Geophysical Research Abstracts
Vol. 21, EGU2019-4745, 2019
EGU General Assembly 2019
© Author(s) 2019. CC Attribution 4.0 license.

An ensemble of hydrologic forcing variables for hydropower inflow forecasting in Nepal

Bikas Chandra Bhattarai, John Faulkner Burkhart, Lena Merete Tallaksen, Frode Stordal, Chong-Yu Xu, and Felix Nicholas Matt

University of Oslo, Department of Geosciences, Norway (b.c.bhattarai@geo.uio.no)

The ability of hydrological models to forecast runoff depends largely on the quality model forcing datasets. A number of global and regional distributed datasets hold great promise for hydrologic prediction by providing a more comprehensive spatial and temporal coverage. While these datasets are now more commonly used for hydrologic simulation, a significant degree of sensitivity to precipitation amount and timing is observed. In this study, Statkraft's Hydrologic Forecasting Toolbox (Shyft) is used to evaluate simulations forced with observations and three different distributed forcing datasets: I) ERA Interim, ii) Water and Global Change (WATCH) Forcing Data ERA-interim (WFDEI), and iii) COordinated Regional Climate Downscaling EXperiment with contributing institute Rosssy Centre, Swedish Meteorological and Hydrological Institute (CORDEX-SMHI)) over the Narayani catchment, Nepal. Not only does this provide an opportunity to evaluate variability and uncertainty resulting from the ensemble of forcing data, but it also demonstrates the capability of these data in data sparse regions. The fidelity of streamflow simulation is greatest when using observed and WFDEI forcing datasets. Results demonstrate the successful application of global gridded datasets in regional watershed-scale modeling. The distributed hydrologic simulations show good streamflow simulation performance based on statistical model evaluation techniques. Results are also promising for inter-annual variability. This study shows that WFDEI datasets hold great potential for understanding the hydrology of data-sparse Himalayan regions and indicate that CORDEX-SMHI and ERA-I derived precipitation products will require further validation, bias correction, and algorithm improvements, particularly over the high mountain regions.