HyMeX – Baltic Earth Workshop

Joint regional climate system modelling for the European sea regions

5-6 November 2015, Roma, Italy

On 5 and 6 November 2015, the HyMeX/Med-CORDEX and Baltic Earth programs organised a joint workshop in Rome, Italy. The workshop was co-sponsored by MISTRALS/HyMeX, Baltic Earth, ENEA (Italian National Agency for New Technologies, Energy and Sustainable Economic Development, Rome, Italy) and HZG (Helmholtz-Zentrum Geesthacht, Germany), and dedicated to the regional climate system science of the European sea regions. The workshop goal was to contribute to the understanding of regional energy, momentum, water, and matter fluxes and their effects on the regional climate using observations and Regional Climate System Models, encompassing processes in the atmosphere, land, sea, and anthroposphere. The European sea regions include the Mediterranean Sea, North Sea, Baltic Sea, Black Sea and Arctic Ocean as well as their respective areas of influence (coastal zone and catchment basin). Those European sea regions are highly sensitive areas to climate variability and change for which global models often fail to give reliable climate information.

The workshop focused on the development, evaluation and scientific usage of a new generation of climate modelling tools; the so-called Regional Climate System Models (RCSM). They now include high-resolution representations of various components of regional climate system, combining high-resolution regional models for the atmosphere, ocean, land-surface, rivers but also natural and anthropogenic aerosols, surface waves, land vegetation, land and marine biogeochemistry, the marine carbon cycle as well as marine biology and food webs. They consequently allow to elaborate further on the following scientific topics: (i) coupled regional climate processes and their influence on past regional climate variability, (ii) an integrated vision of the regional climate change impacts on the European seas and coastal zones and (iii) to explore the role of the regional climate drivers on the regional climate change projections.

After an introduction talk on the Baltic Earth, HyMeX/Med-CORDEX and CORDEX programs, studies were presented in four plenary sessions with a total of 21 orals and 29 posters. Sessions were (1) Development and evaluation of regional climate system models, (2) Regional process studies and studies on the added value of coupled models with high resolution, (3) Extreme and high impact events and (4) Climate change impact studies and uncertainty assessments of projections using coupled model simulations. Those science sessions were completed by a presentation of the Med-CORDEX climate information system and by discussions on progress in the field and open challenges.

66 persons participated to the workshop mainly representing the Mediterranean Sea, the North Sea and the Baltic Sea but also the Arctic Ocean, Black Sea and North-Atlantic Ocean. All the components of the European sea climate system were represented: atmosphere, ocean, land-surface, hydrology, biogeochemistry, marine biology, aerosol, vegetation. In addition to the studies of dedicated regional climate phenomena, various impacts of the regional climate change were exposed such as acidification, sea level rise, drought increase, change in ocean surface currents, increase in heavy precipitation and floods, change in frequency of cyclones and medicanes, changes in carbon ocean uptake and heat ocean uptake.

The initial workshop goal to establish scientific and personal connections between the researchers of the various geographically-organized communities was a great success. The workshop also allowed to discuss the major scientific challenges of the European sea regions research community for the coming years and decades. It was decided to write a « White Paper », summarizing the outcomes of the workshop and defining the community scientific open questions. This « White paper » may allow the European sea regions research community to efficiently interact with the GEWEX, CLIVAR and CORDEX programs as well as with the European and National funding agencies for the scientific research and the climate services.

Among the topics discussed, we would like to mention

- the positioning of the European sea regions research community with respect to CORDEX and specifically to Euro-CORDEX, Med-CORDEX, the Flagship Pilot Studies and the CORDEX challenge on ocean-ice-atmosphere regional coupled modelling,
- the climate change impacts on the European seas and related coastal areas, coastal cities and islands,
- the added-value of the RCSM with respect to more classical tools as GCM or Atmosphere-RCM,
- the upscaling of the regional climate information at the global climate scale,
- the possible contribution of the European sea regions research community to the next generation of the European climate services.

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