



Comparison of sea surface winds derived from active and passive microwaves instruments on the Mediterranean Sea

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In order to characterize the energy and momentum fluxes at the air-sea interface, the surface wind vector must be known with adequate spatial and temporal coverages. Satellite-borne active and passive microwaves instruments perform such measurements.

In the Mediterranean Sea, and in general in enclosed or semi-enclosed basins, an adequate coverage is yet more difficult to achieve than in open sea, because of the presence of vast coastal areas and elevated orography near the coastline.

This study aims to compare the performance of three of such instruments (two actives and one passive) over several years of activity over the Mediterranean Sea, in order to delve into the possibility of using the three data-sets as a common reference for marine meteorology investigations, dramatically improving the availability of surface wind data in the Mediterranean Sea. They are the METOP-A ASCAT scatterometer, the QuikSCAT SeaWinds scatterometer and the Coriolis WindSat radiometer.

ASCAT and QuikSCAT data are freely available for download, at spatial resolution of 25 km by 25 km and 12.5 km by 12.5 km, from the Physical Oceanography Distributed Active Archive Center PO.DAAC (<http://podaac.jpl.nasa.gov>). ASCAT near real time data have 2 hours latency. The time span covered by these data is March 2007-present for ASCAT, July 1999-November 2009 for QuikSCAT. In the Mediterranean Sea the nominal temporal coverage is less than 2 hit per point per day for both.

WindSat data have spatial resolution of 25 km by 25 km, cover the period February 2003-present, and are freely available for download from Remote Sensing Systems (<http://www.ssmi.com>). They are available as delayed datasets covering one day at a time.

The two collocated datasets cover the period February 2003 - November 2009 (WindSat - QuikSCAT) and March 2009 - November 2010 (WindSat - ASCAT), and offer the means to perform:

- a comparison of the performances of active and passive microwaves instruments;
- a very long comparison (seven years) of the data on the collocated dataset WindSat-QuikSCAT;
- an assessment of the active/passive instruments comparison beyond the end-of-life of the QuikSCAT instrument.

The main results of the comparisons are the unsuitability of the WindSat data for coastal applications, a general degradation with time of some statistical indicators of the data quality (wind speed bias, wind direction bias, wind direction correlation), as well as the presence of an irregular population of some of the circular sectors for the WindSat wind direction, which could be attributed to systematic errors.