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A comparative study on the creation of multi-satellite SST ensemble using OI and BMA.

Kwangjin Kim, Wang-Won Lee

Department of spatial information engineering, Pukyong National Univ.

Sea surface temperature(SST) is an important parameter to understand global climate change and numerical weather prediction. So, to retrieve accurate SST have been very important issue. SST is detected with various satellite-born instruments. SST delivered from satellite have an advantage that is to provide a spatially continuous and consistent dataset. However the satellite products have uncertainty. Also the amount of the uncertainties is different due to difference in sensor and retrieval algorithms. To reduce the inherent uncertainties, statistical methods such as data assimilation and ensemble have been used. In this study, multi-SST product will be created using Bayesian model averaging(BMA) and optimal interpolation(OI) of the statistical methods, and be compared each other. The BMA is weighted averaging using the posterior probability as weight. BMA can consider difference in amount of uncertainty. OI is statistical methods to minimize error variance to reference data for data synthesis and gaps interpolation. In this study, the Moderate Resolution Imaging Spectroradiometer(MODIS) and Advanced Microwave Scanning Radiometer-EOS(AMSR-E) of Aqua and Advanced Very High Resolution Radiometer(AVHRR) of NOAA are used as ensemble members. And Advanced Along-Track Scanning Radiometer(AATSR) of Environmental Satellite(EnviSat) is used as reference data. The match-up data set consist of SST product for 3 years from 2006 to 2008. And 36,000 random sample data were extracted for 36 months(i.e., 1,000 samples per month). And then The posterior probability and covariance are calculated through analysis with reference data. The leave-one-out method was employed for the training and validation of a 36-month dataset. Finally, the two ensemble SST will be compared in various aspects such as RMSE and the cost of calculation.