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Evaluation of the WRF to model the diurnal cycle of surface temperature during austral summer in the Peruvian central Andes

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The modelling in mountain regions are one of the most difficult topic in numerical simulation. Here, we present simulations of the air temperature at 2 m height using Weather Research and Forecasting Model (WRF). The region of study is the Peruvian central Andes. This region is composed by complex topography and considers from 500 m near the amazon, at the east, to 5000 m.a.s.l. in the Andes. In addition, the topography is implemented from Shuttle Radar Topography Mission (SRTM) of 1 km of spatial resolution. NCEP FNL Operational Global Analysis data is used to force WRF. Dynamical downscaling is used with WRF up to reach 3 km of spatial resolution. The simulation is evaluated contrasting with observed values in six different zones of the study region. Interesting behaviour is observed if stations are grouped nearer the amazon, NA (<2000 m.a.s.l.) and over the Andes, AS (>2000 m.a.s.l.). NA and AS show correlation coefficients of $r > 0.7$, stating the good representation of the diurnal variability. However, there is a difference in the bias, NA overestimate while AS underestimate the observed values. In the first case the overestimation is enhanced due the overestimation during nights. In the second ones, the underestimation is probably due the bad representation on the altitude of the stations in the model, this is usually overestimate them. These results are valid for modelling using NOAH and CLM4 land surface model; although in AS the mean bias with NOAH is -4 degC while -2.5 degC with CLM4.