

Three-Way Error Analysis between AMSR2, Himawari-8, and In Situ Surface Temperature Observations

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For sea surface temperature (referred to as SST) observed by satellite, skin temperature of around 10 μm depth from ocean surface is observed by infrared radiometer, and sub-skin temperature of around 1 mm depth is observed by microwave radiometer.

Therefore, SST errors observed by satellite occur due to influence of solar radiation when sea surface wind speed is weak and so on, so in conventional verification, SST observed by water temperature and depth measurement of marine buoy which observe water temperature of around 1 m is taken as ground truth and has been verified with satellite data.

However, marine buoy data also has errors due to aged degradation of measuring instruments and weather condition, it is important to evaluate each error including marine buoy.

For this reason, in this study, SST observed by Advanced Microwave Scanning Radiometer2 (AMSR2) which is the microwave radiometer carried by Global Change Observation Mission –Water (GCOM-W) satellite, and SST observed by Advanced Himawari Imager (AHI) which is the infrared radiometer carried by Himawari - 8 geostationary meteorological satellite and SST observed by marine buoy were compared and verified.

Marine buoy data are iQuam dataset provided by National Oceanic and Atmospheric Administration (NOAA), and among them, only high quality buoys was extracted in this study. For validation condition, firstly, I matched up SST observed by AMSR2 with SST observed by buoy, and next, matched up SST observed by Himawari with buoy SST used only AMSR2 matched-up data, and finally, matched SST observed by AMSR2 with SST observed by Himawari. And, I calculated the relative error as above and evaluated each absolute error by referring to ANNE G. O' CARROLL, JOHN R. EYRE, AND ROGER W. SAUNDERS(2007).

In this study, I show the results of evaluation between AMSR2, Himawari-8, and In Situ sea surface temperature Observations.

Keywords: sea surface temperature, microwave radiometer, infrared radiometer