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Evaluation of wind vectors measured by QuikSCAT using ocean buoy data along the Galician coast (NW Iberian Peninsula)

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Wind above sea surface constitutes a key parameter to analyze coastal phenomena, like upwelling in the NW part of the Iberian Peninsula. The present work analyzes the accuracy of QuikSCAT for the period 2000-2009 by comparing satellite data with in situ data from three buoys placed along the NW coast of the Iberian Peninsula. The use of these long data series has two main objectives, on the one hand, the margin of error diminishes with the extent of the series and, on the other hand, it allows capturing the high inter-annual variability of the area. According to previous studies, the wet season is characterized by a high variability, in such a way that wind patterns change from year to year.

The comparison confirms a low skill of QuikSCAT for low speed winds (<3 m/s) as previously pointed out by other authors. Once these winds were discarded, QuikSCAT revealed a higher accuracy for winds within the range 6-12 m/s. In direction, winds blowing from coast seem to be less accurately calculated by the satellite.

Statistical results were similar for the three buoys in spite of the different coastal orientations. In average, the RMSE and bias for wind speed were 1.5 m/s and 0.2 m/s, respectively. Statistical data were also similar for wind direction, with the mean RMSE on the order of 34º and the mean bias on the order of 4º in absolute value. These statistical parameters are at least as accurate as those calculated in other near-shore areas all over the world. In particular, the bias was observed to be lower (in absolute value) than measured by most of the authors, which is possibly due to the high percentage of sampled winds lying within the interval [6-12] m/s, where satellite measurements are more accurate.