SEA SURFACE TEMPERATURE RETRIEVAL FROM IRAS/FY-3A DATA

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Abstract: Sea Surface Temperature (SST) is a key climate parameter, which can be accurately derived from passive infrared remotely sensed data in global scale. This work addresses the SST retrieval from the measurements acquired by the InfraRed Atmospheric Sounder (IRAS) aboard the Chinese second generation polar-orbiting meteorological satellite FengYun 3A (FY-3A). IRAS/FY-3A channels 8 (12.47μm) and 9 (11.11μm) are two infrared window channels, and are suitable in SST estimation. One of the factors affecting the accuracy of retrieved SSTs is the calibration. However, the calibrations of IRAS/FY-3A infrared channels have not been validated so far. Fortunately, the accurately-calibrated high spectral resolution channels of Atmospheric InfraRed Sounder (AIRS) aboard Aqua fully contain IRAS/FY-3A channels 8 and 9, and can be used as references in the intercalibration. The intercalibration of IRAS/FY-3A channels 8 and 9 with AIRS/Aqua data in July 2008 over the North Pole region will be implemented using the High Spectral Convolution (HSC) method (Gunshor *et al*., 2004; Jiang *et al*., 2009). The Sea Surface Emissivity (SSE), another important parameter in SST derivation, varies with wavelength, Viewing Zenith Angle (VZA) and sea surface roughness mainly caused by sea wind. To achieve an accuracy of 0.3 K in SST retrieval, it requires that the SSE uncertainty should be not greater than 0.5%. The SSE model of Wu and Smith (1997) was adopted in this work, because it can precisely predict SSE, even at large VZAs. SST retrieval algorithm (Noyes *et al*., 2006; Niclòs *et al*., 2007) was developed with the aid of numerical experiments carried out using MODerate spectral resolution atmospheric TRANsmittance and radiance code (MODTRAN), SAFREE dataset,

the modeled SSEs and radiative transfer equation. The SSTs in global scale were estimated from the actual IRAS/FY-3A observations using the multi-channel algorithm, and then validated with the field measurements of National Data Buoy Center (NDBC). The results indicate that the accuracy of the derived SSTs is ~0.6 K.

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