Benchmark Assessment of Mean Annual Runoff Prediction - Global Coverage

Ross Woods

NIWA, Hydrological Processes, Christchurch, New Zealand (r.woods@niwa.co.nz, +64 3 343-7803)

We quantify the performance of two methods for estimating the mean annual runoff from river catchments world-wide, as a contribution to benchmarking for Prediction in Ungauged Basins. The two models (Woods, Advances in Water Resources 26(3), 2003, and Fekete et al, Journal of Climate, 17(1), 2004) each make spatially-distributed predictions for the global land surface for grid cells. The models can be described as (i) similarity index (Woods) (ii) time-stepping (Fekete et al). Both can be used in an uncalibrated mode, with a priori estimates of parameter values that are based on generalised maps of physical attributes of the grid cells. The Fekete et al model can also assimilate measured runoff data where it is available, to produce a composite runoff surface, but it is not straightforward to benchmark this surface.

Based on data from over 600 catchments from the Global Runoff Data Centre, we report on the percentage of the total tested catchment area which has modelled runoff within $\pm 25\%$ of the measured runoff. We make a stratified assessment of the model errors with respect to latitude, catchment size, and aridity, and estimate the model sensitivity to key variables such as precipitation, potential evaporation and soil water holding capacity. There are numerous collaborative opportunities to extend the results of this study to include other global runoff assessment methods.