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Importance of correcting wind input for wave simulations: analysis of a Mistral event in the French Mediterranean Coastal Zone

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Despite the many efforts carried out to study the air-sea interactions in the Mediterranean basin, the underestimation of predicted wind and wave fields for this zone remains a problem to investigate. In particular for enclosed basins, in the case of strong wind coming from the land, recent studies have shown that the sea surface wind speed simulated with atmospheric models is often underestimated. Using such simulated wind fields to force wave models a similar bias is observed on the modelled significant wave heights. However it is still unclear how important the accuracy of the wave models is and how the results of wave models could be improved using more accurate wind input.

The aim of this paper is to show that a correction applied on wind model's outputs allows to obtain more reliable predicted wave fields in the case of Mistral wind. The analysis is carried out using both the Regional Atmospheric Modelling System (RAMS) and the spectral wave model MIKE21SW developed by the Danish Hydraulic Institute.

The period of study (24-26 March 1998), characterised by a strong Mistral event, allows comparing simulated data with measurements collected during the international FETCH campaign in March-April 1998. Comparing the modelled wind speed with available measurements at sea, an increasing percentage coefficient is used to calculate the 'modified' wind inputs. The wave model is firstly forced with the wind fields provided by the atmospheric model RAMS and then with the corrected wind fields. In the second case evident improvements are observed in the representation of the significant wave heights for each measurement point.