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## Comparison of different geostatistical approaches to estimate wind speed at hourly scale in the province of Granada (Southern Spain)

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Wind plays a key role in different processes of the earth system such as the earth's energy and water cycles. The use of the wind to produce clean energy as a substitute of other traditional systems may help to reduce the emission, and, therefore, to mitigate climate change. Wind is defined by two variables, direction and speed. This work is focused on the assessment of the second one. The aim is to estimate wind speed at ten meters ( $U_{10}$ ) fields in the province of Granada (Southern Spain). A grid with a spatial resolution of 300 m and an hourly temporal resolution has been adopted to estimate it for the period 1986 to 2016. Different geostatistical estimation approaches (ordinary kriging, kriging with external drift, regression and regression kriging) have been evaluated considering a monthly variogram model. Elevation showed a good correlation with wind speed and has been used as secondary variable for the external drift and the regression approaches. We have also tested mesoscale ( $U_{80}$ ) and logarithm transformations of  $U_{10}$  for each of the geostatistical techniques. The performance of each transformation and geostatistical approach was assessed using a cross validation experiment. In general, geostatistical techniques that takes into account elevation as secondary information and approaches without transformation of data showed better accuracy. The regression kriging without transformation showed the lower mean error and mean squared error ( $0.03 \text{ m s}^{-1}$  and  $3.46 [\text{m s}^{-1}]^2$  respectively) for the considered period but other approaches such as kriging with external drift showed similar results ( $0.04 \text{ m s}^{-1}$  and  $3.52 [\text{m s}^{-1}]^2$  respectively).

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