

MEETINGS

Studying the Hydrological Cycle in the Mediterranean

Fourth Hydrological Cycle in Mediterranean Experiment Workshop; Bologna, Italy, 8–10 June 2010

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Studying the hydrological cycle in the Mediterranean involves researching issues relating to floods and water scarcity, its response to climate change, and the sensitivity of the environment and societies to hydrologic variability. The development of a coordinated program for studying the hydrological cycle in the Mediterranean region was the focus of the fourth international Hydrological Cycle in Mediterranean Experiment (HyMeX; <http://www.hymex.org>) workshop, organized by a committee chaired by Silvio Davolio of the Institute of Atmospheric Sciences and Climate of the Italian National Research Council.

The HyMeX program has two main objectives: (1) to improve understanding of the water cycle, with emphasis on extreme events, by monitoring and modeling the Mediterranean coupled system (atmosphere-land-ocean) and its variability (from the event scale to seasonal and interannual scales) and characteristics over 1 decade in the context of global change; and (2) to

evaluate societal and economic vulnerability to extreme events and adaptation capacity.

The purpose of the meeting was to report and coordinate the activities of HyMeX, which is organized into five science working groups: WG1: Water budget of the Mediterranean Sea; WG2: Hydrological continental cycle; WG3: Heavy rainfall, flash floods, and floods; WG4: Intense sea-atmosphere interactions; and WG5: Societal and economical impacts. Another goal of the workshop was to monitor the preparation of observation campaigns. HyMeX includes a strong observational component proposed for the next 10 years (autumn 2010 to summer 2020) consisting of three complementary types of campaigns: a long observation period (LOP), which will run continuously over the 10 years and is based on the coordination of current operational observing systems over the whole Mediterranean basin; enhanced observation periods (EOPs) targeting existing observatories and operational observing systems in key regions of high-impact events; and special observing periods (SOPs) during which special platforms (aircrafts, ships,

balloons, etc.) will observe high-impact events in selected areas of the EOP target regions.

More than 180 participants attended the workshop, coming from Austria, Canada, Croatia, France, Germany, Greece, Italy, Japan, Morocco, Netherlands, Spain, Sweden, Austria, Switzerland, Ukraine, and the United States. The HyMeX science plan was introduced first before turning the workshop over to 31 talks and 105 posters that presented scientific results on the main HyMeX topics. A plenary session was devoted to the implementation plan, with a presentation of the experimental setup for each of the three target areas: northwestern Mediterranean, Adriatic Sea, and southeastern Mediterranean. Further, the elaboration and coordination of the HyMeX implementation plan were debated during nine parallel discussion sessions, particularly in relation to the kickoff of the LOP (2010–2020) in September 2010, which will require data collection from operational and research hydrometeorological sites and coordination with regional climate model simulations. The discussions provided valuable outcomes for drafting the first version of the implementation plan, which should be issued this fall. Workshop presentations are available at <http://www.hymex.org>.

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Hot Arctic–Cold Continents: Global Impacts of Arctic Change

International Polar Year Oslo Science Conference; Oslo, Norway, 8–12 June 2010

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A warmer Arctic climate is influencing air pressure over the North Pole and wind patterns over the Northern Hemisphere. In response, recent data and modeling suggest that more cold and snowy winters can be expected in Europe, eastern Asia, and eastern North America. These were some of the issues discussed at the International Polar Year (IPY) conference, the largest polar science meeting ever held, with more than 2400 attendees. More than 80 scientific papers debated the state of the science regarding Arctic amplification and midlatitude connections. Arctic amplification is just that: The Arctic is warming twice as fast as the rest of the planet, caused by unique physical processes related in part to loss of sea ice. Arctic amplification is also a consequence of changes in atmospheric circulation that

are anthropogenically forced, part of chaotic variability, or both.

Continued loss of sea ice will be a major driver of large changes across the Arctic over the next decades, especially in late summer and autumn. The recent reduction of the area of multiyear sea ice and reduced sea ice thickness, combined with climate model results presented at the conference, suggest that it is unlikely that the Arctic will return over the next 4 decades to conditions observed in the 1980s. What was not fully recognized until now is that a combination of anthropogenic warming, shifting wind and ocean current patterns, and increased ocean heat uptake during summer was enough to disrupt the previous Arctic climate system, resulting in greater sea ice loss earlier than climate models had predicted. Although loss of sea ice coincides with an

increase in Arctic temperatures, the direction of causality remains uncertain.

Over the past decade, a newly persistent Arctic atmospheric climate pattern, the Arctic Dipole (AD), with a meridional (north-south) flow direction, is now rivaling the well-known Arctic Oscillation (AO) climate pattern, which is more zonal (west-east). Studies presented at the conference showed that the AD brings more warm, moist air into the central Arctic compared with the positive AO.

Participants also discussed model results and case studies showing that midlatitude weather is being affected by changes in Arctic climate. Such results are paradoxical in that there is not a uniform pattern of temperature increases for a globally warming planet. Before the conference, many scientists thought it would be difficult to show a direct Arctic influence on midlatitude weather other than with models, but winter 2009–2010 represented atypical conditions, the third most extreme since 1850 based on the negative North Atlantic Oscillation Index. Higher-than-normal temperatures and air pressures (geopotential heights) over the central Arctic with lower pressures to the south, termed teleconnections, contributed

to record cold and snowy weather in Europe, eastern Asia, and eastern North America. An increase in Arctic-midlatitude connectivity may be more common in the future as the area of sea ice-free ocean at the end of summer increases over the next decades. While the climate of the Arctic is

changing from the base state of the twentieth century, it is still unclear what new pattern will ultimately appear.

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Development of Global Change Research in Developing Countries

Ecosystems and Global Change in the Context of the Neotropics; Medellín, Colombia, 19–20 May 2010

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Research in most areas of global environmental change is overwhelmingly produced outside developing countries, which are usually consumers rather than producers of the knowledge associated with their natural resources. While there have been important recent advances in understanding the causes of global-scale changes and their consequences to the functioning of tropical ecosystems, there is still an important gap in the understanding of these changes at regional and national levels (where important political decisions are usually made).

A symposium was held with the aim of surveying the current state of research activities in a small, developing country such as Colombia. It was jointly organized by the Research Center on Ecosystems and Global Change, Carbono and Bosques; the National University of Colombia at Medellín; and the Colombian Ministry of the Environment, Housing, and Regional Development. This 2-day symposium gathered Colombian and international scientists involved in different areas of global environmental change, tropical ecosystems, and human societies.

Talks were divided into four main sessions that focused on climate policy, social science, climate and biogeochemical changes, land use/land cover changes, and biodiversity change. Presenters highlighted important evidence of significant environmental changes at regional and national levels. One group of talks focused on diagnostics of variables such as temperature, water resources, forest cover, biodiversity, carbon stocks, and emissions. Causes of deforestation were discussed and analyzed within the framework of major political and socioeconomic changes. Consequences of deforestation and forest degradation were presented in terms of biodiversity and carbon stocks and emissions.

In addition to natural and social scientists, policy makers and representatives of indigenous communities participated in the event. A representative from the Coordinator of the Indigenous Organizations of the Amazonian River Basin (COICA) expressed the point of view of indigenous communities with respect to the challenges and mitigation of global change. From this presentation it was clear that current research and policies on tropical forests have mostly ignored

indigenous communities, who are the inhabitants and users of the forest as well as the owners of the rights over the land of vast areas in the tropics. A constructive dialogue between representatives from the Colombian government and COICA originated within the framework of this workshop.

This workshop revealed that despite the lack of a coordinated research infrastructure in a developing country like Colombia, there exists a significant effort to study the major challenges related to global environmental change. This meeting was an exceptional opportunity to assess progress and establish a dialogue among the different stakeholders who can contribute to well-informed policy making at the national level. Different research groups from small developing countries are encouraged to initiate their own research assessments and establish a dialogue among policy makers and scientists. Perhaps they also will find that enough information is already available to make informed decisions to confront the challenge of global change.

Details about the presentations can be found at http://www.carbonoybosques.org/ultimas_noticias/simposio_internacional.html.

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