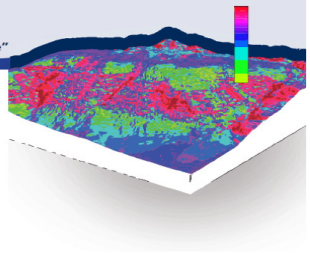
SHARE International Conference "Mountains: energy, water and food for life. The SHARE project: understanding the impacts of climate change"
Milan, May 2009



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# Ev-K2-CNR: 20 years of research activities in Himalaya and in the world

**Elisa Vuillermoz[1]**

**Daniela Milanesi[1] and Paolo Bonasoni[1,2]**

[1] *Ev-K2-CNR Committee*
[2] *CNR-Institute for Atmospheric Sciences and Climate*

Milano Comune di Milano Mobilità, Trasporti, Ambiente

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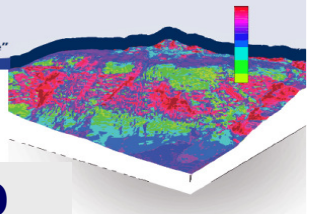

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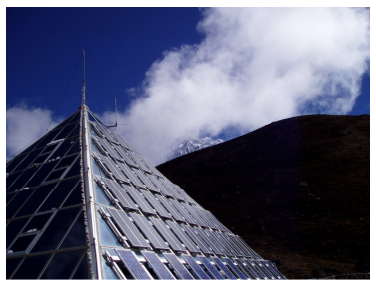
# Ev-K2-CNR – HISTORY AND BACKGROUND

**1987** *Project beginning* as geological and geodetic research campaign in the Himalayan (Everest) and Karakorum (K2) mountains, under the guidance of then 90-year old Prof. Ardito Desio in collaboration with the *Italian National Research Council*.

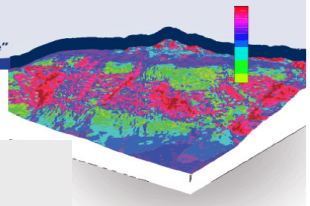
**1989** *Ev-K2-CNR Committee* as independent non-profit association dedicated to scientific and technological research, promotes and develops research activity in *Hindu Kush – Karakorum – Himalaya (HKKH) mountain region*.

**1990** Establishment of the *Pyramid International Laboratory-Observatory* at 5,050 m asl, Khumbu Valley, Sagarmatha National Park, at the base of the Nepali side of Everest thanks to an agreement between CNR and the *Nepal Academy of Science and Technology (NAST)*

**2007** Establishment of the *External Research Unit of the CNR Earth and Environmental Department* dedicated to supervision and execution of the '*High Altitude Scientific and Technological Research*' Program



"Comitato Ev-K2-CNR"



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# Ev-K2-CNR – RESEARCH ACTIVITIES

**1988** *EARTH SCIENCES*

**1989** *EARTH SCIENCES, ENVIRONMENTAL SCIENCES, MEDICINE AND PHYSIOLOGY*

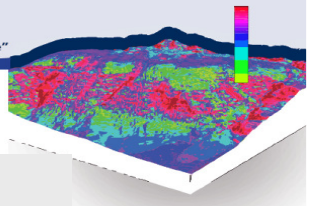
**1991-1999** *MEDICINE AND PHYSIOLOGY, ENVIRONMENTAL SCIENCES, EARTH SCIENCES, ANTHROPOLOGICAL SCIENCES, CLEAN TECHNOLOGIES*

**FROM 2000**

Increasingly *interdisciplinary approach* led to the development of *new integrated program* to progressively promote more management-oriented research to maximize benefits for socioeconomic development and environmental stewardship in the region:

-*HKKH Partnership* & *Karakorum Trust* for contributing to local sustainable development by providing specialized scientific knowledge to the benefit of decision makers and protected areas management

-*SHARE* to foster understanding and successful management of the impacts of climate change through long term research and monitoring of environmental processes in high altitude regions



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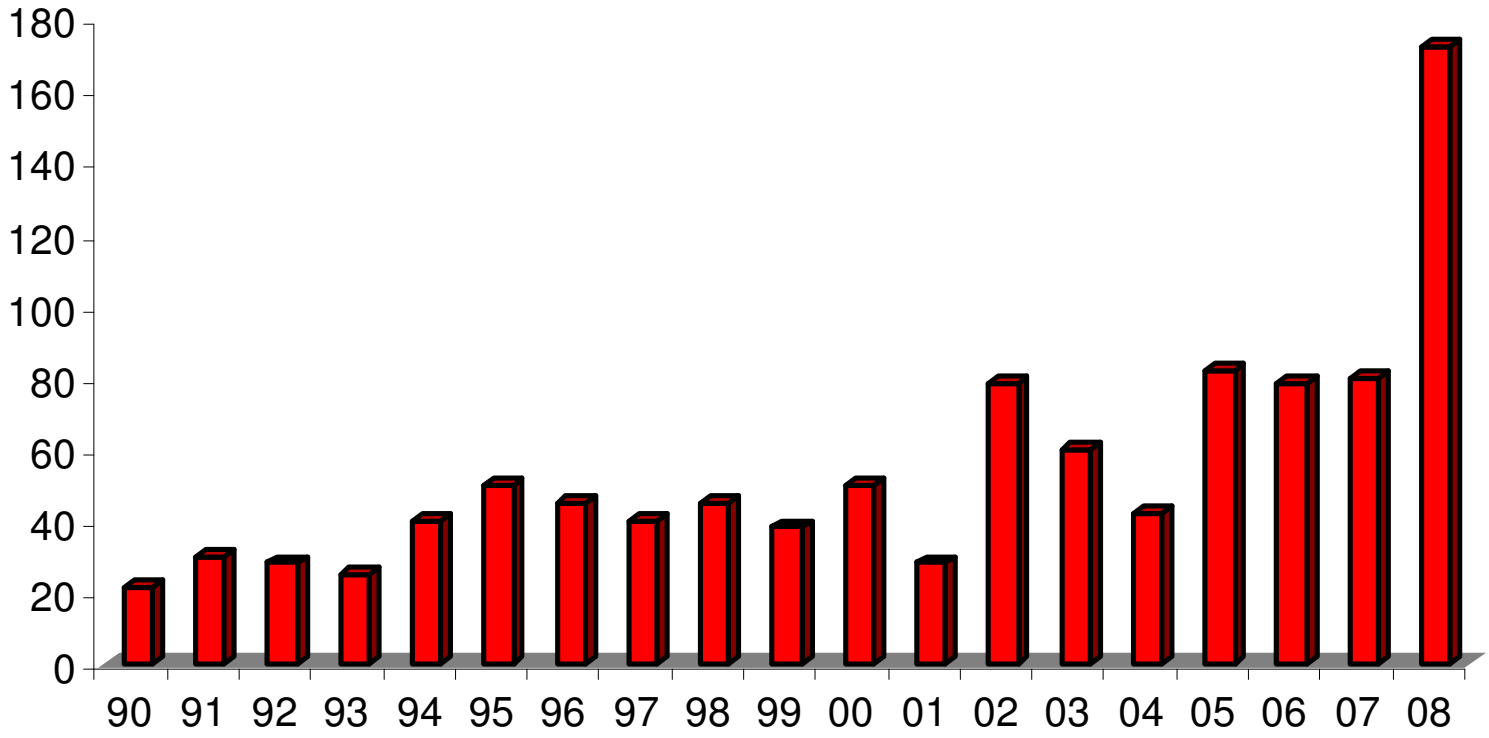
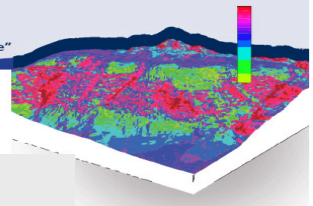
# Ev-K2-CNR – RESULTS

To date, over 520 research expeditions have been carried out at the Pyramid Laboratory, seeing the participation of 220 researchers from 143 different institutions, such as CNR and several Italian and International universities and research centres.




*Number of researchers and technicians for year of activity*



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# Ev-K2-CNR – RESULTS

| | Medical-physiological sciences | Environmental Sciences | Earth Sciences | Clean technologies and environmental management systems | Ev-K²-CNR Multi-disciplinary Project | Total |
|---|---|---|---|---|---|---|
| **Papers published in journals with editorial policy** | 75 | 80 | 36 | 0 | 7 | **198** |
| **Papers published in other journals** | 13 | 11 | 19 | 2 | 5 | **50** |
| **Chapters in books** | 9 | 19 | 12 | 0 | 2 | **42** |
| **Books** | 1 | 1 | 0 | 1 | 1 | **4** |
| **Proceedings of National and International Congresses** | 26 | 43 | 36 | 5 | 6 | **116** |
| **Abstracts, posters Communications presented at National and International Congresses** | 177 | 142 | 80 | 2 | 5 | **406** |
| | | | | | | **816** |

"Comitato Ev-K2

*There are over 800 publications concerning research carried out in the framework of the Ev-K2-CNR Project*

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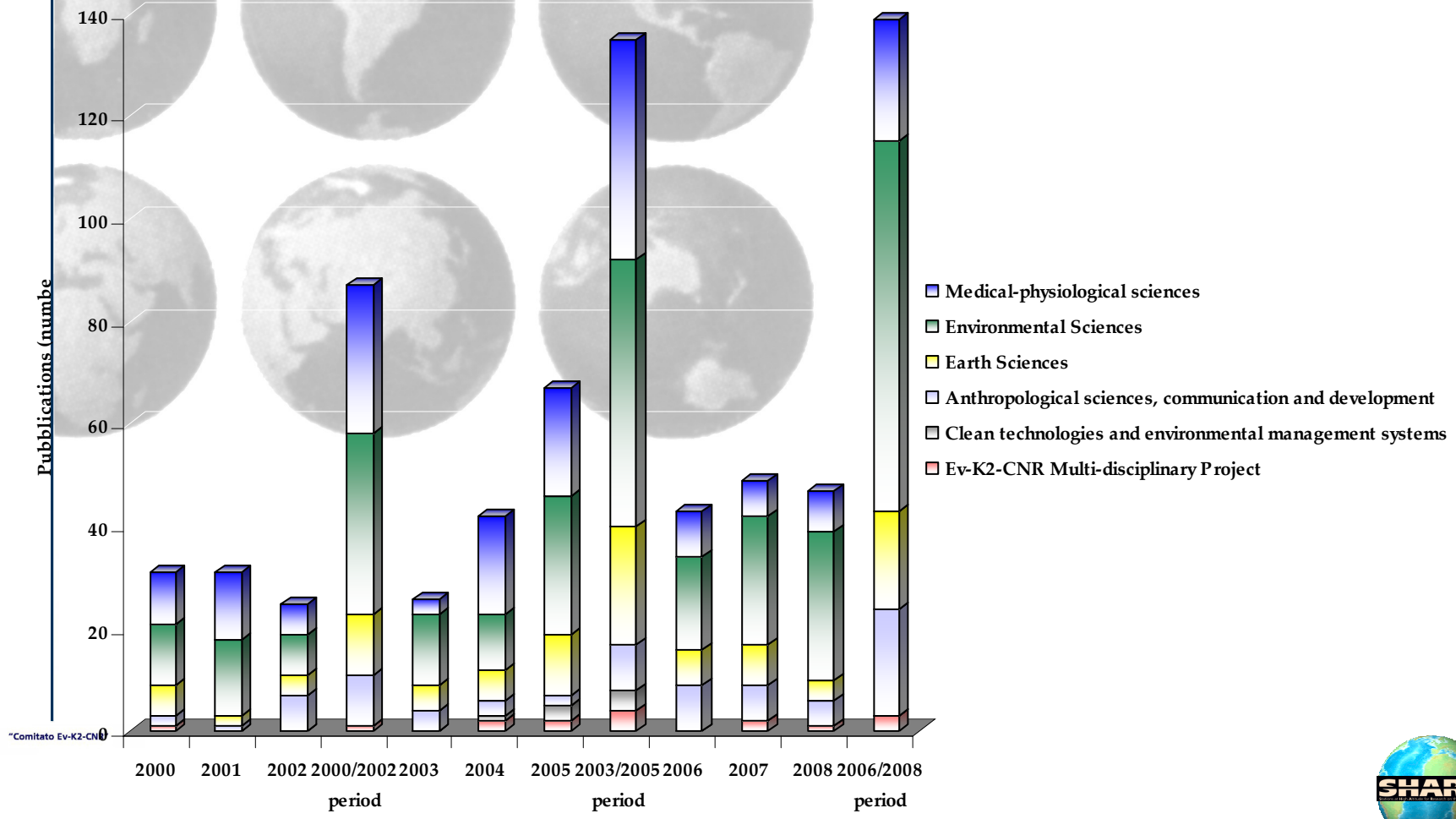
# Ev-K2-CNR – RESULTS

## Publications for topic 2000-2008



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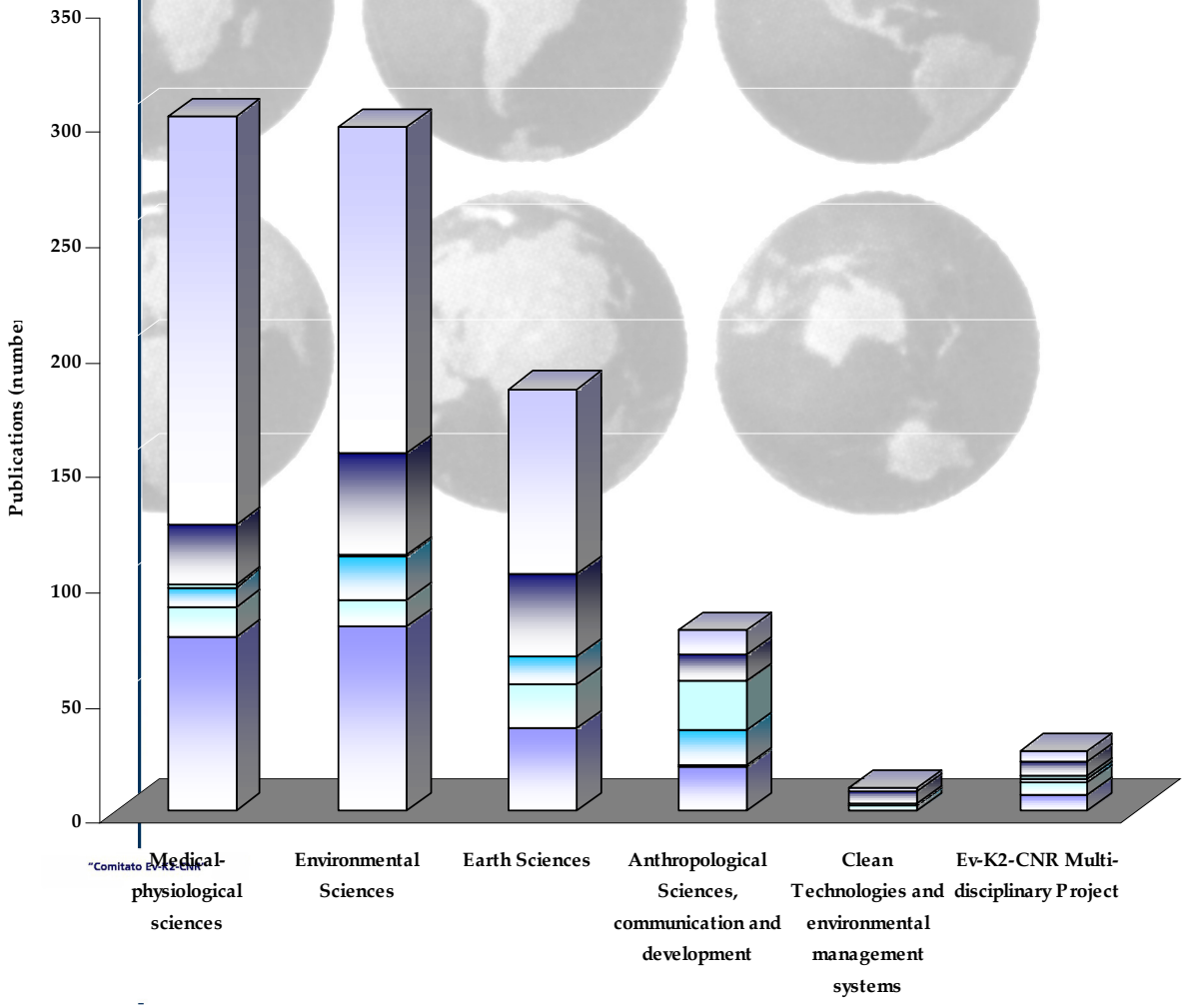
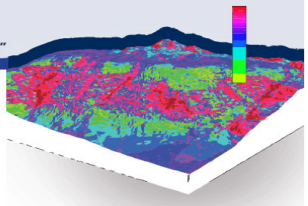
# Ev-K2-CNR – RESULTS

## Publications for topic and typology





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# Ev-K2-CNR TRAINING ACTIVITIES

***Training course for Nepalese Pyramid Laboratory Technicians.*** Year: 2000, 2001, 2002, 2003, 2004, 2005,2006,2007, 2008, 2009 (ongoing)

***Training course for Pakistan Representative Office staff.*** Year: 2005,2006,2007, 2008, 2009 (ongoing)

***Training course for Pakistan Karakorum International University graduates on gemmologial analysis and gemstones cutting*** Year: 2007, 2008

***Training course in rescue techniques for Sherpa guides .*** Year: 2000, 2002, 2005

***Training course for Sagarmatha National Park staff for the management of Automatic Weather Station situated at Namche Bazar Headquarters.*** Year: 2004.

***Training course for DHM , PMD, UMD staff for the management of Automatic Weather Stations.*** Year: 2006,2007,2008,2009

***Training course for Kathmandu University and ICIMOD staff for the management of Atmospheric Observatory.*** Year: 2009

***Training course for environmental data elaboration and analysis and analytical laboratory management.*** Year: 2008, 2009 (ongoing)

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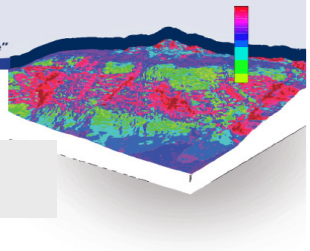
***Advanced course in mountain medicine***. Year: 2005.



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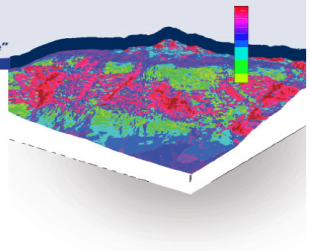
# MONITORING NETWORK

| Installation site | Nation/Continent | | Station | Characteristics | Altitude (m a.s.l.) |
|---|---|---|---|---|---|
| Mt. Cimone (Northern Appennines) | Italy | Europe | "Ottavio Vittori" Research Station: | Atmospheric monitoring station | 2,165 |
| Forni glacier (Central Alps, Valtellina) | Italy | Europe | - | Automatic weather station | 2,669 |
| Dosdè Glacier (Central Alps, Valtellina) | Italy | Europe | - | Automatic weather station | 2.740 |
| Gigante Glacier (Mt. Bianco, Alps) | Italy | Europe | - | Automatic weather station | 3.500 |
| Pyramid Laboratory Observatory (Lobuche, Khumbu Valley) | Nepal | Asia | Nepal Climate Observatory-Pyramid (ABC-Pyramid) | Atmospheric monitoring station | 5,079 |
| | | | GPS Master | GPS station | 5,050 |
| | | | AWS0, AWS1; AWS CEOP | Automatic weather stations | 5,050 |
| | | | DORIS | Orbitographic station | 5,050 |
| Pheriche (Khumbu Valley) | Nepal | Asia | AWS2 | Automatic weather station | 4,258 |
| Namche Bazaar (Sagarmatha National Park Head Quarter, Khumbu Valley) | Nepal | Asia | AWS NP | Automatic weather station | 3,560 |
| Lukla (Khumbu Valley) | Nepal | Asia | AWS3 | Automatic weather station | 2,660 |
| Kala Patthar (Khumbu Valley) | Nepal | Asia | AWS-KP | Automatic weather station | 5,600 |
| Mt Everest South Col | Nepal | Asia | AWS-CS | Automatic weather station | 8,000 |
| Urdukas (Baltoro glacier, Baltistan) | Pakistan | Asia | AWS PK1 | Automatic weather station | 3,926 |
| Askole (Baltistan, Pakistan) | Pakistan | Asia | AWS PK2 | Automatic weather station | 3,015 |
| Mt. Rwenzori (Elena Glacier) | Uganda | Africa | AWS RW | Automatic weather station | 4,700 |




ABC
NASA
GCW
EOP
EUSAAR
European Supersites for Atmospheric Aerosol Research
SHARE



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# K2-2004 50 YEARS LATER

Alpine – scientific Project involving 33 climbers and 49 researchers

Realization of 9 research projects related to 5 subjects : medicine and physiology, geodesy, glaciology, environmental sciences, eco-compatibility

- Everest Northern slope (April-May 2004) : 34 researchers
- K2 Southern slope (June-July 2004) : 17 researchers
- K2 Northern slope (June-July 2004) : 3 researchers

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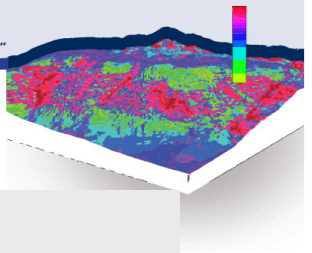
K2 1954 - 2004 IL SUCCESSO ITALIANO CONTINUA



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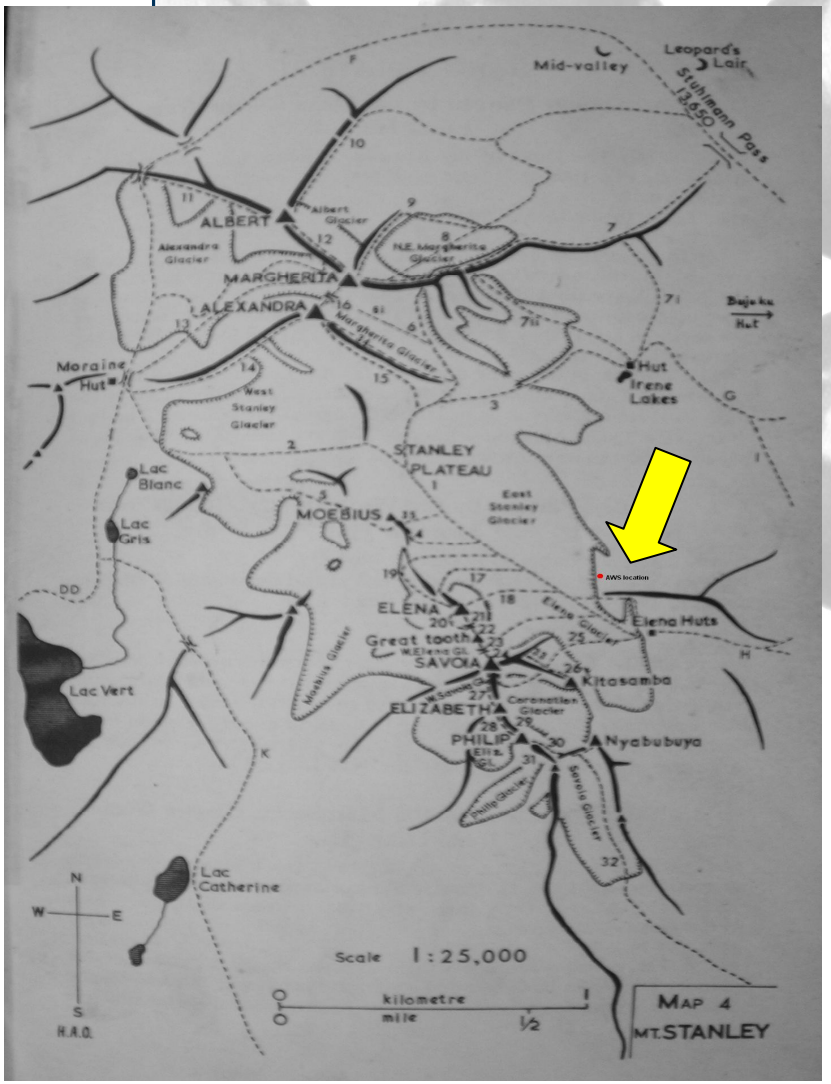
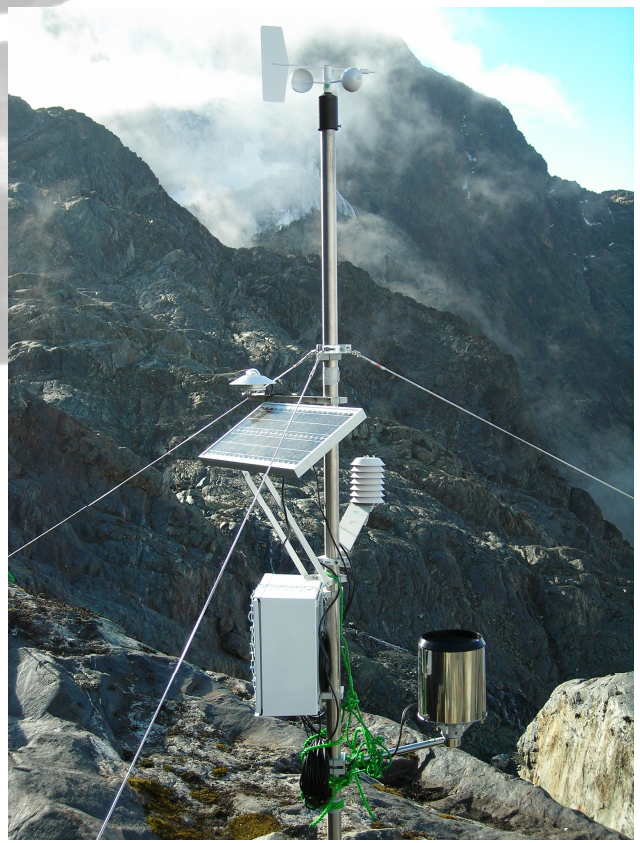
# 2006 - SHARE STATION IN UGANDA




## Mt. Ruwenzori – Elena Glacier

**Lat N : 0° 22' 34.55"**
**Long E: 29° 52' 43.24"**
**Altitude: 4,750 m asl**



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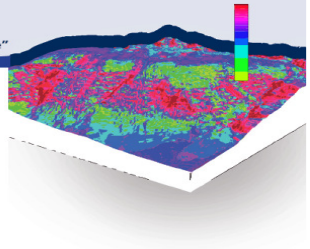


# SHARE EVEREST

THE GLOBAL WARMING SENSOR


- AWS installation at Kala-Pattar (5.600 m asl)
- AWS installation at Mt. Everest South Col (8.000 m asl)

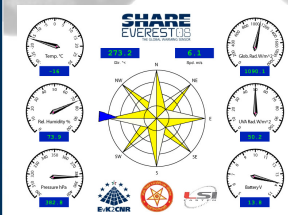
Continuos measurements

- temperature (° C)
- humidity (%)
- pressure (hPa)
- wind speed (m/s) and direction (° )
- global solar radiation (W/m2)
- UVA radiation

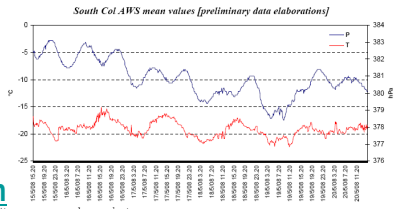

AWS Kala - Pattar


AWS South-Col

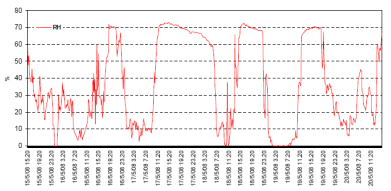

AWS South-Col

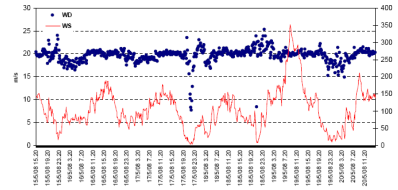


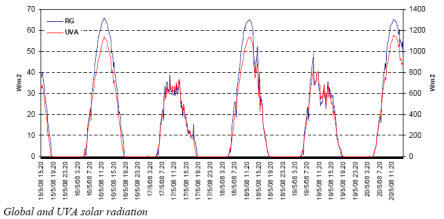
www.share-everest.com


South Col AWS mean values [preliminary data elaborations]

Air temperature and atmospheric pressure


Relative humidity


Wind speed and direction


Global and UVA solar radiation

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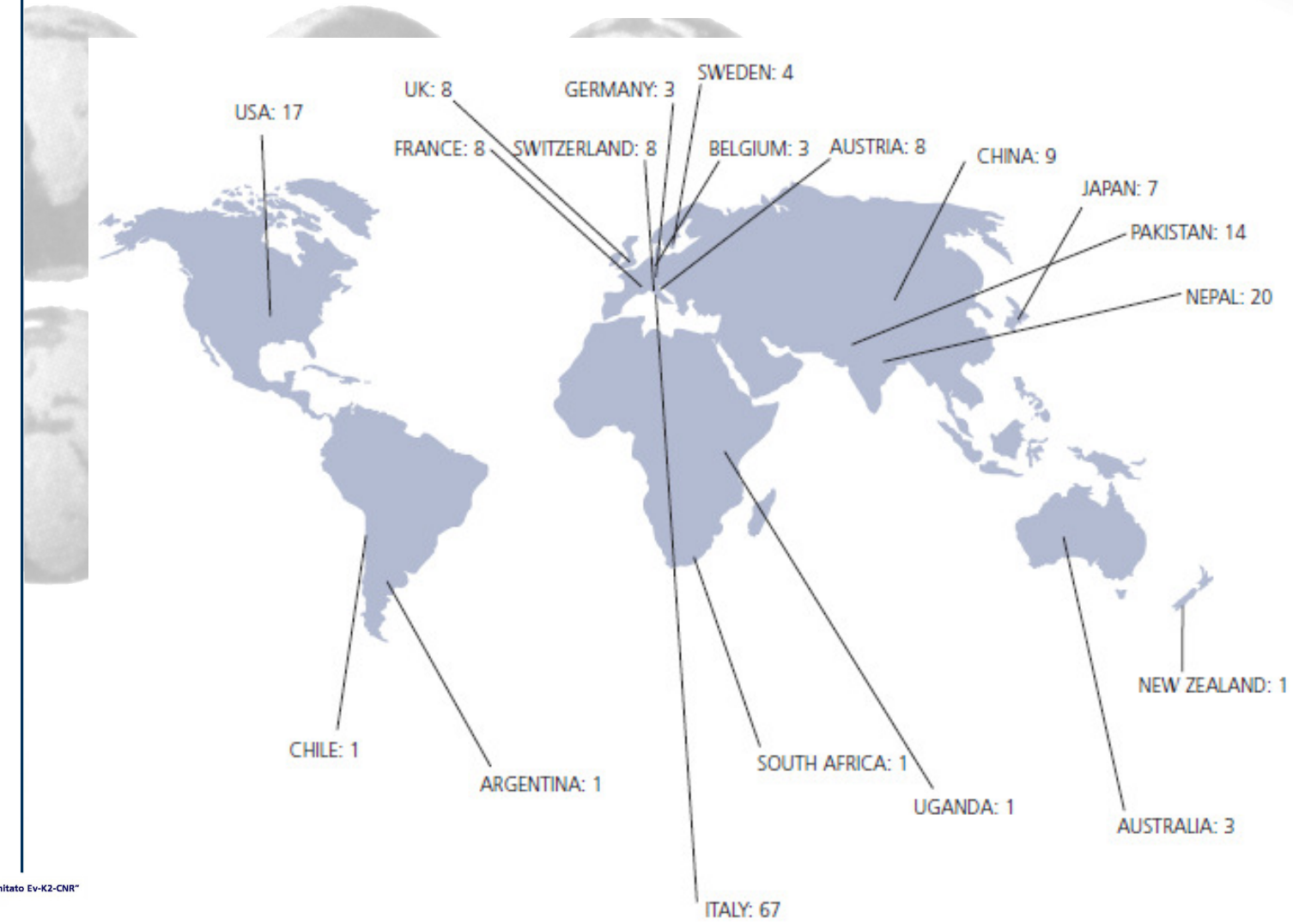
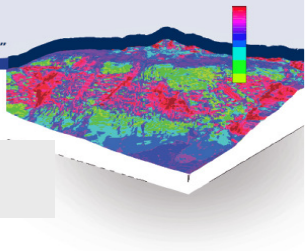
# Ev-K2-CNR – COLLABORATIONS




"Comitato Ev-K2-CNR"

*Since 1990, over 180 national and international institutes have collaborated with Ev-K2-CNR*



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# Ev-K2-CNR – COLLABORATIONS

| ENTE | OGGETTO | ACCORDO | DURATA | ANNO |
|---|---|---|---|---|
| **ITALIA** | | | | |
| *CNR – Istituto di Ricerca sulle Acque* | Attività di ricerca in aeree remote | Convenzione | Pluriennale | 2006 |
| *CNR – Istituto di Scienze dell'Atmosfera e del clima* | Partecipazione al progetto SHARE | Convezione operativa | Pluriennale | 2008 |
| *CNR – Istituto per lo studio degli Ecosistemi* | Attività di ricerca limnologiche e paleo limnologiche in aree remote di alta quota | Convezione operativa | Pluriennale | 2008 |
| *Università degli Studi di Milano – Bicocca* | Svolgimento di Studi e ricerche volti all'innovazione scientifica e tecnologica | Accordo Quadro | Pluriennale | 2007 |
| *Università degli Studi di Milano – Facoltà di Agraria* | Attività di collaborazione scientifica e supporto alla didattica | Convenzione Quadro | Pluriennale | 2007 |
| *Associazione di Protezione Ambientale Umana Dimora* | Sviluppo di ricerche scientifiche nell'area del Parco Nazionale del Ruwenzori (Uganda) | Convenzione | Pluriennale | 2008 |
| *Università degli Studi di Milano – Dipartimento di Scienze della Terra "Ardito Desio"* | Attività di ricerca nel settore Geografia fisica e Geomorfologia | Convezione per collaborazione scientifica | in progress | |
| **NEPAL** | | | | |
| *DHM – Department of Hydrology and Meteorology (Government of Nepal)* | Gestione rete di Stazioni Meteorologiche di alta quota | Memorandum of Understanding | Quinquennale | 2008 |
| **PAKISTAN** | | | | |
| *PMD – Pakistan Meteorological Department* | Gestione rete di Stazioni Meteorologiche di alta quota | Memorandum of Understanding | Biennale | 2008 |
| **UGANDA** | | | | |
| *UMD – Ugandan Meteorological Department* | Gestione rete di Stazioni Meteorologiche di alta quota | Memorandum of Understanding | in progress | |

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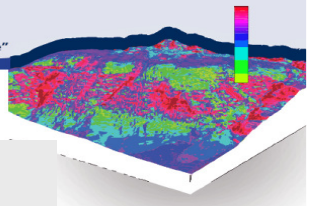

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# SHARE - PROJECT STRUCTURE

| ACTIVITY SECTOR | WORK PACKAGE | | THEMATIC AREA |
|---|---|---|---|
| **Scientific Research and Climate**<br><br>**Reference Person**<br>*P. Bonasoni*<br>*(CNR-ISAC)* | WP 1 | Integrated Project for climatic, environmental and geophysical monitoring, at local, regional and global scale:<br><br>Asia (Himalaya-Karakorum)<br>Africa (Ruwenzori)<br>Europe (Alps and Apennines)<br>South America (Cordillera Real) | *WP 1.1* Atmosphere<br>*WP 1.2* Glaciology<br>*WP 1.3* Energy and water cycle<br>*WP 1.4* Limnology<br>*WP 1.5* Biodiversity and natural resources<br>*WP 1.6* Medicine |
| **Technological Research and Climate**<br><br>**Reference Person**<br>*P. Laj*<br>*(CNRS)* | WP 2 | Scientific research and industry for the development of a state-of-the-art technological system in the field of environmental monitoring in mountain areas. | |
| **Information System**<br><br>**Reference Person**<br>*M.T. Melis*<br>*(University of Cagliari)* | WP 3 | Multidisciplinary Information System concerning scientific and technological research activities in mountain areas, to the benefit of government and inter-government scientific agencies. | |
| **Capacity building**<br><br>**Reference Person**<br>*F. Salerno*<br>*(CNR-IRSA)* | WP 4 | program supporting decision-making processes, at governmental level, in the environmental field; transfer of skills and technologies in order to produce and assure a sustainable development; technology transfer, business promotion and institutional offer system. | |

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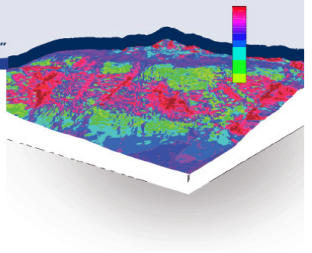

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# THANK YOU FOR YOUR ATTENTION

Milano
Comune di Milano
Mobilità, Trasporti, Ambiente

UNEP

Mountain Partnership

"Comitato Ev-K2-CNR"

EvK2CNR

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