Contribution ID: **168** Type: **not specified**

Research Infrastructures for Integrated Environmental Modeling: the DRIHM(2US) experience

Tuesday, 10 November 2015 17:40 (20 minutes)

From 1970 to 2012, about 9000 high impact weather events (HIWE) were reported globally: all together, they caused the loss of 1.94 million lives and economic damage of US$ 2.4 trillion (2014 UNISDR report). Storms and floods accounted for 79 per cent of the total number of disasters due to weather, water, and climate extremes and caused 55% of lives lost and 86% of economic losses. These figures call for focused hydro-meteorological research to: (a) understand, explain and predict the physical processes producing HIWE (b) understand the possible intensification of such events because of climate change effects; and (c) explore the potential of e-Infrastructures to provide deeper understanding of those events through fine resolution modelling over large areal extents.
The underlying premise of the DRIHM (Distributed Research Infrastructure for Hydro-Meteorology) and DRIHM2US (Distributed Research Infrastructure for Hydro-Meteorology to US) projects (www.drihm.eu and www.drihm2us.eu, DRIHM(2US) hereafter) is that understanding and predicting the environmental and human impact of HIWE requires a holistic approach. The DRIHM(2US) virtual research environment (VRE) enables the production and interpretation of numerous, complex compositions of hydro-meteorological simulations of HIWE from rainfall, either simulated or modelled, down to discharge, water level and flow, and impact. HMR topics which are allowed or facilitated by DRIHM(2US) services include: physical process studies, intercomparison of models and ensembles, sensitivity studies to a particular component of the forecasting chain, and design of flash-flood early-warning systems.

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Session Classification: Showcasing tools and services from Research Infrastructures (II)