



## **A comparative evaluation of a regional water-balance model for Central America using signatures of historical discharge data**

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High spatial and temporal variability of climate with frequent floods and droughts make the Central American region vulnerable to adverse effects of a changing climate. In combination with generally uncertain and fragmented hydrometeorological data, this creates great problems for water-resources estimation and management in the region. A particular problem is the lack of reliable regional datasets of precipitation so that global datasets such as TRMM and ERA-Interim need to be used. These data only exist for the last 10-20 years, but during these years there are much less discharge data available in this region (and also worldwide) compared to previous decades. We developed a regional water-balance model that takes advantage of globally available high-resolution datasets such as the hydrographic HydroSHEDS-dataset. Our approach in developing the model involved testing different model structures and methods for model evaluation on a daily and monthly scale. To calibrate and evaluate this regional model despite the mismatch between available precipitation and discharge data, we evaluated the approach of calibrating to signature indices of historical hydrological data in a few catchments where long-term data were available. The model evaluation was done within the Generalised Likelihood Uncertainty Estimation (GLUE) framework and the signature indices were derived in a limits-of-acceptability approach accounting for previously estimated uncertainties in discharge data. We compared model results obtained with the two global precipitation data sets TRMM and ERA-Interim with those obtained with local quality-controlled data.