Dynamical downscaling of global seasonal forecasts: the MRED project

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The Multi-Regional climate model Ensemble Downscaling (MRED) project is a multi-institutional effort to produce large ensembles of downscaled winter seasonal forecasts from coupled atmosphere-ocean seasonal prediction models. Eight regional climate models each are downscaling 15-member ensembles from the National Centers for Environmental Prediction (NCEP) Climate Forecast System (CFS) to create 120-member ensembles, i.e. 8 regional models x 15 global ensemble members. These ensembles are produced for each winter season (December-April) of 1982-2003. Several groups have finished the full ensemble while others are currently in progress. Results to date show that combined global-regional downscaled forecasts have greatest skill for seasonal precipitation anomalies during strong El Niño events such as 1982-83 and 1997-98. Ensemble means of area-averaged seasonal precipitation for the regional models generally track the corresponding results for the global model, though there is considerable inter-model variability amongst the regional models. Skill of the regional models compared to the CFS varies greatly depending on both the geographical region and the variable being considered. For seasons and regions where area mean precipitation is accurately simulated the regional models add value by extracting greater spatial detail from the global forecasts, mainly due to better resolution of terrain. In terms of spatial variability of skill, the combined global-regional seasonal forecasts tends to perform best in the southwestern and southeastern U.S., possibly because both of these regions are known to have strong ENSO signals in their winter climate.