A New Smart Weighted Fitting Algorithm of Retrieving SWH in China's Offshore Waters Based on Data from the SWIM Radar on Board the CFOSAT

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Résumé

The nadir echo waveforms of Surface Ware Investigation and Monitoring (SWIM) are similar to those provided by satellite radar altimeter: both are affected by land echoes in coastal waters. For this reason, geophysical parameters (i.e., significant wave height (SWH)) derived from the nadir echoes retrieved over coastal waters have relatively large errors and are reliable only to a certain extent. In this paper, we first studied echo waveforms from coastal waters, classified the distorted waveforms; Secondly, several fitting algorithms were investigated in processing those contaminated data, and then offshore echoes were simulated by a series of electromagnetic scattering models according to the classifications of the echoes surveyed by the SWIM radar. Those behaviors of echo waveforms were obtained to help retrieving SWH. Finally, we proposed a new smart weighted piecewise fitting (SWPF) algorithm in order to obtain the SWH of coastal waters. This new algorithm ignores the components of land echoes and mainly pays attention to the ocean signals. The validations of SWPF used to retrieve the SWH were carried out by comparing with the buoy, Jason1/2, and AUX data. The bias and the unusable distance were evaluated. The compared results showed that SWPF had a very weak bias and a good consistency with respect to the buoy and AUX data, and that it could effectively reduce the unusable distance (to

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