

The Influence of Agulhas Current Flow on SAR derived Wind Fields

July 31, 2015

Abstract

Wind velocity fields from 987 Synthetic Aperture Radar (SAR) swaths of individual wind events were derived using the CMOD5.n, Geophysical model function (GMF). The data were processed and investigated in order to determine the affect of the surface roughness of the Agulhas Current on the Normalized Radar Cross-Section (NRCS) and, ultimately ,the derived wind signature error. The data was refined into 6 zones of interest and standardized into 4 direction regimes in order to eliminate time variability and ambiguity, and to facilitate a better intercomparison. Transects were constructed, perpendicular to the core of the current, for each zone of interest and the scalar wind speed for each direction regime was overlaid on to SEVIRI SST daily mean data as a proxy for the current core location.

Preliminary results show a marked increase in along-current mean wind speeds over the current, with a greater than expected effect occurring in the up-current direction regime, and the down-current direction regime exhibiting an effect which opposes that of conventional theory. This suggests that there are other, non-negligible geophysical roughness modifying effects which need to be considered. Secondly, it was found the that degree of influence of the ocean current on the derived wind speed is relative to the initial wind speed itself. The greatest effect was found to occur between 5 and 15*m/s*. Additional case studies also yielded evidence of Natal Pulse features in the wind data which reaffirms the suggestion of external, uncatered for, roughness modifying effects.