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Providing open hydrological data for decision making and research – hypeweb.smhi.se

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Following the EU open data strategy the Swedish Meteorological and Hydrological Institute (SMHI) is providing large parts of their databases openly available. These data are ranging from historical observations to climate predictions in various areas such as weather, oceanography and hydrology. In this presentation we will focus on the work on making hydrological data openly available.

Hydrological modelling demands large amounts of spatial data, such as soil properties, land use, topography, lakes and reservoirs, ice and snow coverage, water management (e.g. irrigation patterns and regulations), meteorological data and observed water discharge in rivers. By using such data, the hydrological model will in turn provide new data that can be used for new purposes (i.e. re-purposing). In the presentation we will focus on how readily available open data from public portals have been re-purposed by using the Hydrological Predictions for the Environment (HYPE) model in a number of large-scale model applications covering numerous subbasins and rivers. HYPE is a dynamic, semi-distributed, process-based, and integrated catchment model. So far, the following regional domains have been modelled with different resolutions (number of subbasins within brackets): Sweden (37 000), Europe (35 000), Arctic basin (30 000), La Plata River (6 000), Niger River (800), Middle-East North-Africa (31 000), and the Indian subcontinent (6 000).

The model output is launched as new Open Data at the web site www.hypeweb.smhi.se. The web site provides several interactive applications for exploring results from the models. The user can explore an overview of various water variables for historical and future conditions. Moreover the user can explore and download historical time series of discharge for each basin and explore the performance of the model towards observed river flow. The available results can be used for many different purposes including; (i) Climate change impact assessments on water resources and dynamics; (ii) The European Water Framework Directive (WFD) for characterization and development of measure programs to improve the ecological status of water bodies; (iii) Design variables for infrastructure constructions; (iv) Spatial water-resource mapping; (v) Operational forecasts (1-10 days and seasonal) on floods and droughts; (vi) Input to oceanographic models for operational forecasts and marine status assessments; (vii) Research.

The presentation will give an overview of the functionality of the web site and the available hydrological datasets. We will also discuss a number of challenges experienced and solutions found during the construction of the website. One such is the functionality and interface design of the web site which involves cooperation between IT-specialists and hydrologists. Here, an important goal has been the software and database design to provide an efficient website which can easily be extended with new data and functionality. Another important issue is providing relevant information about the provided datasets and models to make it easy for external user to reuse the data as well as the use of standards and limitations due to dependencies of other datasets. The openly available data has been attractive by other research teams and agencies and led to new collaborations.