FP6 BEOBAL Project

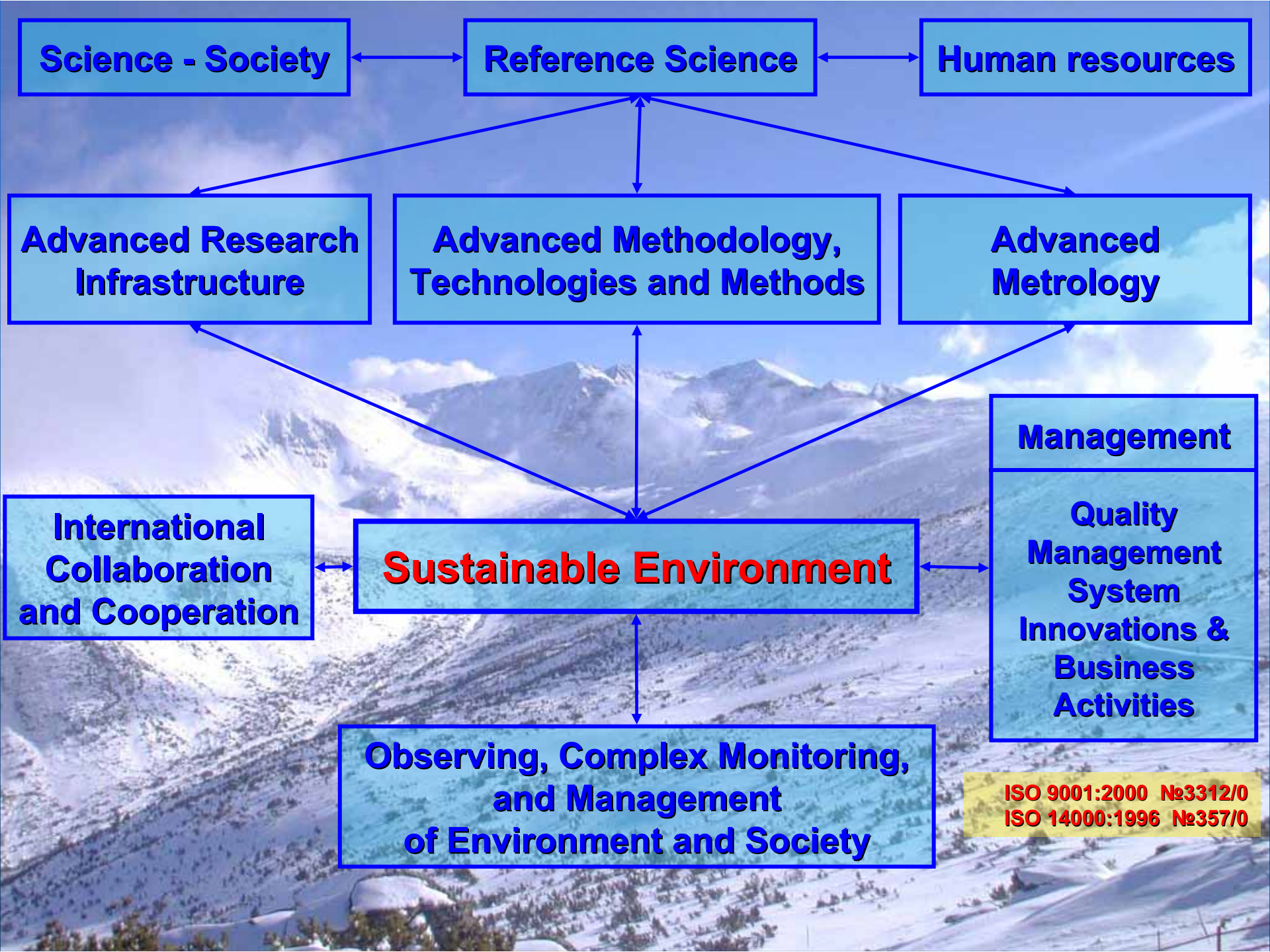
BEO Centre of Excellence Research Capacity Improvement for Sustainable Environment and Advanced Integration into ERA

BEOBAL after 2 years

Abstract

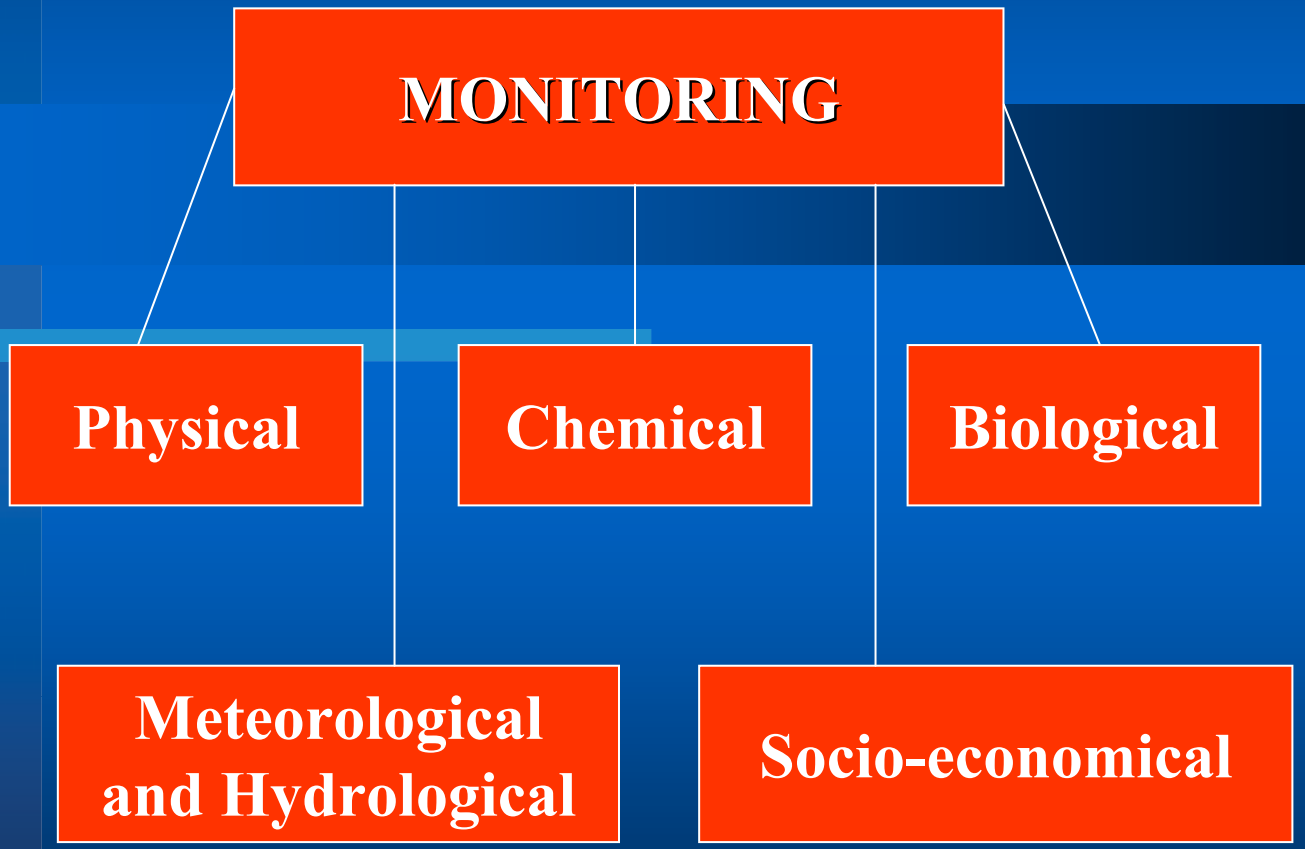
Reinforcement of the BEO Centre of Excellence Research Capacities, and by this way the respective S&T potential of INRNE and Bulgaria for advanced **Sustainable Environment** studies, devoted to the main Global change and ecosystems observing problems, using sophisticated information technologies and advanced **Integration in ERA**, in their institutional, national, regional and European aspects

- **Networking, International Collaboration & Integration and Reinforced Research Infrastructure**
- **Improvement of Human Resources**
- **Advanced Science – Society Interactions**
- **Advanced Management**


Science - Society
Reference Science
Human resources
Advanced Research Infrastructure
Advanced Methodology, Technologies and Methods
Advanced Metrology
Management
Quality Management System Innovations & Business Activities
International Collaboration and Cooperation
Sustainable Environment
Observing, Complex Monitoring, and Management of Environment and Society
ISO 9001:2000 №3312/0
ISO 14000:1996 №357/0

Complex Monitoring and Management of Environment

INRNE



HIMONTONET
FP5 project

Director

Scientific council

Head

Expert Councils

BEO Centre of Excellence

Laboratories and Scientific Experimental Facilities

- BEO Moussala and BEO INRNE
- Radio Analytical Methods
- Radio Chemistry & Pharmacy
- Radioecology
- X-ray - Fluorescent Analysis
- Neutron Generator
- Neutron Data
- Control Laboratory of Radiation Protection
- Information Technologies
- Department of European Projects

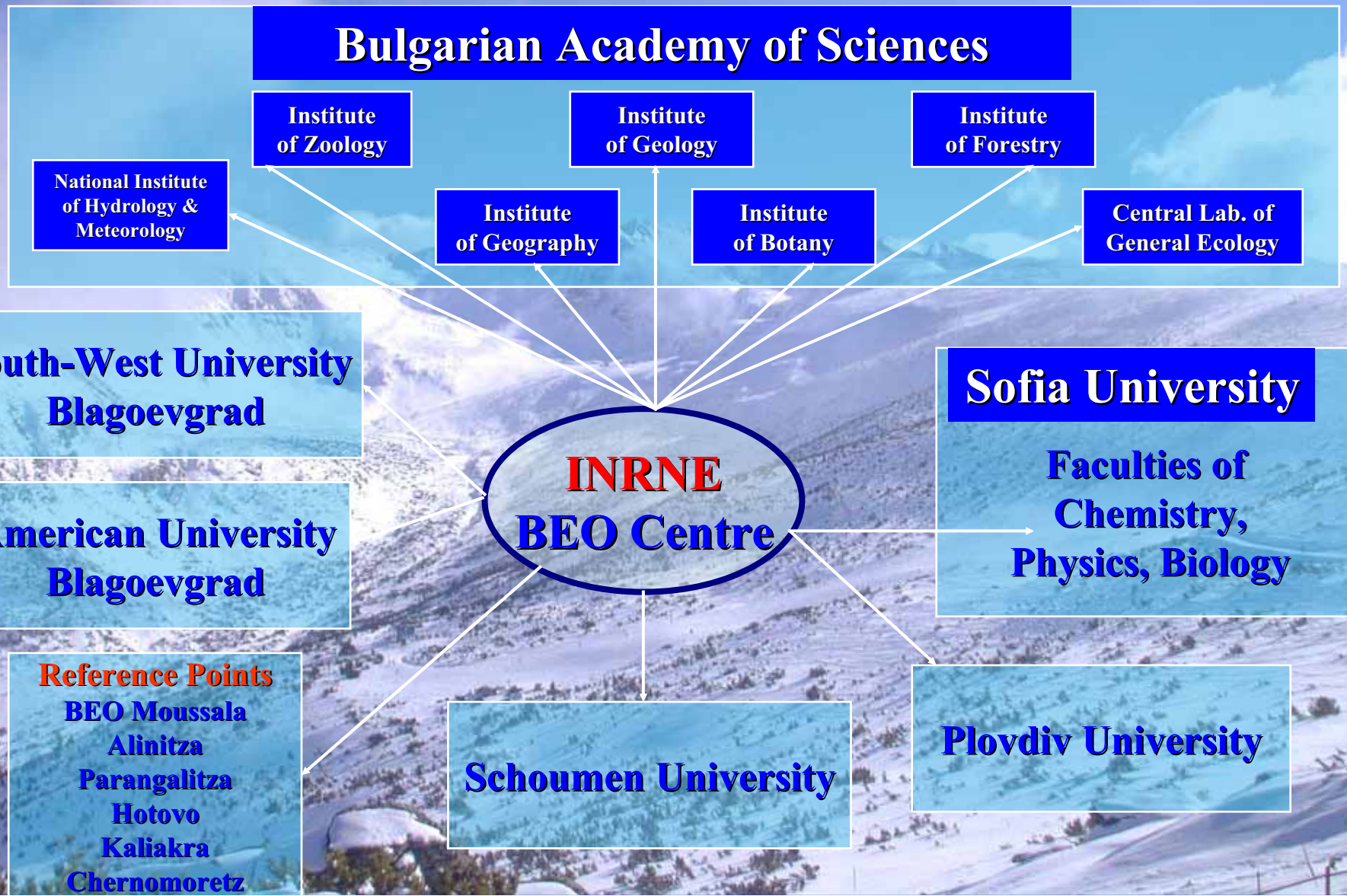
- Radioecology &Environment
- Nuclear Methods
- Neutron & Reactor Physics

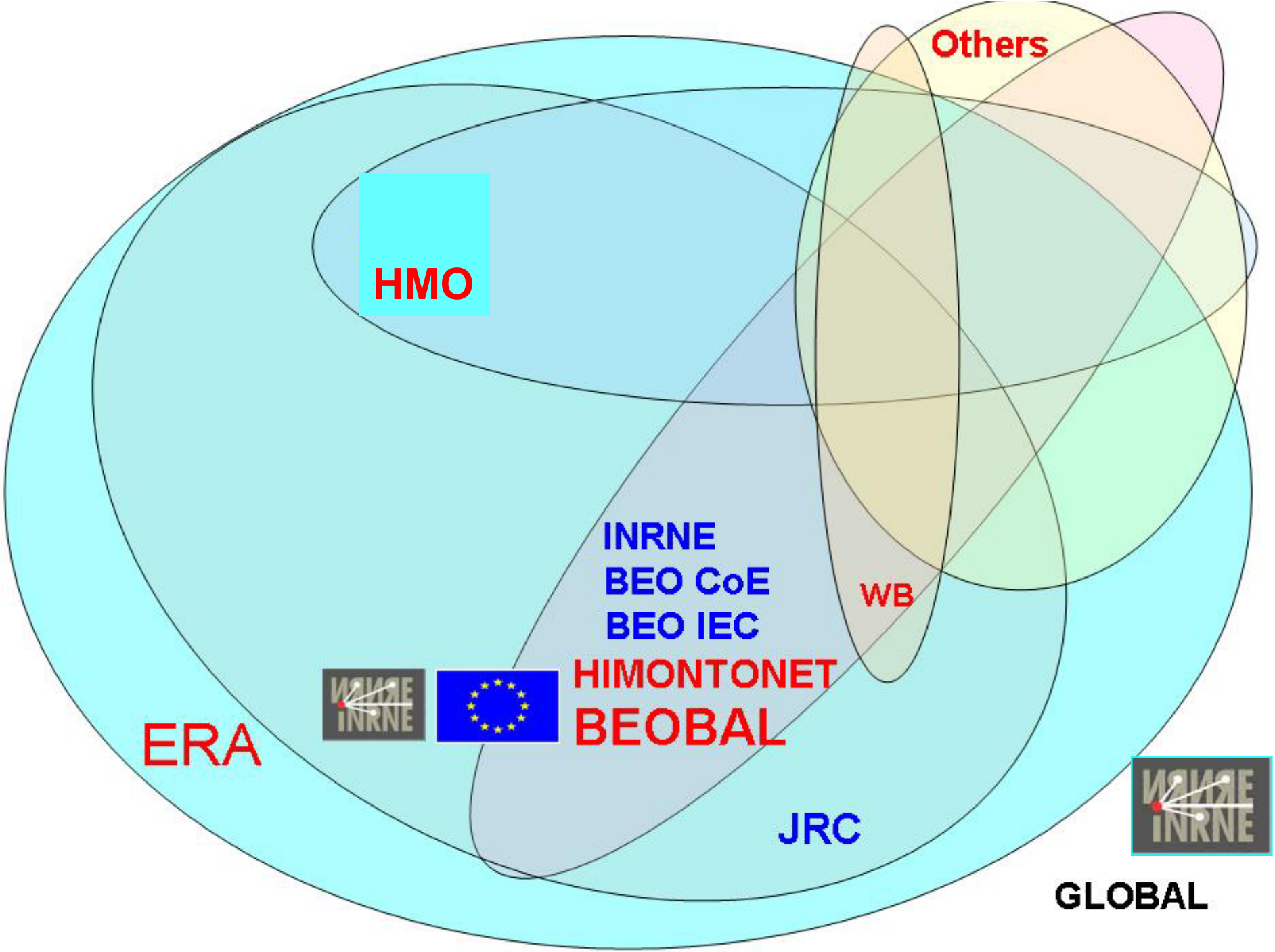
BEO Mission

Observing, complex monitoring and studying of global change, climate, aerospace and terrestrial environment, natural hazards and technogenic risks

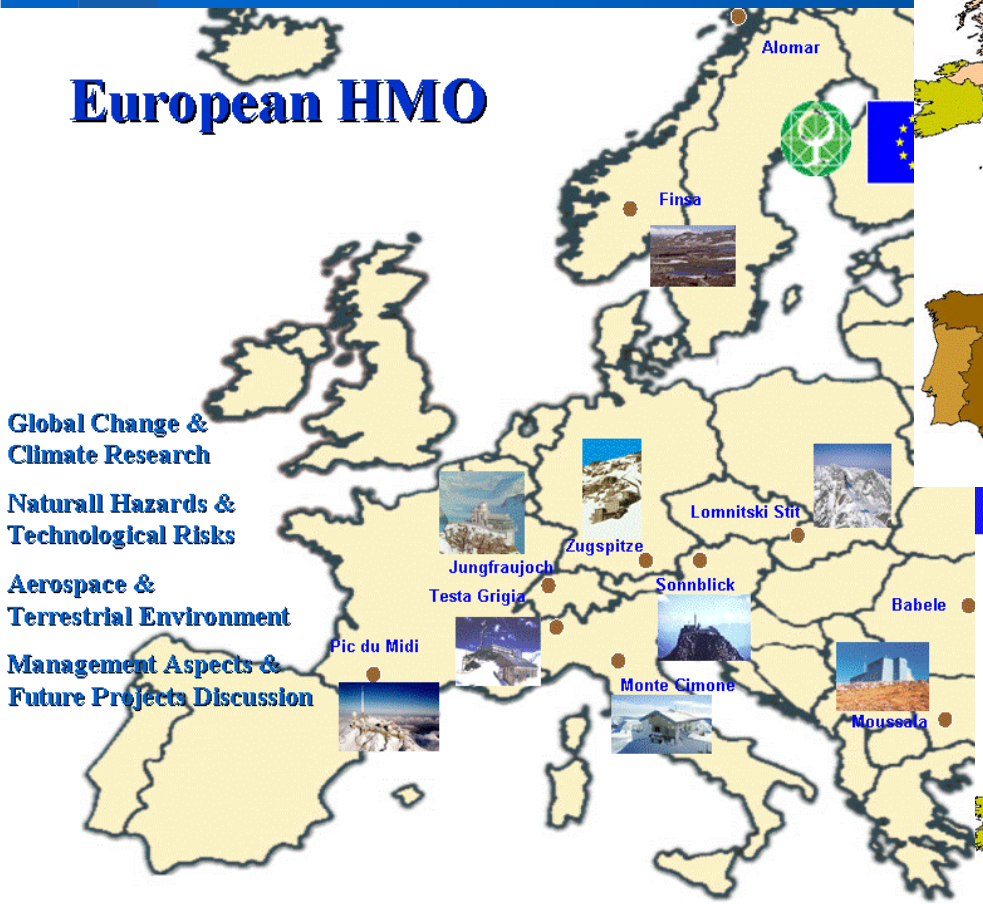
BEO IEC

BEO Integrated Environmental Centre




Others
HMO
INRNE
BEO CoE
BEO IEC
WB
HIMONTONET
BEOBAL
ERA
JRC
GLOBAL

European HMO



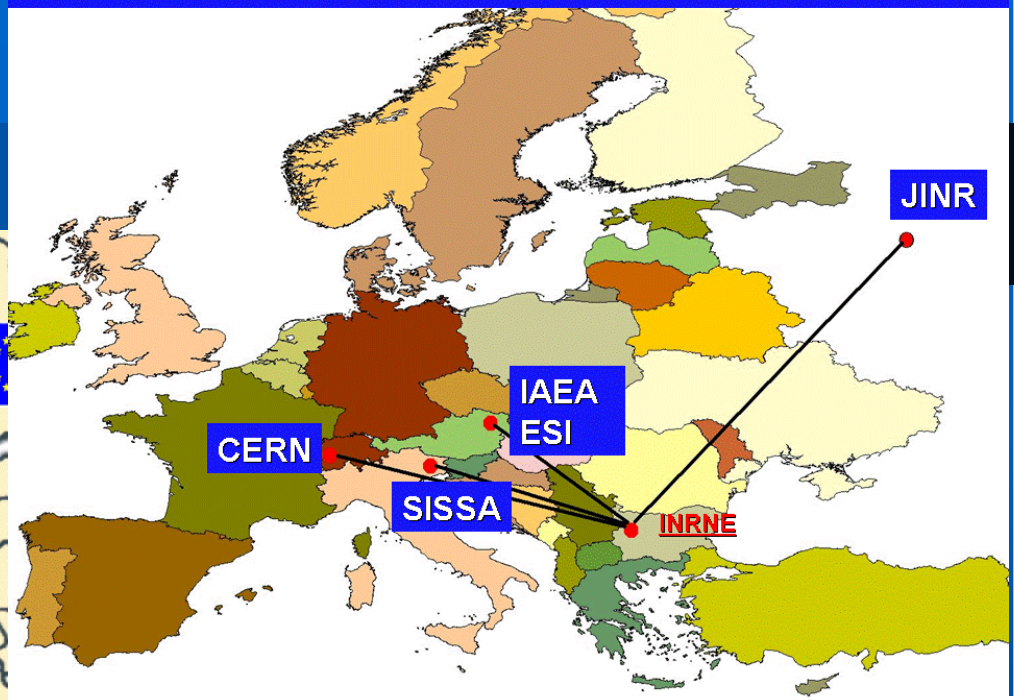
Global Change & Climate Research

Naturall Hazards & Technological Risks

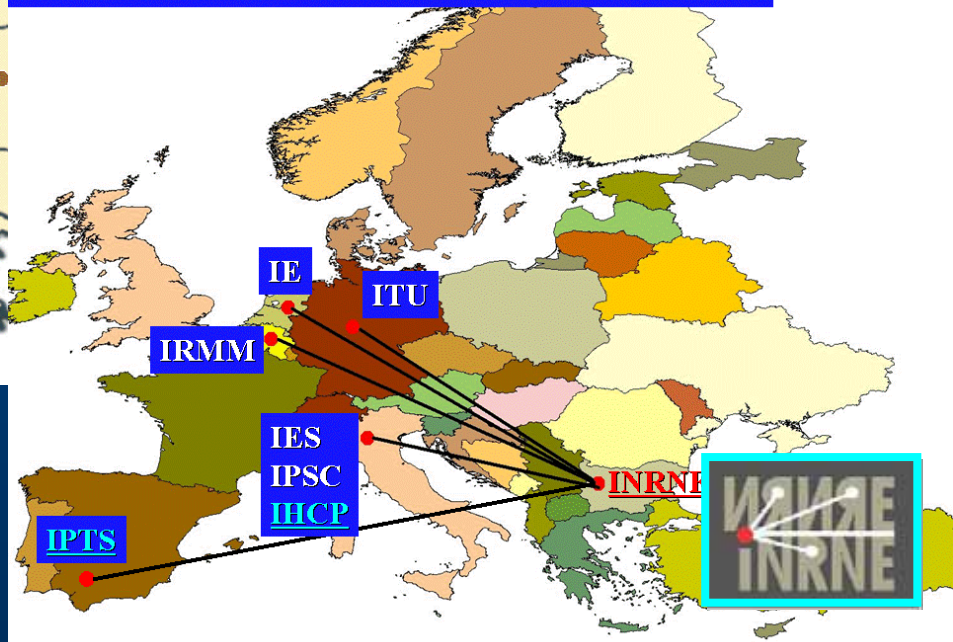
Aerospace & Terrestrial Environment

Management Aspects & Future Projects Discussion

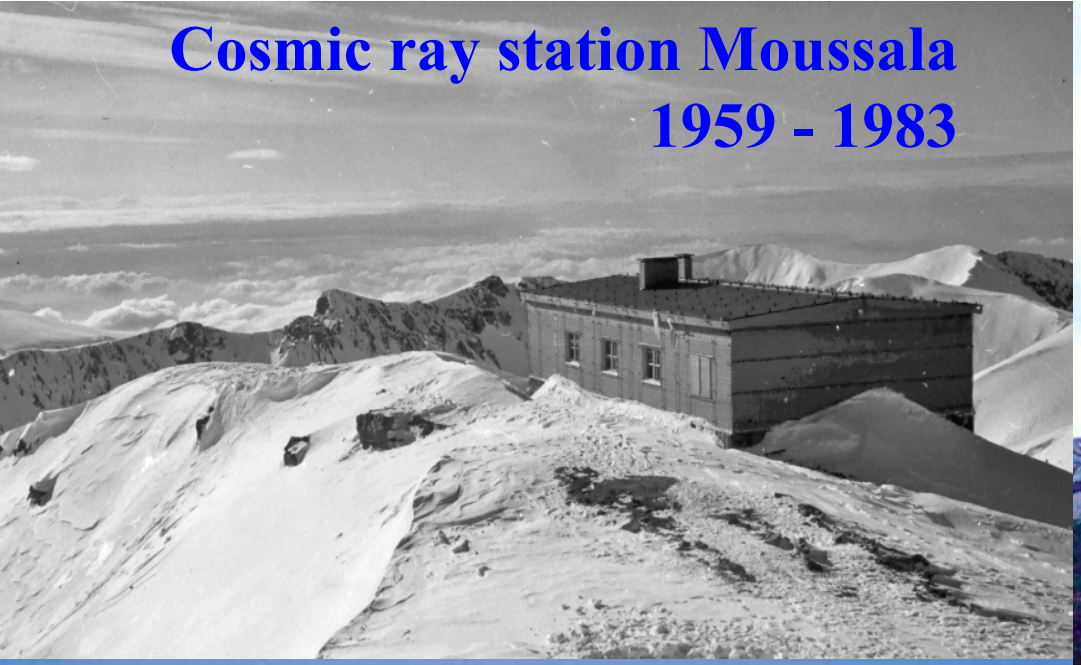
INRNE – International Scientific Centres Connections



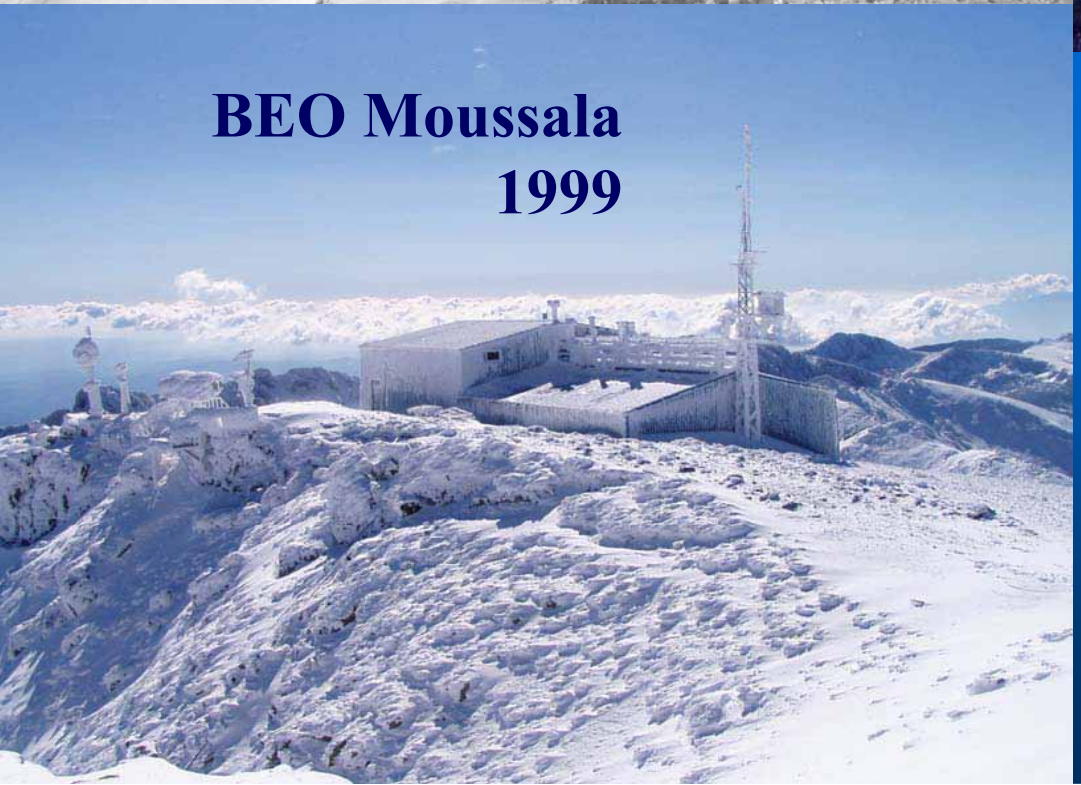
INRNE – JRC Scientific Connections



Cosmic ray station Moussala
1959 - 1983



BEO Moussala
1999



Historical dates

1932 - Inauguration of Meteorological Station on peak Moussala.

1959 – Opening of Cosmic Ray Station on peak Moussala.

1983 - Destroy of Cosmic Ray Station (fired).

1993 - Start of Bulgarian-French project OM2 for monitoring and management of high mountain ecosystems.

1999 – Inauguration of Basic Environmental Observatory (BEO) – Moussala.

2002 - Creation of BEO Centre of Excellence

2002-2003 – HIMONTONET and NUSES FP5 projects

2005 – BEOBAL FP6 project

The improvement of the Mesuring Equipment and Research at BEO

BEO Moussala

Meteorological Observing System

Automatic meteorological station (Vaisala)

Air Quality Monitoring System for trace and greenhouse gases

- O3 Analyzer
- NOx Analyzer
- CO Analyzer
- SOx Analyzer
- CO2 Analyzer

Aerosols Measuring System

- Cascade Impactor
- BAM for PM2,5 and PM10 Measurements
- Integrated nephelometer

BEO Moussala

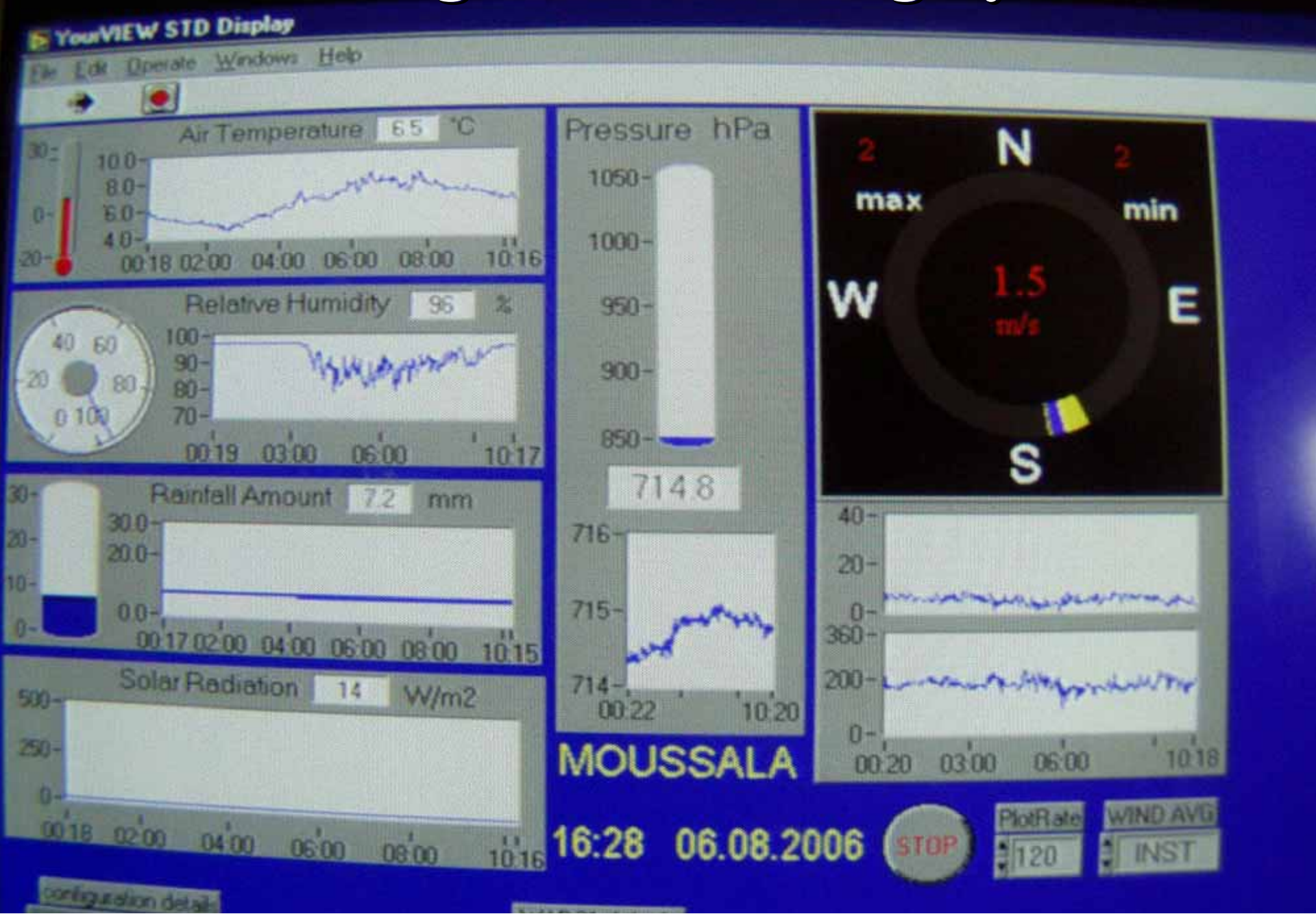
Radiological Control System

- Gamma Background Technidata Detector
- Gamma Background Safimo Detector
- Harwell Neutron Detector
- Polyethylene sphere with lead as a neutron breeder
- High temperature semiconductor spectrometer
- Radon Analyzer
- Alpha Spectrometer

Space Weather Research

- Active neutron detector based on SNM 15 detectors
- Muon telescope
- Lulin device
- Cerenkov telescope

Meteorological Observing System



New wind sensor

Vaissala meteo

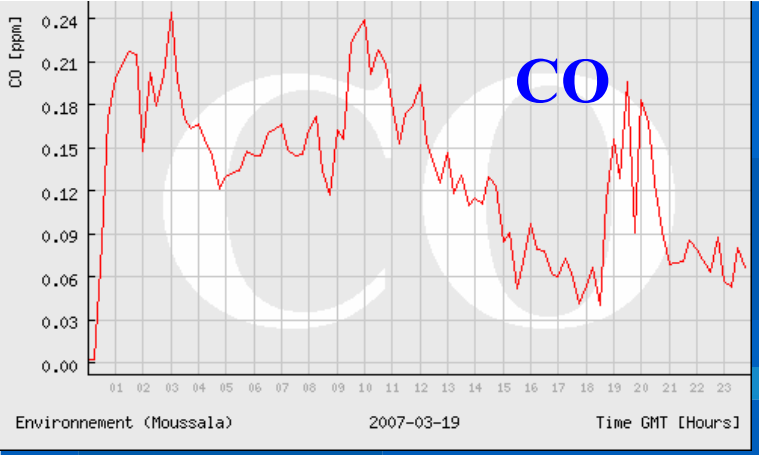
Precipitation

UV-AB

clouds

Lightning-conductor System

Gas Analisers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CO [ppm]
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0.21
0.18
0.15
0.12
0.09
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0.03
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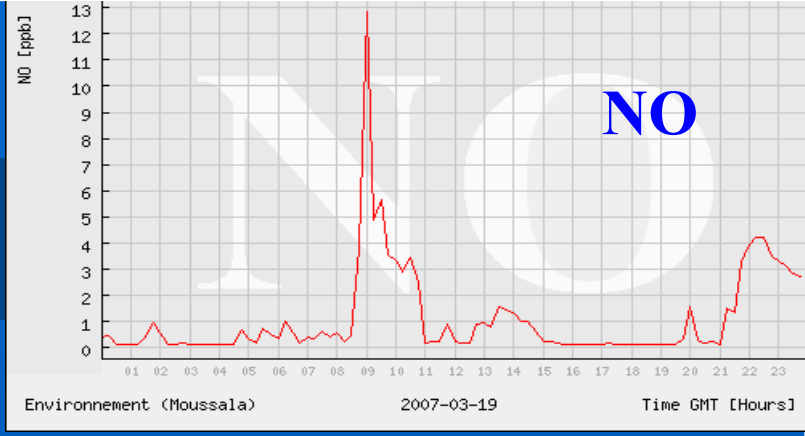
01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Environnement (Moussala)
2007-03-19
Time GMT [Hours]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NO [ppb]
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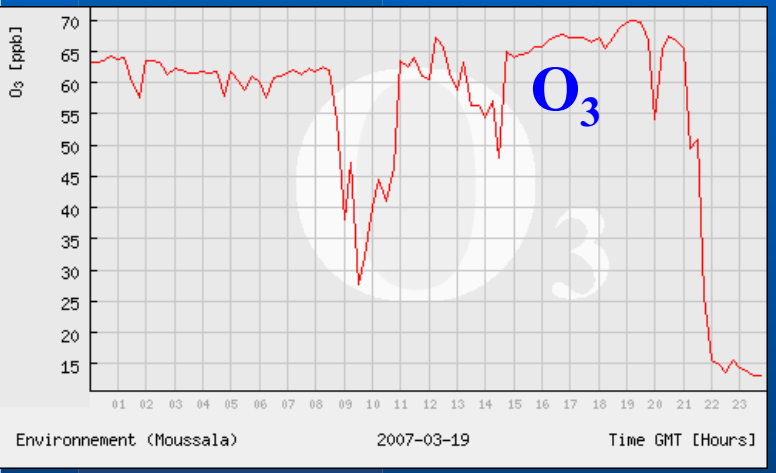
Environnement (Moussala)
2007-03-19
Time GMT [Hours]


O3
O3 [ppb]
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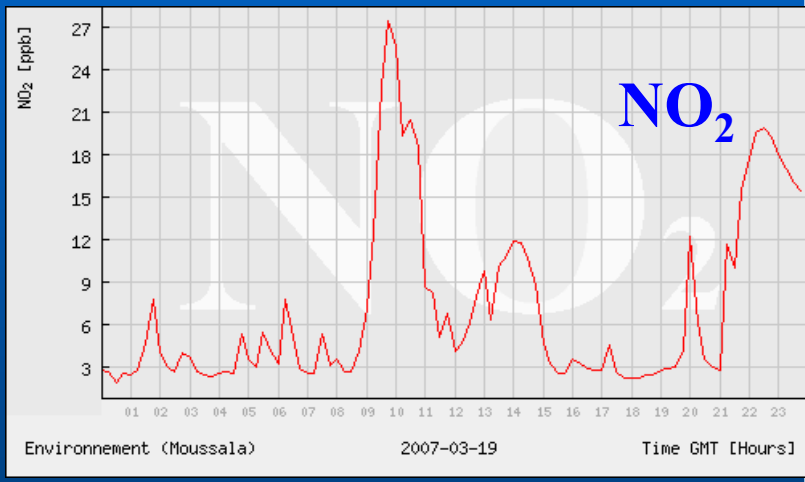
Environnement (Moussala)
2007-03-19
Time GMT [Hours]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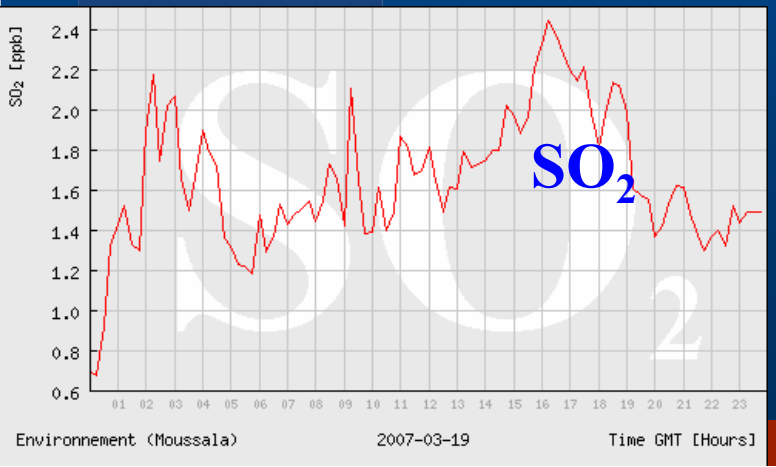
Environnement (Moussala)
2007-03-19
Time GMT [Hours]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SO2 [ppb]
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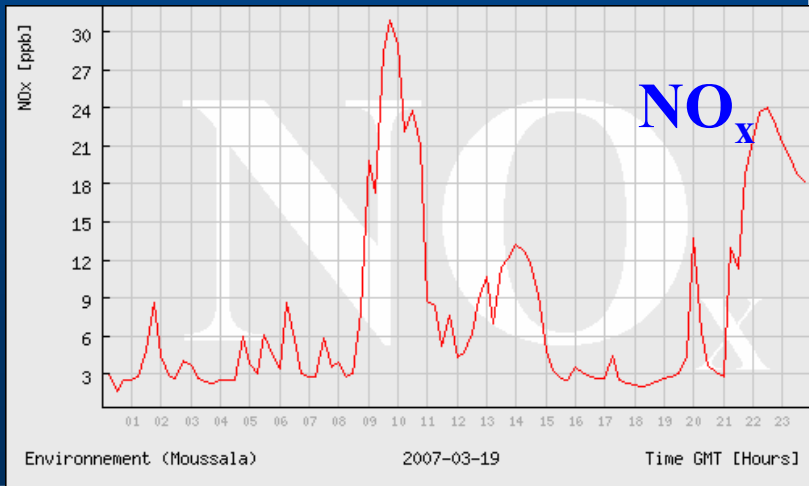
Environnement (Moussala)
2007-03-19
Time GMT [Hours]


NOx
NOx [ppb]
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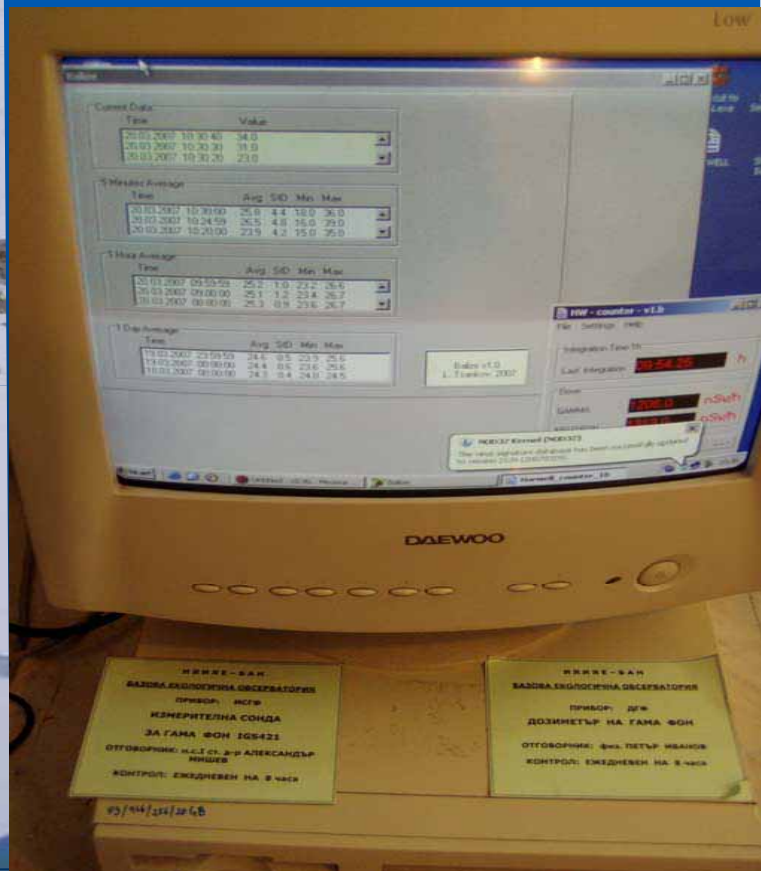
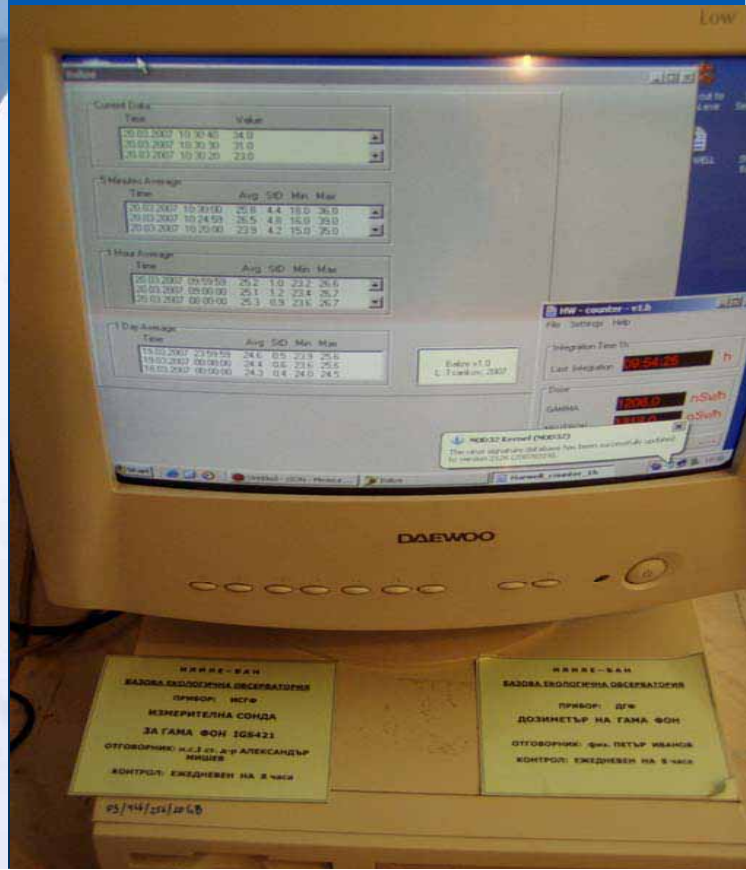
01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Environnement (Moussala)
2007-03-19
Time GMT [Hours]

Aerosols Measuring System
Integrated nephelometer

Gamma Background Technidata Detector



Gamma Background Safimo Detector



Harwell Neutron Detector

Passive neutron detector

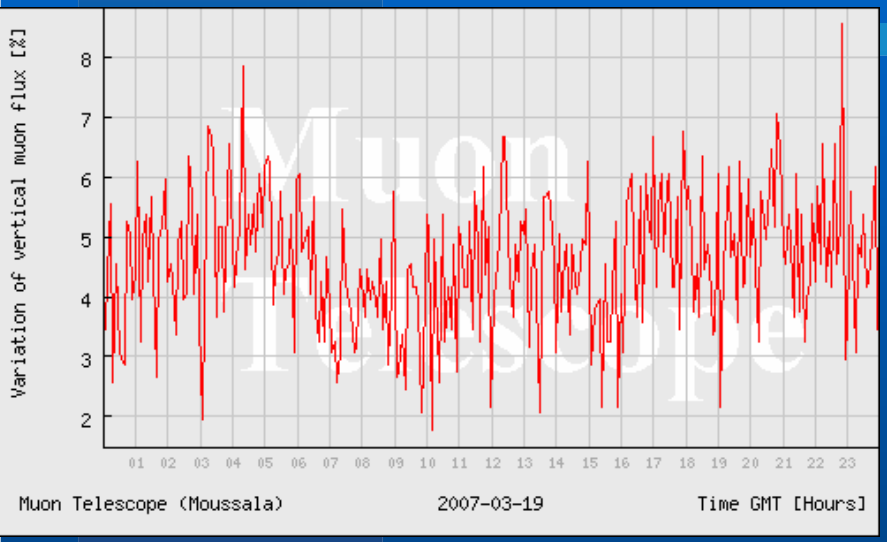
High temperature semiconductor spectrometer

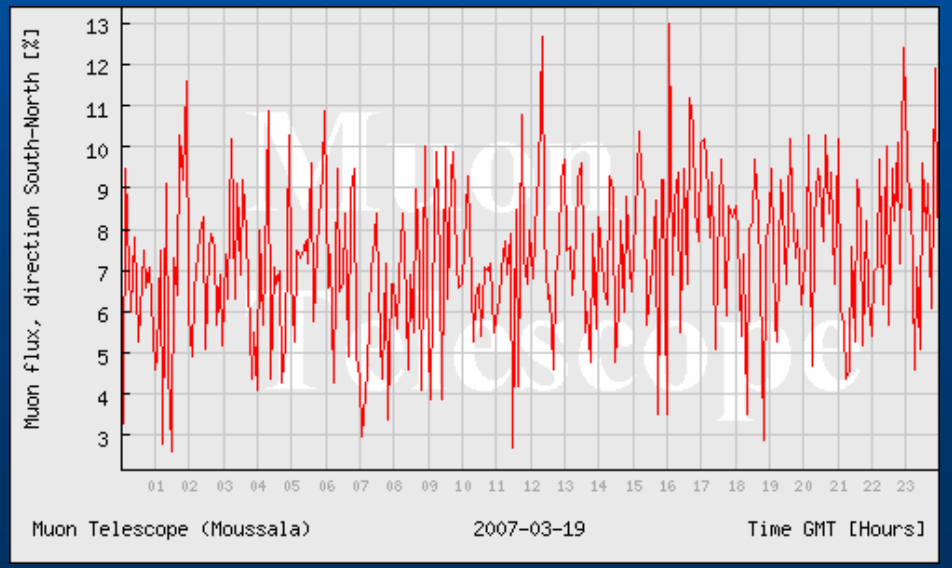
Radon Analyzer

Space Weather Research

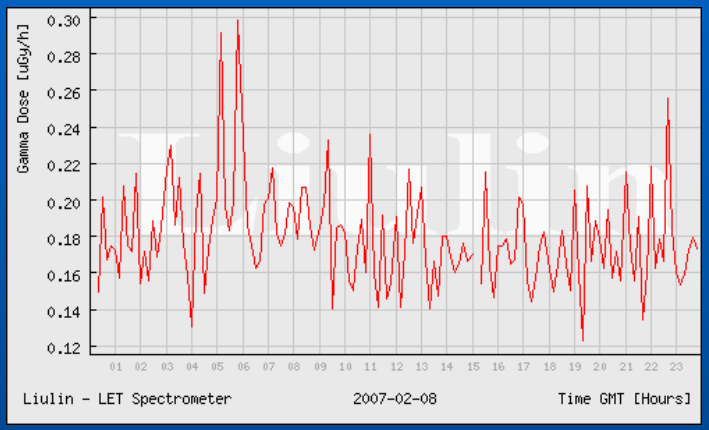
Active neutron detector based on SNM 15 detectors

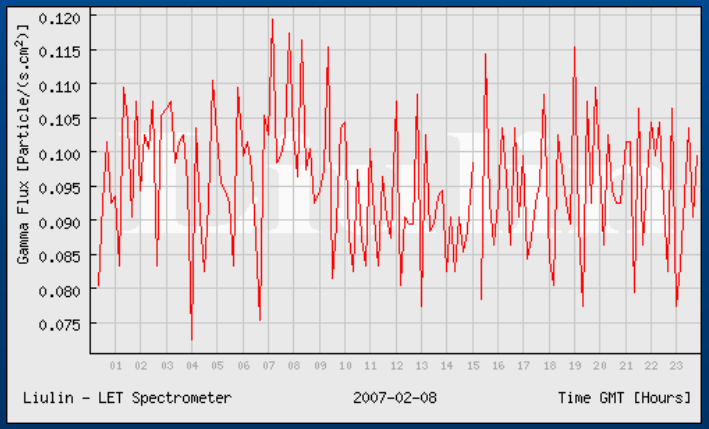
Muon telescope





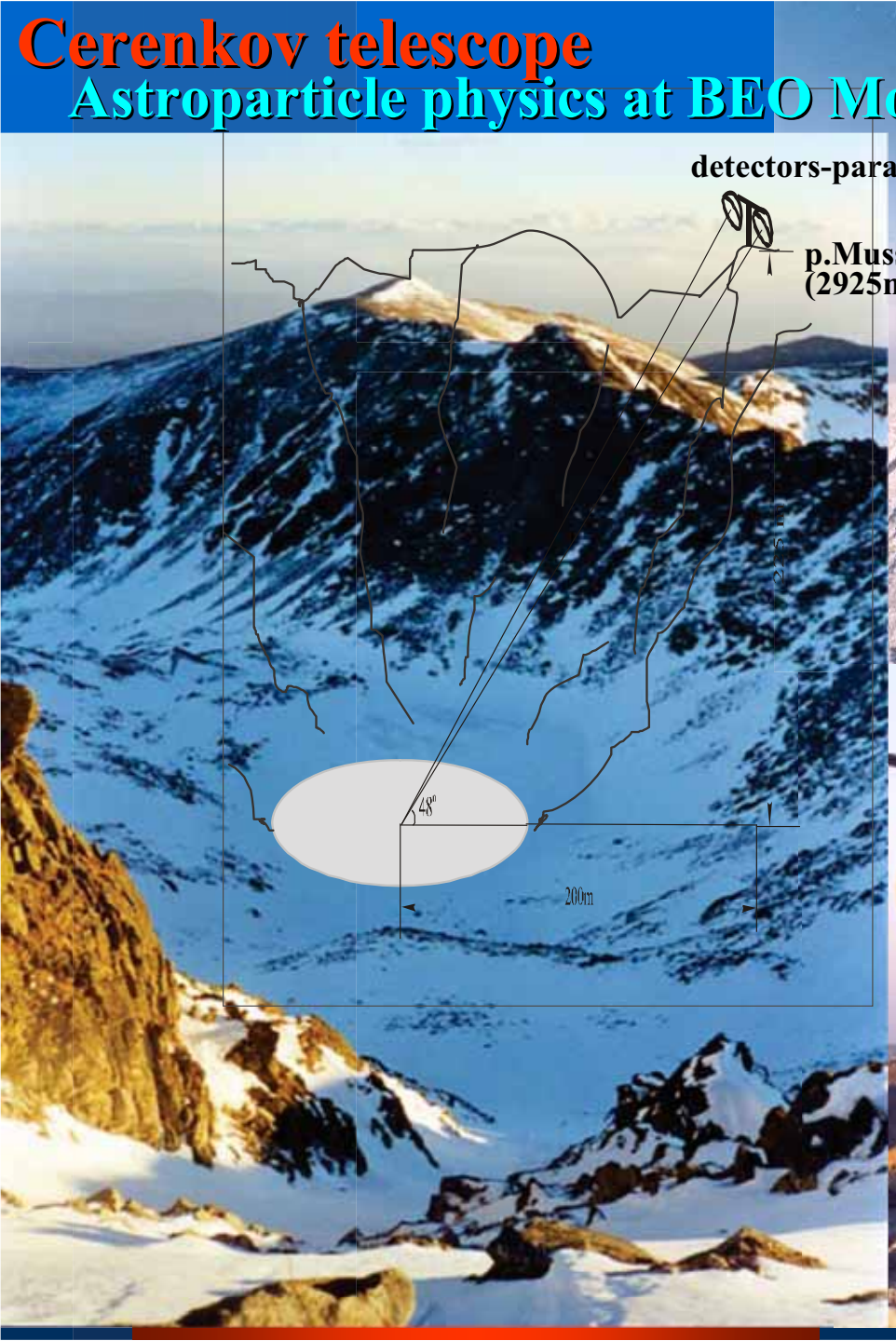
Liulin Space
LET Spectrometer

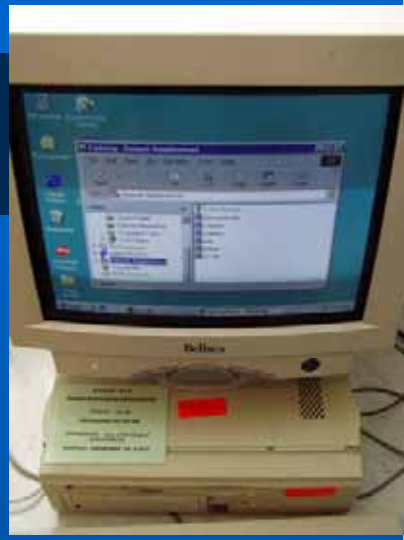


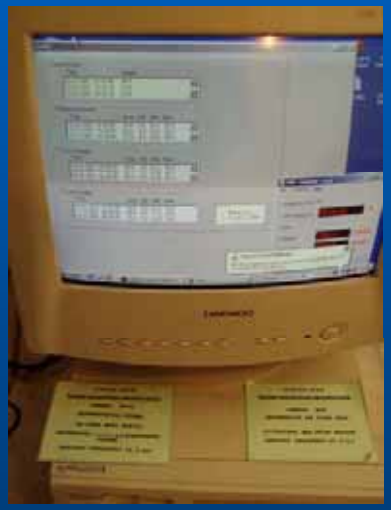


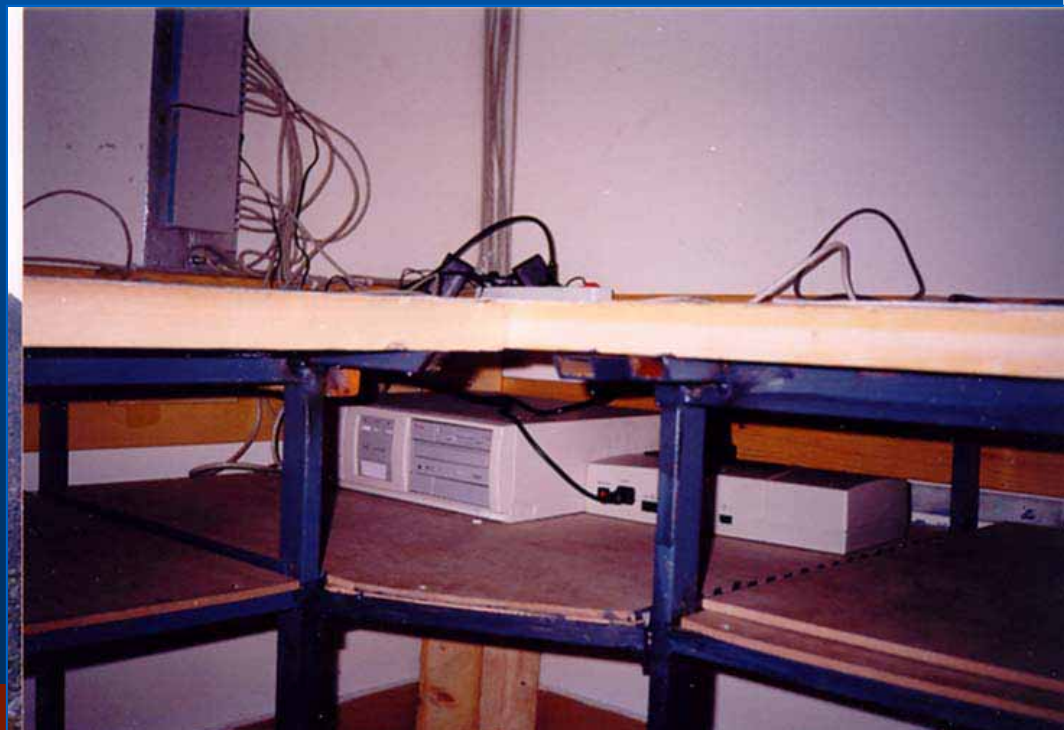
Cerenkov telescope

Astroparticle physics at BEO Moussala









BEO local network

BEO Moussala

Telecommunication system

High frequency radio transmission - 2.4 GHz; wireless Ethernet bridge; high speed data transfer – up to 11 Megabits/s

INRNE Computer cluster GRID

Small portable devices used for monitoring

pH meter

DR2800 spectrophotometer

electronic analytical balance


Peak Moussala
Cargo lift

BEO Moussala


Cargo lift

BEO Moussala
reserve electricity supply


Vasil Barakov
(1939 - 2004)
the first observer
at BEO

BEO Moussala

Interior

Cargo lift valley station “Beli Iskar”

Institute for Nuclear Research and Nuclear Energy

Bulgarian Academy of Sciences

BEO Centre of Excellence

BEOBAL FP6 project training seminars

19 – 20 Feb 2007	"Solar particle phenomena into magnetosphere"	Prof. D.Sc. Karel Kudela IEP SAS, Kosice, Slovak Republic
26 Jul 2006	"Global climate - cosmic rays – clear air standard. Aerosols"	Prof. D.Sc. Volodimir Paclovych, INR NANU, Kyiv, Ukraine
30 – 31 Mar 2006	"Environmental monitoring and complex safety"	Dr. Pavol Vojtyla, CERN, Geneva, Switzerland Sevdalina Topalova, NCRRP, Sofia, Bulgaria Kiril Slavov, NIMH, Sofia, Bulgaria Dr. Alba Zanini, INFN, Torino, Italy
27 – 28 Feb 2006	"In situ measurements for complex environmental monitoring using portable equipment"	Dr. Andre von Zweidorf, ITU (DG JRC), Karlsruhe, Germany Dr. Boyko Vachev, Assist. Prof. Metody Gelev, Dr. Alexander Strezov INRNE Dr. Tsvetan Dachev, CLSTR, Sofia, BG
19 Dec 2005	"Portable X-ray spectroscopy equipment"	Dr. Nicolla Civici, INP AAS, Tirana, Albania

Institute for Nuclear Research and Nuclear Energy

Bulgarian Academy of Sciences

BEO Centre of Excellence

BEOBAL FP6 project training seminars

16 – 17 Feb 2006 **"GRID technologies application in environmental and global change studies"** — Dr. Chris Jones, CERN, Geneve, Switzerland; Mr. Preslav Konstantinov, Ms Elena Puncheva, INRNE, BAS, BG

14 – 15 Feb 2006 **"External exposure to natural radiation"** — Prof. D.Sc. František Spurný, NPI AS CR, Prague, Czech Republic

27 Jun 2005 **"Data quality at GAW stations"** — Dr. Ludwig Ries, Federal Environmental Agency, UFS Zugspitze, Germany; Dr. Alexander Mishev, INRNE, BAS, BG

15 - 16 Jun 2005 **"Track detectors"** — Dr. Karel Turek, NPI AS CR, Prague, Czech Republic; Dr. D. Pressyanov, SU St. Kl. Ohridski, Sofia, Bulgaria; Assist. Prof. Metodi Gelev, INRNE, BAS, Sofia, Bulgaria

Seminars are organised in the framework of INRNE BEOBAL FP6 EC project INCO-CT-2005-016663

For information:
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http://www.beo.inrne.bas.bg

BEOBAL – Work Packages Structure

Conference Activities

Three levels of conference activities are planned:

3.3.1. (7) ***Methodological and coordination workshop***, Bulgaria, October 2005

3.3.2. *(22)* ***Project conference*** *"Global Changes, Environment and Sustainable Development of the Society",* Giuletchiza

3.3.3. (27) ***Conference – Informational Days***,
"South – East Europe Environment – Collaboration, Cooperation, Integration in ERA",
INRNE, BEO CoE, Bulgaria, Sofia, 1st half of 3d year

For contacts
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http://www.beo.inrne.bas.bg
http://beo-db.inrne.bas.bg

Photo: Jordan Stamenov, Boyko Vachev, Peter Ivanov, Ivo Kalapov, Borislav Bangov
Design: Boyko Vachev