



Creating a gridded historical daily precipitation product for the United States

William Kleiber and Gregory Benton

University of Colorado, Department of Applied Mathematics, Boulder, United States (william.kleiber@colorado.edu)

Historical gridded precipitation estimation is a critical goal in climate, atmospheric and hydrologic applications. A large number of historical gridded data products exist, but many of these do not adequately account for various sources of uncertainty. We discuss a new statistical approach to generating gridded historical data products based on in situ measurements of quantitative precipitation. The method relies on kernel density estimates of historical precipitation densities and copula-based methods for modeling. The approach is illustrated over the continental United States based on the United States Historical Climatology Network dataset. We accurately capture seasonally changing daily quantitative precipitation probability distributions at arbitrary locations, even outside of the observational network. The final outputs of our method are ensembles of spatial fields of historical daily precipitation estimates.