Geophysical Research Abstracts
Vol. 17, EGU2015-15091, 2015
EGU General Assembly 2015


# HEPS4Power - Extended-range Hydrometeorological Ensemble Predictions for Improved Hydropower Operations and Revenues

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In recent years large progresses have been achieved in the operational prediction of floods and hydrological drought with up to ten days lead time. Both the public and the private sectors are currently using probabilistic runoff forecast in order to monitoring water resources and take actions when critical conditions are to be expected. The use of extended-range predictions with lead times exceeding 10 days is not yet established. The hydropower sector in particular might have large benefits from using hydro meteorological forecasts for the next 15 to 60 days in order to optimize the operations and the revenues from their watersheds, dams, captions, turbines and pumps.
The new Swiss Competence Centers in Energy Research (SCCER) targets at boosting research related to energy issues in Switzerland. The objective of HEPS4POWER is to demonstrate that operational extended-range hydro meteorological forecasts have the potential to become very valuable tools for fine tuning the production of energy from hydropower systems.
The project team covers a specific system-oriented value chain starting from the collection and forecast of meteorological data (MeteoSwiss), leading to the operational application of state-of-the-art hydrological models (WSL) and terminating with the experience in data presentation and power production forecasts for end-users (e-dric.ch).
The first task of the HEPS4POWER will be the downscaling and post-processing of ensemble extended-range meteorological forecasts (EPS). The goal is to provide well-tailored forecasts of probabilistic nature that should be reliable in statistical and localized at catchment or even station level.
The hydrology related task will consist in feeding the post-processed meteorological forecasts into a HEPS using a multi-model approach by implementing models with different complexity. Also in the case of the hydrological ensemble predictions, post-processing techniques need to be tested in order to improve the quality of the forecasts against observed discharge. Analysis should be specifically oriented to the maximisation of hydroelectricity production. Thus, verification metrics should include economic measures like cost loss approaches.
The final step will include the transfer of the HEPS system to several hydropower systems, the connection with the energy market prices and the development of probabilistic multi-reservoir production and management optimizations guidelines. The baseline model chain yielding three-days forecasts established for a hydropower system in southern-Switzerland will be presented alongside with the work-plan to achieve seasonal ensemble predictions.