Report from JMA for GHRSST-XVII

Japan Meteorological Agency

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Introduction
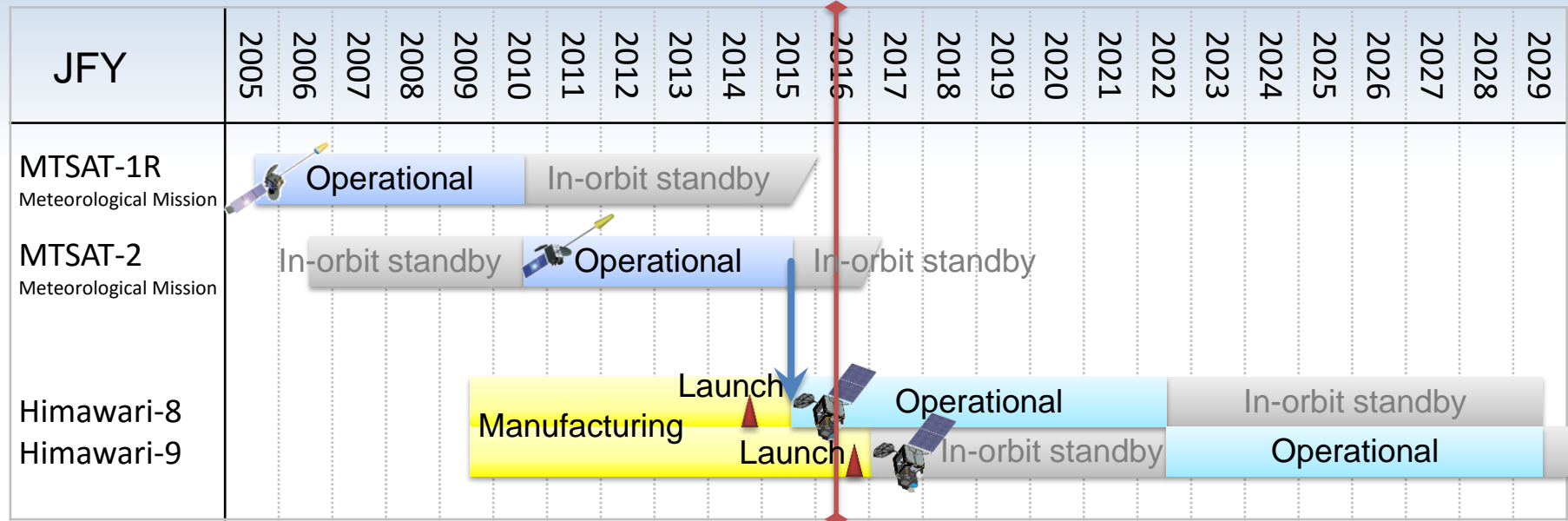
- **MGDSST (L4 SST)**
  - Global, 0.25° resolution, Daily
  - Input: AVHRR (NOAA-18, 19, MetOp-A), AMSR2, Windsat, in-situ
  - Prompt/delayed analysis and reanalysis
    - Prompt analysis: conducted within JMA's NWP System
    - Delayed analysis: conducted five-months later in principle
    - Reanalysis: reprocessed for 1982-2006 with Pathfinder SST v5.0/5.1
  - Included in the GMPE system
- **Satellites**
  - JMA operates geostationary satellites:
    - Himawari-8
   - MTSAT-2 (stand-by satellite)

Himawari-8/9 timeline

JFY	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
MTSAT-1R Meteorological Mission		Operational			In-orbit standby																				
MTSAT-2 Meteorological Mission		In-orbit standby				Operational			In-orbit standby																
Himawari-8 Himawari-9					Manufacturing					Launch		Operational							In-orbit standby						
										Launch		In-orbit standby						Operational							

- **Himawari-8** was launched on 7 October 2014.
- **Himawari-8** started operation on 7 July 2015, replacing **MTSAT-2**.
- **MTSAT-2** observation parallel to **Himawari-8** operation terminated at 00 UTC on 24 March 2016.
- **Himawari-9** is scheduled for launch in 2016.

Main activities since GHRSST XVI

- Himawari-8 L3 SST
  - Hourly, 0.02° horizontal resolution
  - Routine production started at JMA's Meteorological Satellite Center in Oct. 2015
  - Data period: retroactive from Aug. 2015
- Development of regional analysis using Himawari-8 SST data
  - Product: <u>HIMSST</u> (High-resolution MGDSST)
  - Daily, 1/10° resolution for the western North Pacific
  - Test operation started in March 2016
  - Data period: retroactive from Oct. 2015
    [from Jun. 2013 to Mar. 2016 for pilot products (HIMSST w/ MTSAT-2)]

- Ongoing development to improve MGDSST
  - Incorporation of shorter time-scale component of AMSR2
    -> Parameters for optimal interpolation have been determined
  - Incorporation of VIIRS ACSPO L3 SST
    -> L3 data have been acquired from NOAA Server

Data availability
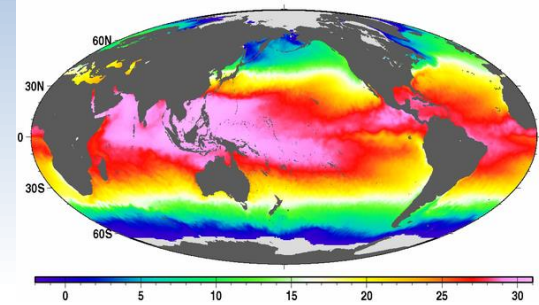
- ## MGDSST (L4 product)
  - Available via NEAR-GOOS Database:
    - http://ds.data.jma.go.jp/gmd/goos/data/database.html

    The latest version was made available in Dec. 2015.
    - Text format
  - GDS 2.0 implementation is underway.
    - Distribution via JAXA's RDAC Server is planned for the current year.

- ## HIMSST (L4 product)
 - Product release vie the NEAR-GOOS database is planned for the current year (text format).
  - GDS2.0 implementation is planned for the coming year.

- ## Himawari-8 SST (L3 product)
  - Provision of data for intercomparison in GDS 2.0 format is under consideration.

Himawari-8 L3 SST

- JMA's Meteorological Satellite Center (MSC) produces Himawari-8 L3 SST data.
- Same SST retrieval algorithm as used by JAXA based on a quasi-physical algorithm (Kurihara et al. 2016)
- Cloud mask based on JMA's Fundamental Cloud Product for Himawari-8
- <u>Hourly</u>, 0.02° horizontal resolution (0.04° for MTSAT-2)
- Coverage: 60°S – 60°N, 80°E – 160°W

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GHRSST
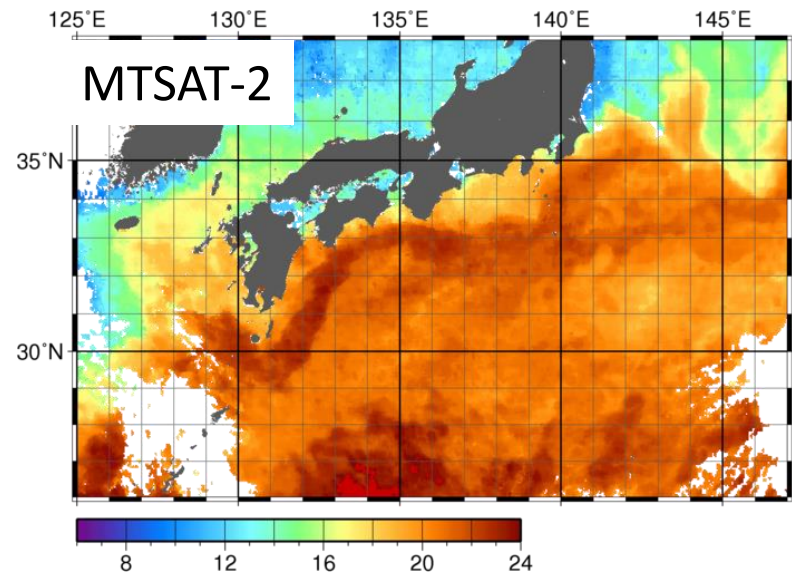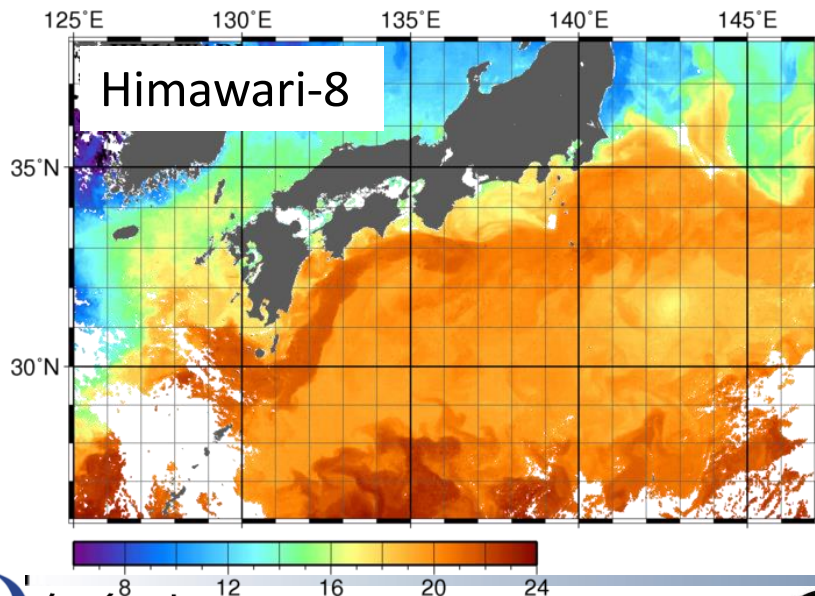
Himawari-8 SST Validation (March 2016)

- Match-up of satellite and buoy SSTs with time differences within 1.25 hours and spatial distances of less than 10km from March 1 to 31 (until March 24 for MTSAT2).
- Himawari-8 SST data were superior to those of MTSAT-2 SST.

Himawari-8


```
#:      178342
BIAS:    -0.409
RMSE:    0.782
STDE:    0.667
```

MTSAT-2


```
#:      143063
BIAS:    -0.450
RMSE:    1.271
STDE:    1.189
```

気象庁 Japan Meteorological Agency

GHRSST
Group for High Resolution
Sea Surface Temperature
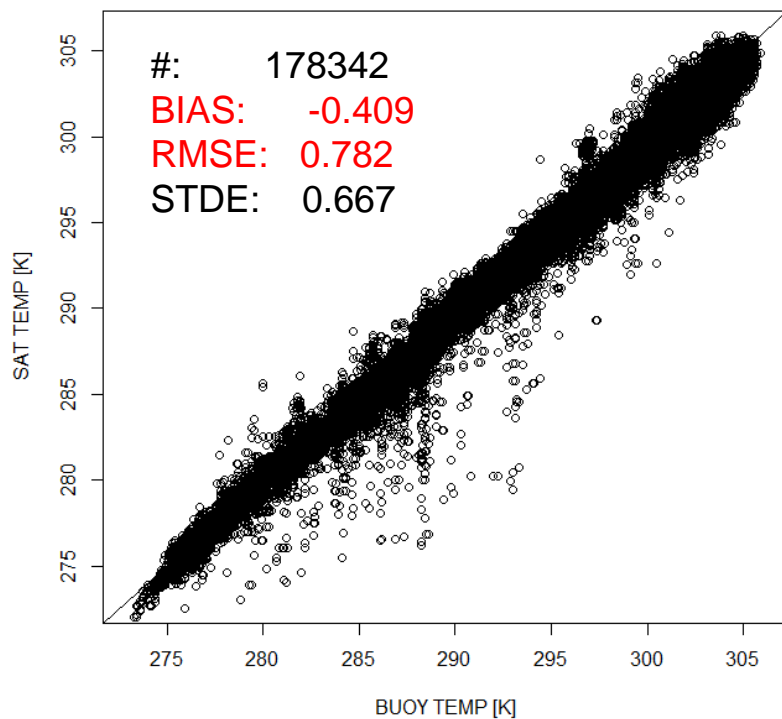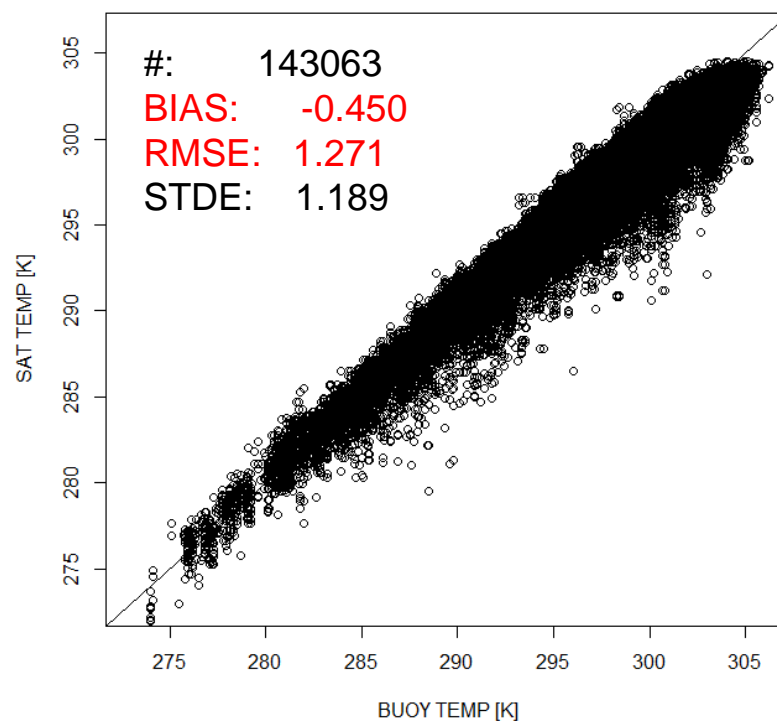
Regional SST analysis (HIMSST)

- Product: HIMSST (High-resolution MGDSST)
- western North Pacific, 1/10° resolution, Daily
- Input: AVHRR, AMSR2, Himawari-8, in-situ
- Shorter/smaller scale components not used in MGDSST are adopted.
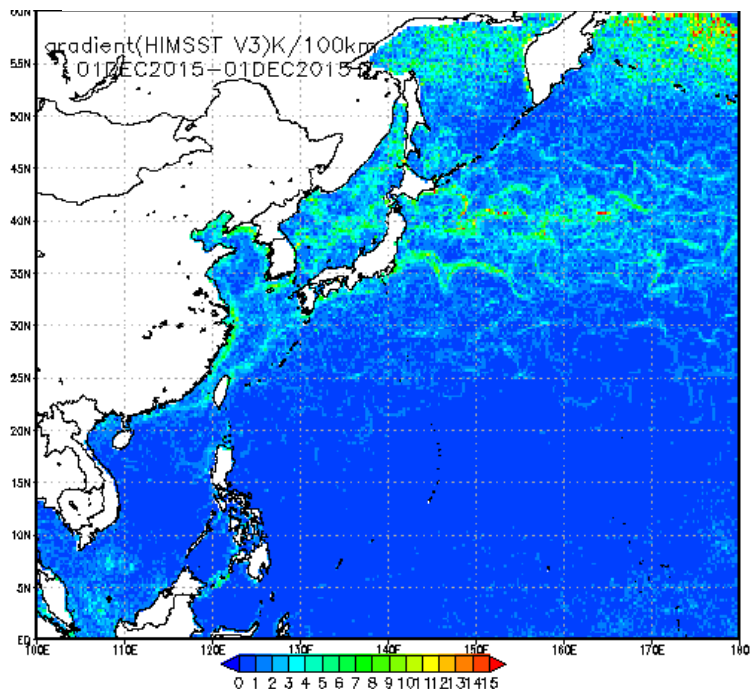- Test operation started in March 2016
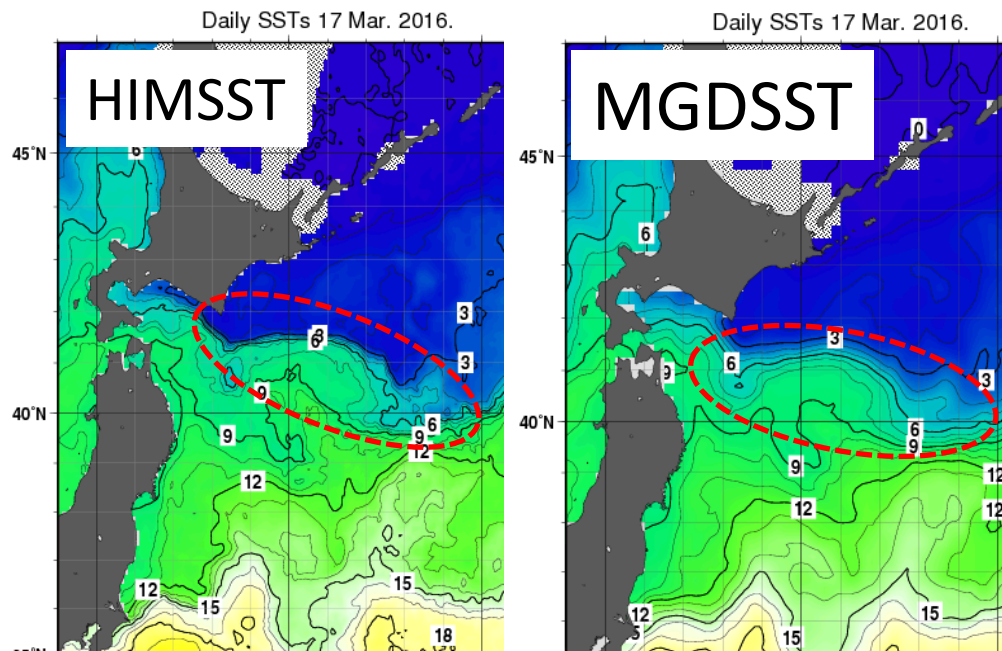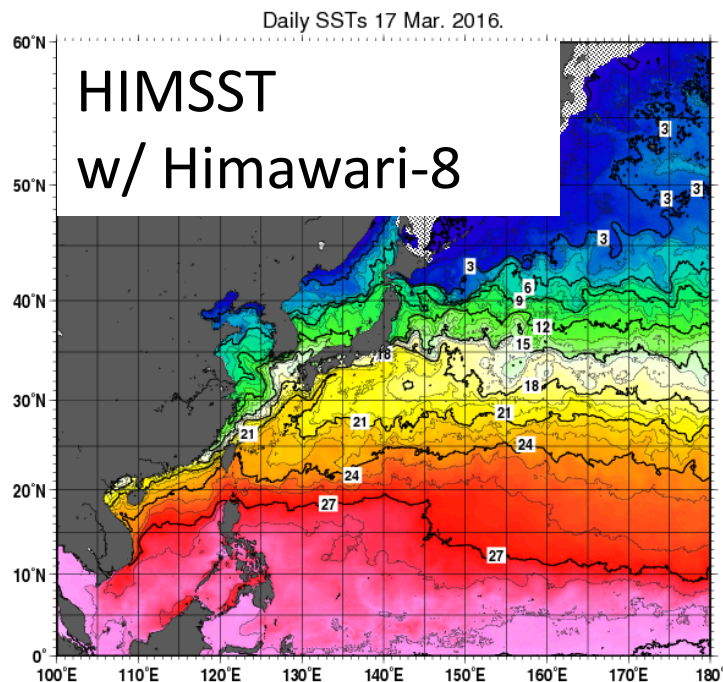
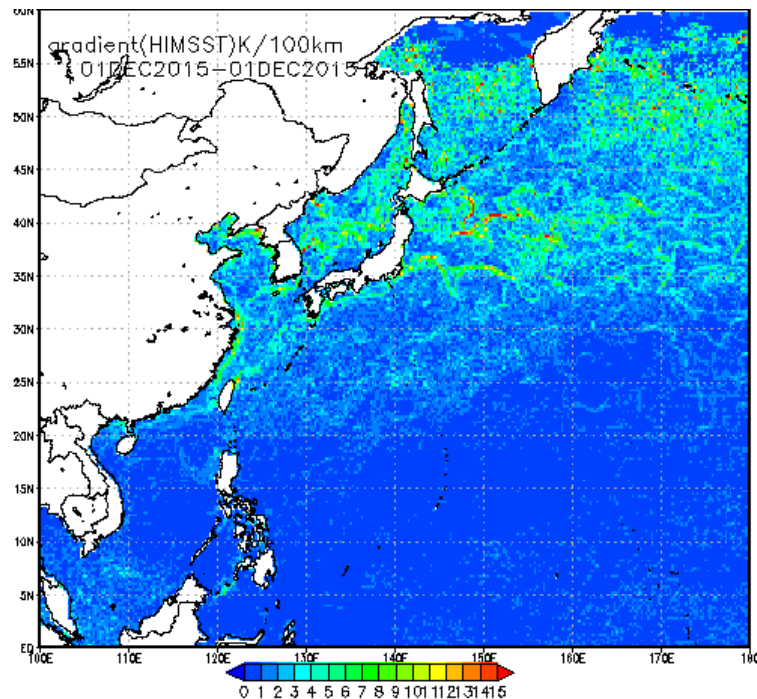The new regional SST analysis (left) shows sharper SST gradients.

Regional SST analysis (HIMSST)
gradient comparison with HIMSST w/ MTSAT-2
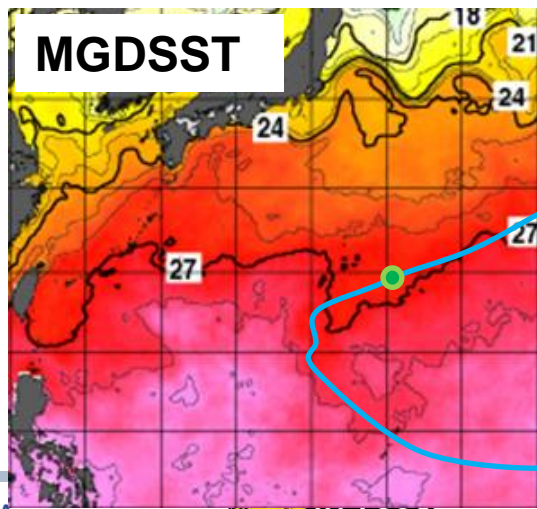
HIMSST w/ Himawari-8
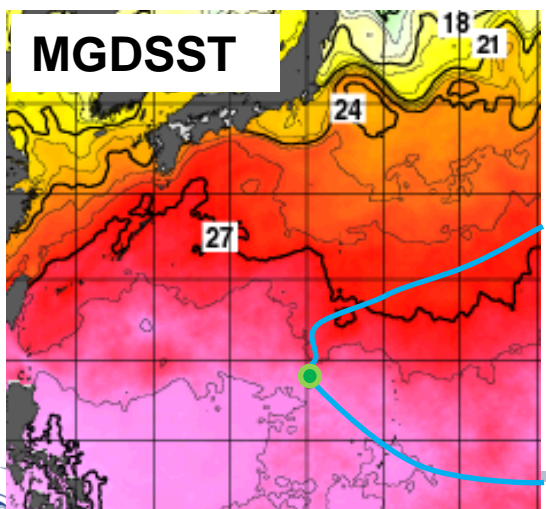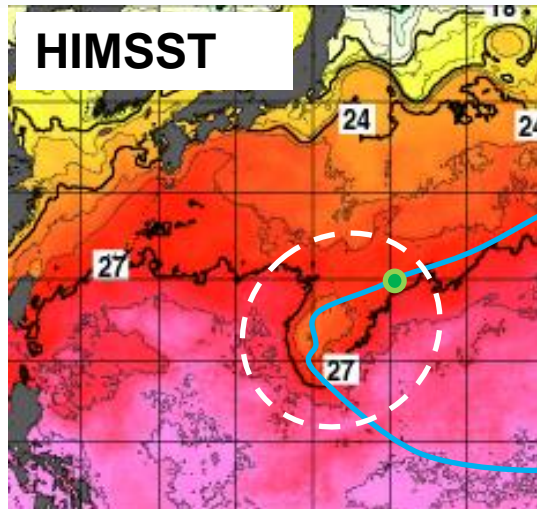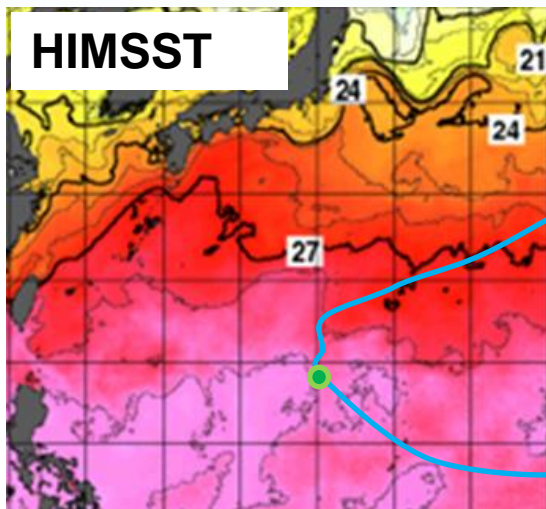

HIMSST w/ MTSAT-2

- Both products show sharp SST gradients in Kuroshio Extension, etc.
- The HIMSST w/ Himawari-8 (left) reduced unnatural high gradients around the dateline and at the high latitudes (except north of 55°N).

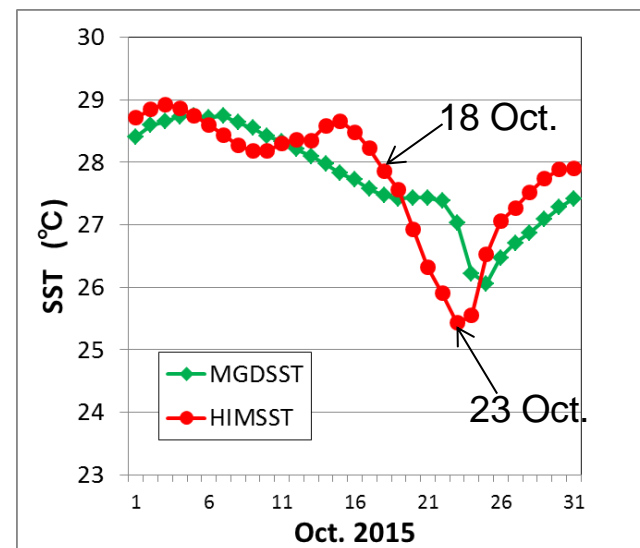# SST cooling response after typhoon passage

18 Oct. 2015 ➡ 23 Oct. 2015

HIMSST exhibits clearer cooling response than MGDSST.

— Typhoon track *CHAMPI*

● Typhoon position on 18 and 23 Oct. 2015

Thank you for your attention