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Science school (2)

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Main Authors:	Carl Beierkuhnlein (UBT), Antonello Provenzale (CNR), Mariasilvia Giamberini (CNR)

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1. Executive summary

In this deliverable we describe the two ECOPOTENTIAL schools held in 2016: La Palma School and Valsavarenche “Alpine Summer School” on “Cross-Scale Interactions in the Coupled Geosphere-Biosphere System”.

The second science school of the ECOPOTENTIAL project was held from 11th until 25th of March on La Palma, the North-Western Island of the Canaries, Spain. The island and its protected areas is one of the sites of interest of the project. A combination of 21 students and 4 lecturers gathered to conduct field work and teaching courses, combined to discuss highly important concerns in the face of global change. The deliverable contains a short description of the activities carried on by the school participants.

The “Alpine Summer School” on “Cross-Scale Interactions in the Coupled Geosphere-Biosphere System” took place in Valsavarenche, a village located inside the territory of the National Park of Gran Paradiso (GPNP), which also is one of the sites of interest of the project. Fourteen teachers, four seminar speakers, twenty-five students from eleven countries attended the School from 15 to 24 June 2016. The School aimed at providing young researchers – in particular doctorate students – with an up-to-date interdisciplinary course presenting a quantitative approach to the physical, chemical, geological, biological and ecological principles of geosphere-biosphere interactions on multiple spatial and temporal scales, focusing on the role of Earth Observations and of modelling approaches.

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2. ECOPOTENTIAL Science School (La Palma)

2.1 General description

The Science School organized by the University of Bayreuth in the frame of ECOPOTENTIAL Project, was offered this year on La Palma, the North-Western Island of the Canaries. The science school took place from 11th until 25th of March.

The Science School offers students the opportunity to get an exclusive view of the diverse ecosystems of the island. The field experience challenged the students to address ecological issues while dealing with variable environmental conditions. Field work and teaching courses are combined to discuss highly important concerns in the face of global change.

2.2 Participation

A total of 21 students attended the Science School. Lecturers invited to the science school for various courses:

- Prof. Dr. Anke Jentsch (University of Bayreuth)
- Dr. Severin Irl (University of Bayreuth)
- Prof. Dr. Lawrence Walker (University of Nevada, Las Vegas)
- Prof. Dr. Peter White (University of North Carolina)

Figure 1. View of the vegetation structure of the National Park in La Palma, Spain.

2.3 Projects developed during the Science School

Students organized themselves in groups of 3 people each, and conducted research on their own about one of the following Topics: Succession on Novel Bedrock, the Laurel Forest Paradox, Cloud Value, Fire

Engineering, Altitudinal Gradients, Island Treeline and Lava Succession. Some preparation before the field work was necessary; in which each group prepared a hypothesis that will be filled with the gathered data during the Science School.

On the first two days, the entire group travelled across the island together to get a primary understanding of the projects of the other groups. After that, each group conducted their own research to answer their hypothesis. On the 24th of March, the students and lecturers got together again to learn about the progress the each group made. During the time on La Palma the first part of a Scientific Writing Course offered in combination with the Science School also took place.

3. ECOPOTENTIAL Alpine Summer School (Valsavarenche, Italy)

3.1 General description

The “Alpine Summer School” on “Cross-Scale Interactions in the Coupled Geosphere-Biosphere System” took place from June 15th to June 24th in Valsavarenche, a village located inside the territory of the National Park of Gran Paradiso (GPNP), which also is one of the sites of interest of the project.

The school has been organised by CNR in the frame of the ECOPOTENTIAL project. It aimed at providing young researchers – in particular doctorate students – with an up-to-date interdisciplinary course presenting a quantitative approach to the physical, chemical, geological, biological and ecological principles of geosphere-biosphere interactions on multiple spatial and temporal scales, focusing on the role of Earth Observations and of modelling approaches.

Fourteen teachers, four seminar speakers and twenty-five students from eleven countries have attended it. The school gave a broad but also detailed insight into quantitative approaches to the physical, chemical, geological, biological and ecological principles of geosphere-biosphere interactions with particular attention not only on the dynamic of our Planet but also on the pressures that anthropic activities are placing on natural ecosystems and environments, with the related danger of losing essential ecosystem services. In addition, the students had the opportunity to present their own research projects and receive valuable feedback from the experts and enabled a vivid exchange of information and ideas.

The School had no registration fees as it was funded by ECOPOTENTIAL fundings.

All the information can be found on the website: www.to.isac.cnr.it/aosta

3.2 Organisation

A total of 25 students attended the Alpine Summer School. 14 Lecturers and 4 seminar speakers were invited to provide courses:

Directors of the school:

Antonello Provenzale, Institute of Geosciences and Earth Resources, CNR, Pisa, Italy; Coordinator of ECOPOTENTIAL.

Carl Beierkuhnlein, Chair of Biogeography, University of Bayreuth, Germany, Co-coordinator of ECOPOTENTIAL.

Scientific Secretary:

Ilaria Baneschi, Institute of Geosciences and Earth Resources, CNR, Pisa, Italy

Scientific coordination of the School:

Jost von Hardenberg - CNR-ISAC, Torino, Italy

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Joel Sommeria - LEGI-CNRS, Grenoble, France

Scientific Council of the School:

D. Anfossi, CNR-ISAC, Torino;

B. Bassano, PNGP, Torino;

G. Boffetta, Università di Torino;

A. Colin de Verdière, LPO, Brest;

F. D'Andrea, LMD-ENS, Paris; M. Gatto, Politecnico di Milano;

M. Ghil, TAO-ENS, Paris;

J. von Hardenberg, CNR-ISAC, Torino;

H. Le Treut, IPSL, Paris;

E. Palazzi, CNR-ISAC, Torino;

A. Provenzale, CNR-IGG, Pisa;

G. Roth, Univ. di Genova;

J. Sommeria, LEGI, Grenoble;

I. Zin, LTHE, Grenoble;

Figure 2. View of the Nivolet plain in Gran Paradiso National Park.

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3.3 Detailed programme: lecturers and topics of the Alpine Summer School

LECTURERS:

Alberto Basset -	University of Salento, Italy
Mara Baudena -	Utrecht University, The Netherlands
Carl Beierkuhnlein -	University of Bayreuth, Germany
Alessandro Chiarucci -	University of Bologna, Italy
Francesco D'Ovidio -	LOCEAN, Paris, France
Ghada El Serafy -	DELTARES, The Netherlands
Elisabetta Erba -	University of Milano, Italy
Klaus Fraedrich -	Max-Planck-Institut für Meteorologie, Hamburg, Germany
Arnon Karnieli -	Ben Gurion University, Beer Sheva, Israel
Tim Lenton -	University of Exeter, United Kingdom
Stefano Poli -	University of Milano, Italy
Antonello Provenzale -	CNR-IGG, Italy
Leonard A. Smith -	London School of Economics, United Kingdom
Ariane Walz -	University of Potsdam, Germany

Seminar speakers:

Chiara Boschi -	IGG-CNR, Pisa, Italy
Elisa Palazzi -	ISAC-CNR, Torino, Italy
Jost von Hardenberg -	ISAC-CNR, Torino, Italy
Niv de Malach / Moshe Shachak -	Ben Gurion University, Beer Sheva, Israel

TOPICS:

Alberto Basset

- Spatial components of size allometries and their expected relationship with climate change

Mara Baudena

- Forests, savannas, and grasslands: bridging the knowledge gap between ecology and Dynamic Global Vegetation Models
- Plant-plant Interactions as a driver of biodiversity and community

Carl Beierkuhnlein

- Communities - Catchments - Landscapes: Linking ecosystem fluxes and environmental change across scales
- Sampling approaches at different scales: Challenges and pitfalls

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Alessandro Chiarucci

- Cross-scale patterns and measurements in biodiversity

Francesco D'Ovidio

- Unveiling the dynamical landscape of pelagic ecosystems

Ghada El Serafy

- Dealing with uncertainties in ecological modelling and forecasting systems

Elisabetta Erba

- The carbon cycle in the ocean: atmosphere- hydrosphere-biosphere-geosphere interactions at short- and medium- term
- The surface organic and inorganic C cycles at long-term: sedimentation in the oceans

Klaus Fraedrich

Along the rainfall-runoff chain:

- A set of parsimonious models: rainfall, runoff, radiation
- Change and attribution: biosphere and biodiversity

Arnon Karnieli

- Change detection - methods and applications

Tim Lenton

- Revolutions that made the Earth - about the coupled history of life and the planet
- Anthropocene - about whether humans are causing a new revolution for the Earth system
- Early warning of climate tipping points

Stefano Poli

- The long-term carbon cycle: feeding the reservoirs of volatile elements in the Earth interior
- Earth degassing: long- and short-term processes governing the release of CO2, H2O, and other abiotic gas species to the atmosphere

Antonello Provenzale

- Terrestrial vegetation response to intermittent drivers: a conceptual modelling approach
- Mesoscale turbulence and its effects on the marine ecosystem

Leonard A. Smith

- From Termites and Penguins to Blocking and the Andes: Interpreting Models of the Earth System

Ariane Walz

- Recent approaches in cross-scale ecosystem research

Seminars

Mara Baudena

- Revealing patterns of species richness along environmental gradients with a novel network tool

Chiara Boschi

- The role of the weathering of the rocks and carbonate precipitation in the long-term carbon-cycle

Jost von Hardenberg

- Global Climate Models and cross-scale interactions

Niv de Malach / Moshe Shahack

- The role of organisms as ecosystem engineers in coupling geosphere-biosphere systems

Elisa Palazzi

- Observations and modelling of the hydrological cycle in the mountain regions: precipitation, snow and elevation-dependent warming

Jose Manuel Redondo

- Multifractal-scaling-in the Environment