Climate changes: flood/drought dynamics

Terni - C.A.O.S. Centro Arti Opificio Siri
Viale Campofregoso, 98 – Terni
18 May 2012

Floods and droughts are among the most damaging natural hazards, with floods being globally the most significant disaster type in terms of loss of human. From an economic perspective, changes in the hydrological cycle can impose great pressures and damages on a variety of industrial sectors, such as water management, urban planning, agricultural production and tourism. Because of the central importance of water in the Earth system, the question of how the water cycle is changing, and how it may alter in future as a result of human behavior, presents one of the greatest challenges of this century. The recent Intergovernmental Panel on Climate Change report highlighted the increasingly strong evidence of change in the global water cycle and associated environmental consequences. It is of critical importance to climate prediction and adaptation strategies that key processes in the atmospheric water cycle are precisely understood and determined, from evaporation at the surface of the ocean, transport by the atmosphere, condensation as cloud eventual precipitation, and run-off through rivers following interaction with the land surface, sub-surface, ice, snow and vegetation. Moisture transport is critically important to life on Earth. It also plays an important role in the heat budget of planet Earth especially through the greenhouse effect of water vapor and, at the surface, by moderating surface temperature changes as heating goes into evaporating moisture rather than increasing temperature. In addition, the transport of water vapor by the atmosphere effectively redistributes the latent heat. Despite their obvious environmental and societal importance, our understanding of the causes and magnitude of the variations of the hydrological cycle is still unsatisfactory. Powerful tools for climate description or simulation, as remote sensing and sophisticated mathematical models, are today available, but the prediction of future changes of precipitation regime on continental regions remains uncertain, especially for extreme events as floods and droughts. The workshop is aimed to explore future flood/drought prospects associated with the climate change as these are shown by observed data and models, their reliability and uncertainly.

Program:

9:00-9:30 Lucio Ubertini - Welcome and workshop presentation

9:30-9:50 Francesco Cioffi: The changing character of precipitations in Europe and Mediterranean regions. Evidences from data and model projections

10:00-10:30 Upmanu Lall (Director of Columbia Water Center, Columbia University, New York, USA) Invited lecture: Uncertainly in future hydrologic cycle projections

10:30-11:00 Evgeny Volodin (Institute of Numerical Mathematics, RAS, Moscow, Russia) Invited lecture: Soil moisture controls summer heat wave statistics in present-day climate and global warming conditions

11:00-11:30 *Coffee break*

11:30-12:00 Bruno Merz (Helmholz-Zentrum Potsdam, Deutsche GeoForschungsZentrum, Potsdam, Deutschland) Invited lecture: Floods and global change: Increasing losses, increasing uncertainty and implications for risk management

12:00-13:00 Discussion and contributions

13:00-14:00 *Lunch*

14:00-15:00 Climate Change: Impact on Urban Water Management

15:00-16:00 Climate Change: Impact on hydropower production

16:00-17:00 Lucio Ubertini, Upmanu Lall - Conclusion

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Workshop

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