Geophysical Research Abstracts
Vol. 15, EGU2013-6011, 2013
EGU General Assembly 2013

Advancing hydrometeorological prediction capabilities through standards-based cyberinfrastructure development: The community WRF-Hydro modeling system

David gochis (1), Antonio Parodi (2), Rick Hooper (3), Shantenu Jha (4), and Ilya Zaslavsky (5)

(1) NCAR, Boulder, Colorado, USA (gochis@ucar.edu), (2) CIMA, Savona, Italy, (3) CUAHSI, Boston, Massachusettes, USA, (4) Rutgers University, Pennsylvania, USA, (5) San Diego Super Compputing Center, San Diego, California, USA

The need for improved assessments and predictions of many key environmental variables is driving a multitude of model development efforts in the geosciences. The proliferation of weather and climate impacts research is driving a host of new environmental prediction model development efforts as society seeks to understand how climate does and will impact key societal activities and resources and, in turn, how human activities influence climate and the environment. This surge in model development has highlighted the role of model coupling as a fundamental activity itself and, at times, a significant bottleneck in weather and climate impacts research. This talk explores some of the recent activities and progress that has been made in assessing the attributes of various approaches to the coupling of physics-based process models for hydrometeorology. One example modeling system that is emerging from these efforts is the community 'WRF-Hydro' modeling system which is based on the modeling architecture of the Weather Research and Forecasting (WRF). An overview of the structural components of WRF-Hydro will be presented as will results from several recent applications which include the prediction of flash flooding events in the Rocky Mountain Front Range region of the U.S. and along the Ligurian coastline in the northern Mediterranean. Efficient integration of the coupled modeling system with distributed infrastructure for collecting and sharing hydrometeorological observations is one of core themes of the work. Specifically, we aim to demonstrate how data management infrastructures used in the US and Europe, in particular data sharing technologies developed within the CUAHSI Hydrologic Information System and UNIDATA, can interoperate based on international standards for data discovery and exchange, such as standards developed by the Open Geospatial Consortium and adopted by GEOSS. The data system we envision will help manage WRF-Hydro prediction model data flows, enabling discovery and flexible configuration of model inputs, and managing provenance for selected model outputs. The talk will end with a discussion on the opportunities for fostering open, standards-based approaches for code development, model interoperability and data and metadata structures as well as the need for multi-scale and multi-physics model structures.