Dynamic interpolation of HIMAWARI-8 SST

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Object

To estimate short term variations of oceanographic condition around Japan using the various observation data including the high resolution satellite SST, we will develop an ensemble forecast system and provide forecast products for establishing the usability in human marine activities.

Summary

We constructed a data assimilation system using the ensemble Kalman filter combined with an ocean model. In this system, Himawari-8 SST data provided by JAXA are assimilated. The result represents the realistic shape of the Kuroshio front, and exhibits the successful dynamic interpolation of SST variation which could not be well detected by Himawari-8 due to cloud effects.

Method and Data

Model: Stony Brook Parallel Ocean Model (sbPOM), **Forcing data:** NRA1, **Area:** South of Japan (128-142°E, 28-36°N)
**Horizontal resolution:** 1/36 degree, **Assimilation:** Local Ensemble transformation Kalman filter algorithm (LETKF)
Assimilated data: Himawari-8 SST, NAVOCEANO MCSST, AVISO SSHA, GTSPP (in-situ temperature/salinity)
**Composite period:** 2-day (Satellite SST and in-situ data), 6-day (AVISO SSHA)

Results

Representation of Kuroshio SST front

| HIMAWARI-8 | LETKF (1/36 degree) | JCOPE2 (1/12 degree) |
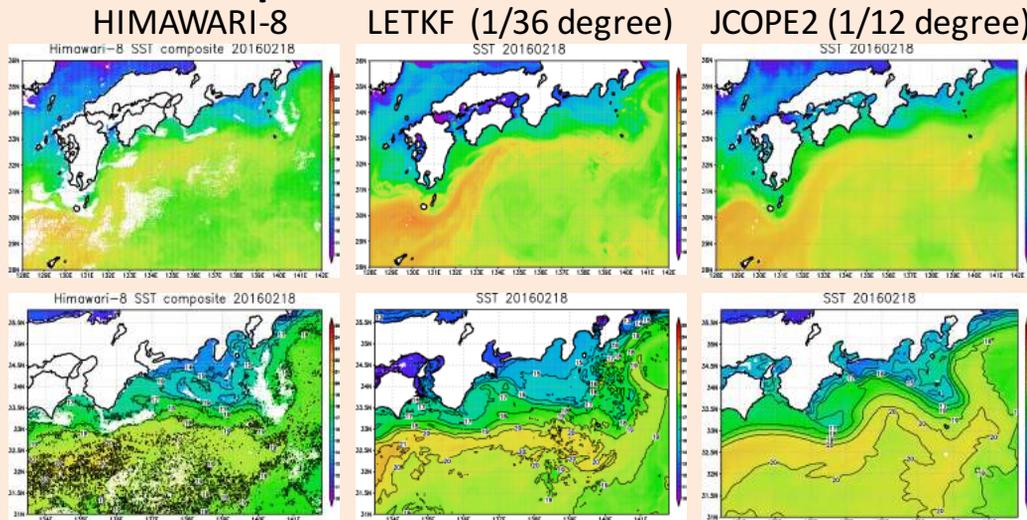
A snapshot of LETKF SST analysis represents the sharpness of SST front more realistically than that reproduced by the current operational forecast system JCOPE2. However, LETKF SST analysis tends to overestimate SST in the warm upperstream region.

Dynamic interpolation

| Jan. 27, 2016 | Jan. 29, 2016 | Jan. 31, 2016 |
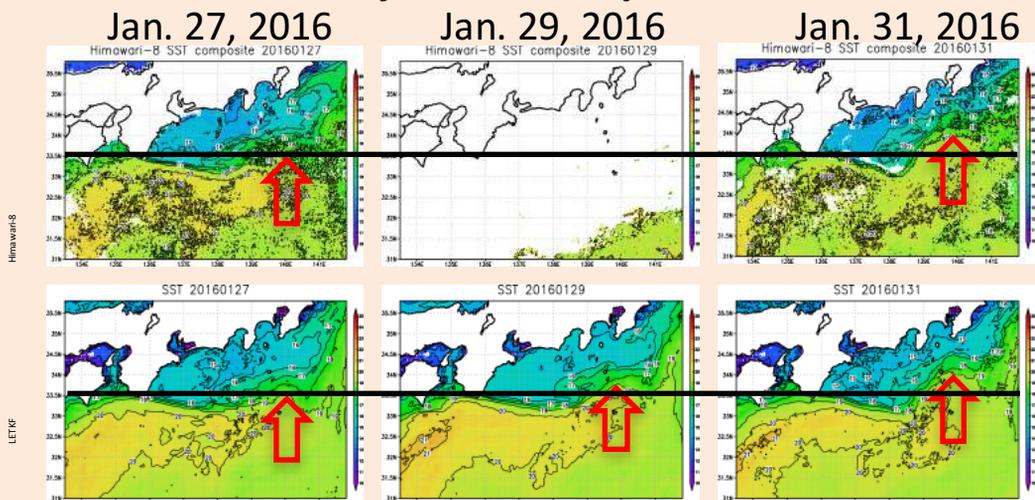
Even though the Himawari-8 SST data were missing in almost part on Jan. 29 due to cloud effects, the whole process of northward moving Kuroshio SST front from Jan. 27 to Jan. 31 was reproduced by the LETKF assimilation.

Future work

To utilize the high resolution SST data of Himawari-8 more effectively, we will develop the higher resolution ocean model. Also, we will assimilate additional satellite SST data observed by the microwave radiometer (e.g. AMSR2, GMI).