Probabilistic quantitative precipitation estimates using reanalysis datasets: a comparison of different approaches

Pablo Mendoza[1], Balaji Rajagopalan[1] and Martyn P. Clark[2]
Department of Civil, Environmental, and Architectural Engineering, University of Colorado, Boulder, USA

Abstract. Statistical methods for generating probabilistic estimates of precipitation have become increasingly popular during the last decades, especially due to the advantage that these estimations may be done independently if the available data (predictors) is deterministic or probabilistic. Outputs from Numerical Weather Prediction (NWP) models are a common source of information for generating probabilistic estimations of precipitation, providing a set of predictors for adjusting the parameters associated to regression equations. Furthermore, ensemble precipitation estimates allow the quantification of a major source of uncertainty in hydrologic modeling (uncertainty in meteorological forcings), affecting thus the uncertainties in streamflow simulations. The main goal of this paper is to generate probabilistic precipitation estimates over specific SNOTEL sites of the Colorado Headwater Regions by using different statistical approaches such as logistic regression and quantile regression. With the aim to evaluate estimations, several verification methods are applied, including probabilistic verification scores such as the Brier Score (BS), and graphical methods such as reliability diagrams, discrimination diagrams and rank histograms.

[1] Department of Civil, Environmental, and Architectural Engineering, University of Colorado, Boulder, USA
And Cooperative Institute for Research in Environmental Sciences, University of Colorado, Boulder, Colorado, USA
[2] Research Applications Laboratory National Center for Atmospheric Research (NCAR), Boulder, Colorado, USA