



Impact of Planetary Boundary Layer parametrization scheme and land cover classification on surface processes: wind speed and temperature bias spatial distribution analysis over south Italy

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The non-hydrostatic numerical weather prediction mesoscale model WRF has been used to simulate hourly surface wind speed and temperature over the Apulia region in south Italy for a winter (January 2013) and a summer (July 2013) period. The model has been set with three different Planetary Boundary Layer (PBL) schemes (YSU, MJY and MYNN3). Many studies demonstrate the existence of a bias for 10m wind speed and 2m temperature for several combinations of physical parametrizations. This work aims to a further investigation combining the three different PBL parametrizations with two land cover classifications, the default American land cover dataset USGS and the European one CORINE. A validation procedure of the resulting six model setups against ground data from the meteorological monitoring network provided by the Agrometeorological Service of Apulia Region (ASSOCODIPUGLIA) has been performed in order to inform on the ability of each setup to reproduce the selected surface parameters with a focus on the analysis of the resulting Normalized Mean Biases (NMB's). Through Taylor diagrams observation, YSU scheme turns to be the one which best reproduces the observed wind speed data for both land cover classifications and periods. Taylor diagrams observation also shows that MYNN3 is the best performing scheme in reproducing observed temperature data for both land cover classifications for January period. Instead for July period no difference between individual setup is reported. Maps of NMB's have been made in order to display the performances on each validation point. To test the spatial autocorrelation of NMB's, Moran's I hypothesis testing for nine alternative definitions of the distance weight matrix has been performed for each setup. The analysis of NMB's distributions shows that CORINE land cover classification enhances or leaves almost unchanged the performance of all schemes.