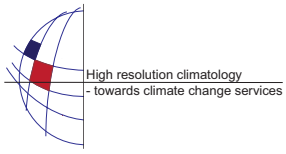
EMS Annual Meeting Abstracts
Vol. 7, EMS2010-368, 2010
10th EMS / 8th ECAC



WRF model and ASAR-retrieved sea surface wind over Eastern Mediterranean Sea

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In Synthetic Aperture Radar (SAR) imagery, signatures of coherent atmospheric structures, due to sea surface roughness modulation by surface winds, are usually well detected. In the present study, the wind fields derived from the Envisat Advanced SAR (ASAR) sensor have been analyzed and compared with those simulated with the Weather Research and Forecasting (WRF) model in two case studies over an area located in the eastern Mediterranean Sea, extending southward and eastward of Crete island. This is a region subject to complex wind patterns, due to the interaction of the almost steady northerly Etesian wind with the orography of the islands in the region.
The ASAR Wide Swath images provide datasets at exceptionally high resolution, appropriate for investigating the mesoscale phenomena on the marine atmospheric boundary layer, allowing the retrieval of surface wind field. The latter has been obtained with a methodology based on the 2-D Continuous Wavelet Transform, suitable to isolate the backscatter patterns on the base of energy and scale considerations.
Numerical simulations with WRF have been performed using three 2-way nested domains, the inner one covering the area of interest with a resolution of 1 km. Several simulations, using different boundary layer parameterization schemes, have been performed in two case studies corresponding to mountain lee waves and island sheltering detected in the ASAR image. The 10 m winds resulting from the numerical experiments are compared each other and with those retrieved from the ASAR, both quantitatively and qualitatively, in order to analyze the correspondence of observed and simulated wind structures.