Sakai, G. S. Lhakupa, R. B. Kayastha, A. P. Pokhrel, M. L. Shrestha, T. Yasunari, and M. Nakawo, 1996: Establishment of the GEN Automatic Weather Station (AWS) in Khumbu region, Nepal Himalayas, *Bull. Glac. Res.*, 14, 13-22.

## TITLE

CAMP\_Himalayas\_Pyramid\_20030401\_20031030.flx

## CONTACT

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## DATE OF THIS DOCUMENT

05 October 2004

## 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. The observation of surface and sub-surface parameters is crucial for studying the feedback mechanisms and the physical exchange processes between the land and the atmosphere, very important in the modulation of the monsoon.

### 1.2 Time period covered by the data

Start: 1 April 2003, 00:00  
End: 30 September 2003, 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° 57' 32.5" N  
Longitude: 86° 48' 47.6" E  
Elevation: 5035 m a.s.l.

## 1.5 Data source

Original data provided by the Ev-K<sup>2</sup>-CNR Committee.

## 1.6 WWW address references

<http://news.epson-meteo.org>

<http://www.montagna.org>

## 2.0 INSTRUMENTATION DESCRIPTION

### 2.1 Platform

The soil heat flux sensor (a circular plate) is placed into the ground horizontally.

### 2.2 Description of the instrumentation

Parameter	Model	Manufacturer
Soil Heat Flux	DPE260	Lsi-Lastem (Italy)

### 2.3 Instrumentation specification

Parameter	Sensor Type	Depth of sensor (cm)	Accuracy	Resolution
Soil Heat Flux	Thermopile	-5	3%	-

## 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

## 4.0 QUALITY CONTROL PROCEDURES

Data has been visually checked, looking for extremely and unusual low/high values and/or periods with constant values. Cross-checking with the variation of other measured parameters (soil temperature, snow cover, etc.) 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

None.

### 6.1.2 Quality issues

None.

## 6.2 Missing data periods

Due to operations on the datalogger, data are missing on 5 April 2003 from 11:00 and 12:00 and from 7 September 2003 at 6:00 to 8 September at 5:00.

## 7.0 REFERENCE REQUIREMENTS

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

## 8.0 REFERENCES

Ueno K., and A. P. Pokhrel, 2002: Intra-seasonal air temperature variation in the Nepal Himalayas, *Mausam*, **53**, 281-288.

Bollasina, M., L. Bertolani, and G. Tartari, 2002: Meteorological observations in the Khumbu Valley, Nepal Himalayas, 1994-1999, *Bull. Glac. Res.*, **19**, 1-11.

Ueno K., R. B. Kayastha, M. R. Chitrakar, O. R. Bajracharya, A. P. Pokhrel, H. Fujinami, T. Kadota, H. Iida, D. P. Manandhar, M. Hattori, T. Yasunari, and M. Nakawo, 2001: Meteorological observations during 1994-2000 at the Automatic Weather Station (GEN-AWS) in Khumbu region, Nepal Himalayas, *Bull. Glac. Res.*, **18**, 23-30.

Bertolani, L., M. Bollasina, and G. Tartari, 2000: Recent biennial variability of meteorological features in the Eastern Highland Himalayas, *Geophys. Res. Lett.*, **17**, 2185-2188.

Tartari, G., G. P. Verza, and L. Bertolani, 1999: Meteorological data at the Pyramid Laboratory. In: A. Lami, R. Mosello, G. Giussani (Eds), *Limnology of high altitude in the Khumbu Valley*, Nepal. Documenta Ist. Ital. Idrobiol.

Ueno K., H. Iida, H. Yabuki, K. Seko, A. Sakai, G. S. Lhakupa, R. B. Kayastha, A. P. Pokhrel, M. L. Shrestha, T. Yasunari, and M. Nakawo, 1996: Establishment of the GEN Automatic Weather Station (AWS) in Khumbu region, Nepal Himalayas, *Bull. Glac. Res.*, **14**, 13-22.