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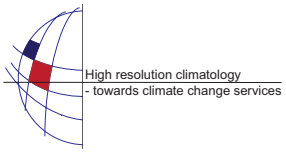

Mapping surface wind speed in Andalusia (Southern Spain) based on residual kriging

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We analyze the ability of the ordinary and residual kriging methods to provide 1-km spatial resolution surface wind speed (SWS) maps for Andalusia (Southern Spain). A dataset of daily-mean SWS values measured at 135 meteorological stations and covering the period of 2001-2005 was used. Overall, the ordinary kriging methodology was found a useful interpolation technique to provide relatively fair estimates of the SWS values, with RMSE values of around 0.49 m/s (23.22%) for the annual data. Nevertheless, this method showed a poor performance in areas of relatively high or low wind speed values. It was found that this weakness of the ordinary kriging is solved, partially, by using the residual kriging method. Particularly, the inclusion of a set of topographic explanatory variables (namely: terrain roughness, elevation, cross-product of slope and aspect and distance to the coast) enabled to account for around 30% of spatial variability. The inclusion of the explanatory variables in the kriging procedure (residual kriging) substantially improved the estimates compared to the ordinary kriging, particularly, for the high and low wind speed estimates.