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# ENSO teleconnections in an ensemble of CORDEX-CORE regional simulations

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Using high-spatial-resolution regional simulations from the global program, Coordinated Regional Climate Downscaling Experiment-Coordinated Output for Regional Evaluations (CORDEX-CORE), we examine the capability of regional climate models (RCMs) to represent the El Niño–Southern Oscillation (ENSO) precipitation and surface air temperature teleconnections during boreal winter (December-February). This study uses CORDEX-CORE simulations for the period 1975-2004 with two RCMs, the RegCM4 and REMO, driven by three General Circulation Models (GCMs) from phase 5 of the Coupled Model Inter-comparison Project (CMIP5). The RCM simulations were run at a 25-km grid spacing over Africa, Central and North America, South Asia and South America.

The teleconnection patterns are calculated in the reanalysis data (observations), and these results are compared to those of the ensemble and individual simulations of both the GCM and RCM. Linear regression is used to calculate the teleconnection patterns and a permutation test is applied to calculate the statistical significance of the regression coefficients. Results show that overall, the ENSO signal from the GCMs is preserved in the ensemble and the individual RCM simulations over most of the regions analyzed. These reproduced most of the observed regional responses to ENSO forcing and showing teleconnection signals statistically significant at the 95% level. Furthermore, in some cases, the ensemble and individual simulations of RCMs improve the spatial pattern and the amplitude of the ENSO precipitation response of the GCMs, particularly over southern Africa, the Arabian-Asian region, and the region composed of Mexico and the southern United States. These results show the potential value of the GCM-RCM downscaling systems not only in the context of climate change research but also for seasonal to annual prediction.