

THORPEX/HEPEX Hydrologic Prediction System (THEPS)

THEPS is a project which integrates the HEPEX project within the [THORPEX project](#).

HEPEX is an ideal partner for the THORPEX program in a very important area of weather forecast applications. A hydrologic component, the THORPEX/HEPEX Hydrologic Ensemble Prediction System (THEPS) is proposed as a joint THORPEX/HEPEX collaborative activity within the THORPEX project.

This project would have 3 goals:

1. Assess how the TIGGE datasets and THORPEX science plan can meet the requirements of the HEPEX community.
2. Provide feedback to the THORPEX community on the information content of TIGGE and THORPEX scientific questions , and hence contribute to the design and development of GIFS.
3. Help the HEPEX community in using the TIGGE datasets and THORPEX research outputs within Hydrological EPSSs.

Hydrological applications range across scales from catchments of less than a few km² to continental scale. It can integrate responses over a range of variables (for example precipitation, evaporation, temperature, radiation etc) as well as across spatial and temporal scale.

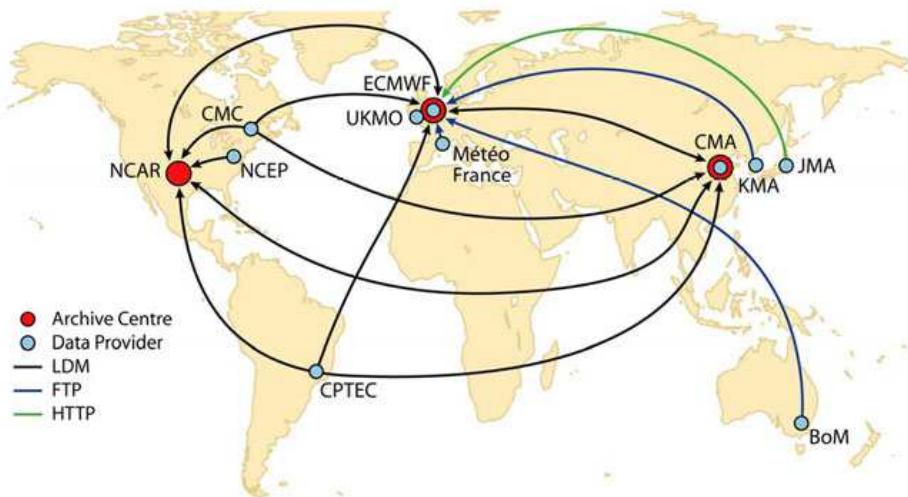


Fig.1 TIGGE Archive, Forecast Data for Weather Research

Hydrological systems act often as a low pass non-linear filter of atmospheric drivers. As such it can for example allow to assess predictive skill at all forecast ranges, including potential predictability of many near surface variables on a large range of scales. These scales are meaningful integrators of point observations and thus allow a suitable comparison to model predictions. Additionally, hydrology can act as a diagnostic to quantify the contributions of initial condition and model uncertainty to forecast errors or investigate the relative effects of small and large-scale initial-condition uncertainty and as such develop improved global ensemble-prediction systems. For example, many hydrological regimes can be sensitive to initial conditions and evaluate the signal of changing configurations. Additionally, hydrological models are already part of many meteorological models in the form of land surface schemes. HEPEX can act as a communication platform between the traditional small scale hydrological community and the large scale hydrologists.

Scientific issues associated with THORPEX-HEPEX collaboration include:

1. What are the requirements for meteorological ensemble forecasts to support hydrological ensemble prediction and the scientific issues or questions that need to be addressed to meet these requirements?
2. How important is the feedback of hydrologic processes for the atmospheric circulation?
3. What downscaling methods (dynamical or statistical) can be used to interpret lower resolution atmospheric forecasts for hydrologic applications?
4. What is the best way for the user community to take advantage of ensemble forecasts?