
Evaluation of CFOSAT scatterometer wind data in global oceans

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Résumé

The China-France Oceanography SATellite (CFOSAT) is a joint mission of the Chinese and French space agencies which was successfully launched on 29 October 2018. Recently, CFOSAT scatterometer wind data with a spatial resolution of 12.5 km² and 25 km² were open for research use. To evaluate the CFOSAT wind product, the L2B swath data with a spatial resolution of 25 km² were used to compare with in situ measurements between December 2018 and December 2020. The in situ measurements were collected from seven different buoy platforms include: the National Ocean Technology Center, China; the National Data Buoy Center buoys, US; the operational TAO/TRITON Array of Moored ocean buoys; the Research Moored Array buoys for Africa-Asian-Australian Monsoon Analysis and Prediction; the Pilot Research Moored Array buoys; the Ocean Climate Station; and the National Earth System Science Data Center, National Science & Technology Infrastructure of China. All buoy wind speeds were converted to 10 m neutral winds using a simple logarithmical method. The temporal and spatial differences between the CFOSAT and in situ measurements were limited to less than 30 minutes and 0.25°. 326276 collocations were collected from 252 buoys. The results indicate that the mean bias for wind speed and direction are 0.29 m s⁻¹ and 1.26°, root mean squared error (RMSE) are 1.72 m s⁻¹ and 35.32° and correlation coefficient (r) are 0.84 and 0.78, respectively. The bias, RMSE and r in the near shore (less than 100 km away from the land and water depth < 50 m) were 1.13 m s⁻¹, 2.53 m s⁻¹ and 0.77 for wind speed and 0.98°, 39.42° and 0.71, respectively. After rain-flag was used, the bias, RMSE and r changed to 0.78 m s⁻¹, 1.98 m s⁻¹ and 0.83 and 1.62°, 33.85° and 0.75, respectively. In the offshore, the bias, RMSE and r were 0.01 m s⁻¹, 1.32 m s⁻¹ and 0.89 and 1.36°, 33.61° and 0.8, respectively. After the rain effect is rejected, the bias, RMSE and r altered to -0.04 m s⁻¹, 1.16 m s⁻¹ and 0.9 and 1.50°, 30.41° and 0.82, respectively. The performance of the CFOSAT wind products is better than the SSMIS, AMSR, TMI, OSCAT, HY-2A and is comparable to that of the WindSat, QuikSCAT, ASCAT and Sentinel-3 wind products. The effects of sea surface temperature, air-sea temperature difference, significant wave height, atmospheric

*Intervenant

pressure and sea surface current on wind residuals were also investigated. The evaluation results over the first two years show that CFOSAT wind products meet the requirements of scientific research although some improvements are needed to enhance the performance.