

Model function for wind speed retrieval from SARAL-AltiKa radar altimeter backscatter: Case studies with TOPEX and JASON data

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Abstract

In this article, a forward model is developed for estimation of the microwave nadir-viewing radar backscatter of a sea surface at C-, Ku- and Ka-bands during clear sky conditions. The forward simulations are carried out based on electromagnetic field theory of stratified media under various conditions like, sea surface temperature, salinity and wind. This theoretical basis is tested as a model function for retrieval of oceanic wind speed from the radar backscatter measurements from earlier or existing altimeters such as TOPEX/Poseidon and Jason-2 during non-raining conditions. Results show that the present model provides a better agreement with real altimeter data for wind speed retrieval at Ku-band. Moreover, a multiple regression approach is utilized to find the underlying relationship between radar backscatter and wind speed at Ka-band that could be possibly utilized for the retrieval of oceanic wind speed from the AltiKa radar measurements onboard the recently launched Satellite with Argos and AltiKa (SARAL).