P52 Sensitivity of the grip-point selection for surface winds when the sub-grid topography is resolved

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The selection of the grid-point that most accurately represents an observed atmospheric situation is a controversial decision. The process of comparing a point observation with a discretized grid model is a challenge that increases when sub-grid processes are resolved and evaluated. In this sense, this work assesses the sensitivity in the selection of a grid-point when the sub-grid orography (SSO) is resolved for surface winds.

The experiments are conducted by Weather Research and Forecasting (WRF) model, over a region with complex terrain encompassing a 6 years period. Two simulations are performed differing in the inclusion (or not) of the sub-grid topography (WRF-default and WRF-topo). The sub-grid topography is resolved using the parameterization of Jiménez and Dudhia (2012). Previous works have demonstrated that the SSO parameterization reduces the wind speed bias by comparing with nearest grid-point. However, there is also a significant increase of the bias in a few stations with different orographic features.

Results show that the SSO scheme increases the wind speed spatial variability, and consequently the sensitivity to the selection of the most representative grid-point. Hence, to stablish a criteria to find the most repressentative grid-point becomes more relevant. Considering the minimum wind speed bias of the nine nearest grid-points reduces significantly the mean wind speed bias both in WRF-default and WRF-topo simulation. However, the grid-point with minimum bias for WRF-topo and for WRF-default is the same only 18% of the stations. Moreover, the grid-point with lower bias depends on the season. In addition, RMSE and the Pearson's correlation are inspected instead of the bias, showing that its selection also depends of the skill score considered.