



Passive microwave estimates of sea surface winds over the Mediterranean sea

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The sea surface wind is an important variable in the dynamics of the atmosphere as well as in the circulation of seas and oceans. The advent of the satellite technology made possible the development and deployment of various space-borne instruments that can be used in deriving global estimates of sea surface winds. Among the instruments that, although not specifically designed to monitor the sea surface winds, can be used to derive information about the sea surface winds are the passive microwave radiometers such as the Special Sensor Microwave Imager (SSM/I) and the Advanced Microwave Scanning Radiometer for Eos (AMSR-E). In this study, an algorithm is devised to estimate sea surface winds over the Mediterranean Sea from microwave radiometer observations. The algorithm is based on numerical radiative transfer calculations. That is, realistic atmospheric profiles from numerical model reanalyses and realistic sea surface variables (wind, salinity, temperature) are used to simulate radiometer brightness temperature. Then, a nonlinear regression is derived to determine the sea surface wind from the simulated brightness temperatures. The algorithm is applied to SSM/I and AMSR-E observations over the Mediterranean Sea. The estimates are analyzed and compared to buoy wind estimates from the Hellenic Centre for Marine Research. Based on the findings, the algorithm is refined. Conclusions and recommendations concerning the use of the sea surface wind estimates in various applications are formulated.