Report from JMA for GHRSST-XIX

Japan Meteorological Agency

Toshiyuki SAKURAI[*], Hiromu KOBAYASHI, Mika KIMURA, Yukio KURIHARA[**], Akiko SHOJI[**]
(Global Environment and Marine Department),
Toshiyuki KITAJIMA (Observation Department),
Kouki MOURI (Meteorological Satellite Center)

[*]e-mail: tsakurai@met.kishou.go.jp
[**] affiliation is valid until March 2018
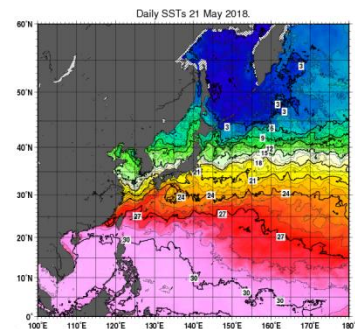
Introduction (1)

- **Global SST Product (MGDSST)**
  - Global, 0.25° resolution, Daily (L4 SST)
  - 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
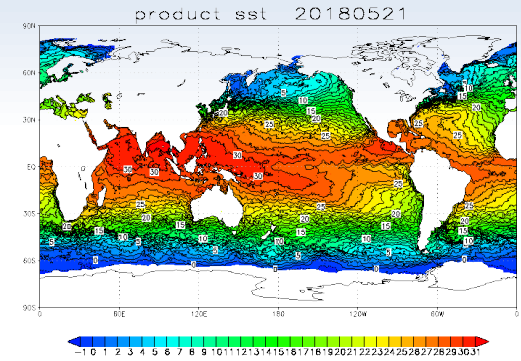
- **Regional SST Product (HIMSST; HIgh resolution Merged satellite and in-situ data Sea Surface Temperature)**
  - Daily, 1/10 deg. resolution for the western North Pacific
  - Operation started in Nov. 2016
  - Input: Himawari-8 in addition to data used in MGDSST
  - Only prompt analysis

気象庁 Japan Meteorological Agency
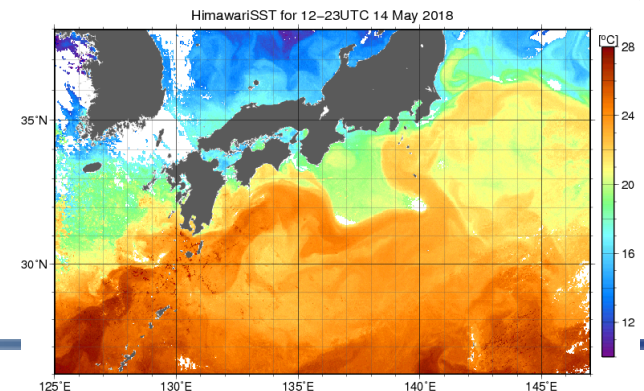
GHRSST

Introduction (2)

- ## Satellites

  - JMA operates geostationary satellites: Himawari-8, -9

- ## Himawari SST

  - Hourly, 0.02deg horizontal resolution
  - Routine production started at JMA's Meteorological Satellite Center in Oct. 2015
  - Same SST retrieval algorithm as used by JAXA based on a quasi-physical algorithm (Kurihara et al. 2016)
 - Data period: from Aug. 2015 onwards

Y. Kurihara, H. Murakami, M. Kachi, Sea surface temperature from the new Japanese geostationary meteorological Himawari-8 satellite, Geophys. Res. Lett., 43 (2016), pp. 1234-1240

HimawariSST for 12–23UTC 14 May 2018

気象庁 Japan Meteorological Agency

GHRSST
Group for High Resolution
Sea Surface Temperature

Main activities since GHRSST XVIII

• Himawari-9

– Launched on 2 Nov. 2016, located at 140.7 E.

– It was put into in-orbit standby as backup for Himwari-8 on 10 Mar. 2017

– Several non-operational observations (e.g. health check) have been conducted. Himawari-9 SSTs have a larger negative bias compared to Himawari-8 SSTs.
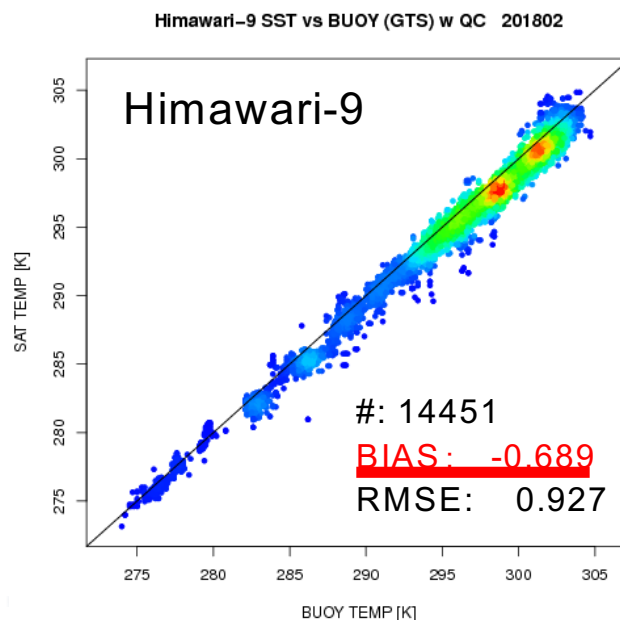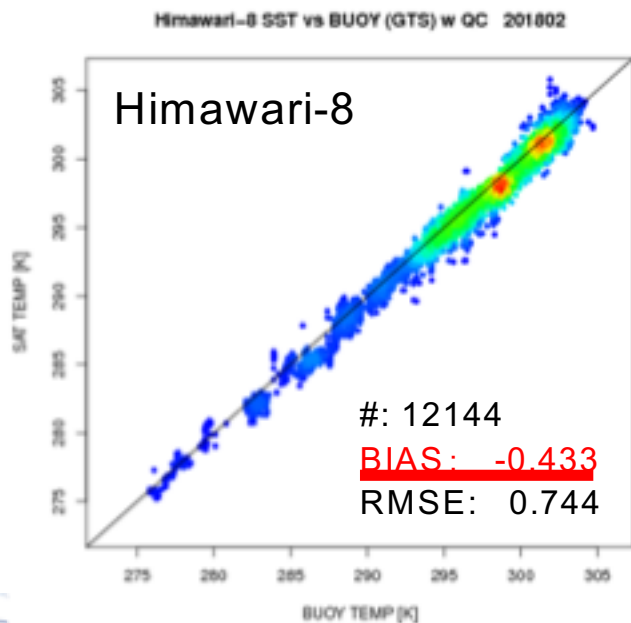
The comparison against buoy SSTs for about 2 weeks from 2 to 16 Feb. 2018.

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● Himawari-8 SST

- Unnatural warm SSTs from Himawari-8 were sometimes seen in the Okhotsk sea and east of the Kuril Islands in summer night-time.

(Possible causes)
  - ✓ Relatively lower accuracy because of large SZA.
  - ✓ Cloud classification problem. Temperatures at the top of lower clouds in this area tends to be warmer than SST in summer. Visible bands are not used in the night-time.

- In HIMSST analysis, abnormal Himawari-8 SST are removed by QC using AMSR-2 SST for north of 42N and east of 143E. However, this occasionally causes an artificial SST front analysis along the boundary of the area where QC applied. We are exploring other QC methods which can be applied for the whole region.
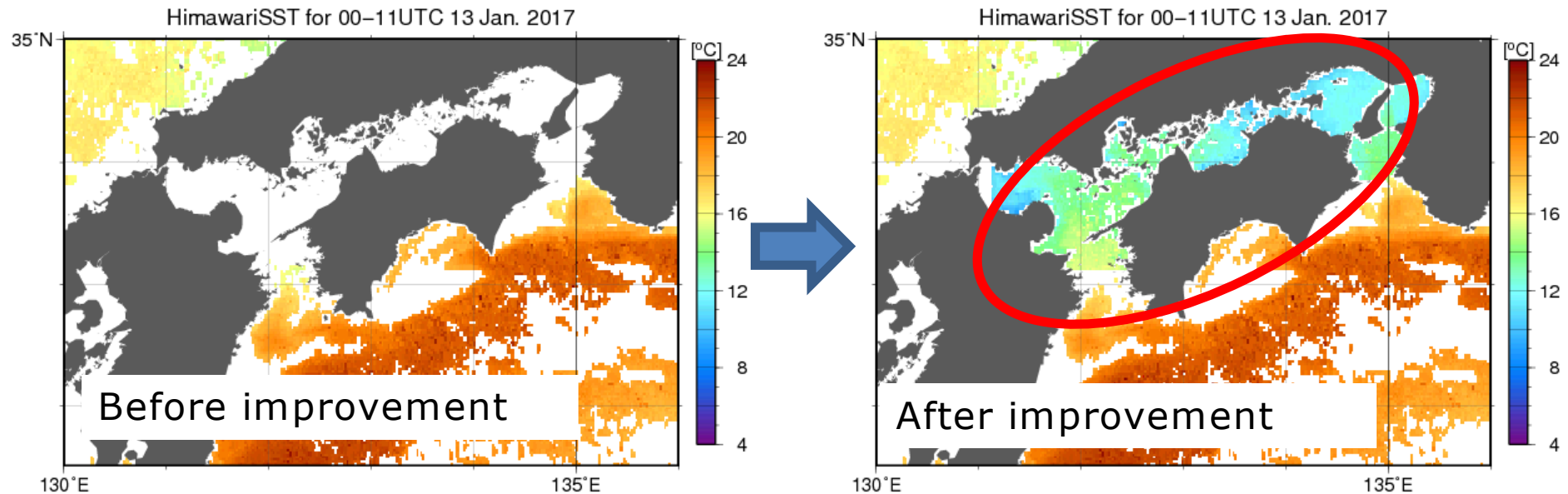
AMSR2 SST for 20 Jul. 2017
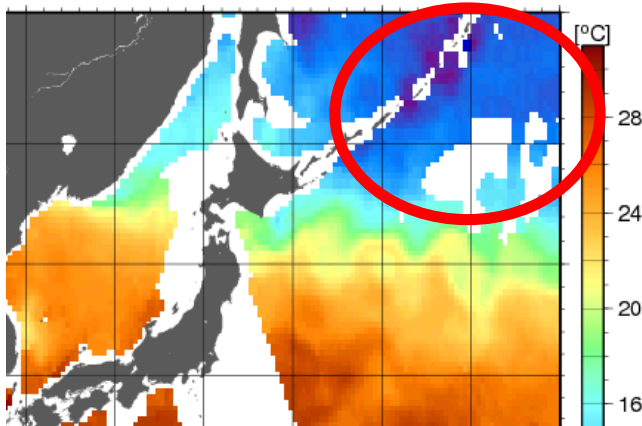
Night time composite Himawari-8 SST for 20 Jul. 2017

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Boundary of the area where QC applied.
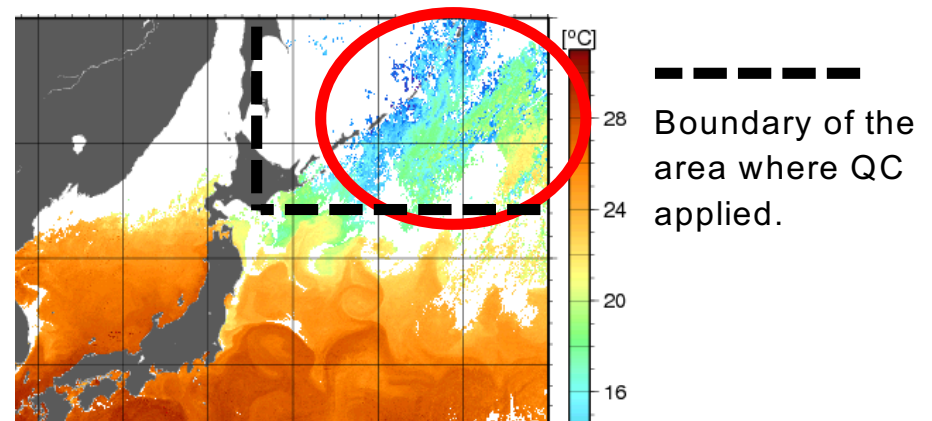
Improvement of Himawari-8 SST for inner bays

- False clouds were often detected over inner bay area, such as the Seto Inland Sea in winter (see the figure below left).

- The cloud mask algorithm compares the top temperature with MGDSST, which has a large positive bias over the Seto Inland Sea in winter.

- Not using MGDSST for cloud screening over the Seto Inland Sea reduced false clouds detections.


HimawariSST for 00–11UTC 13 Jan. 2017 — Before improvement

HimawariSST for 00–11UTC 13 Jan. 2017 — After improvement

(Cotinued previous slide)

– Although lower SSTs in winter were ingested into HIMSST analysis, the positive bias of HIMSST over the Seto Inland Sea was not remarkably reduced.

– Possible cause : Himawari-8 SSTs are not used in the long-term and large scale (LL scale) analysis, though Himawari-8 SSTs for LL scale usually have large negative anomalies in winter over this area.

– In the current year, we have a plan to extend the area where MGDSSTs are not used in the cloud mask, and to introduce Himawari-8 SST for LL scale analysis.

MGDSST ◯
HIMSST ●
AVHRR ✖

HimawariSST for 00–11UTC 13 Jan. 2017
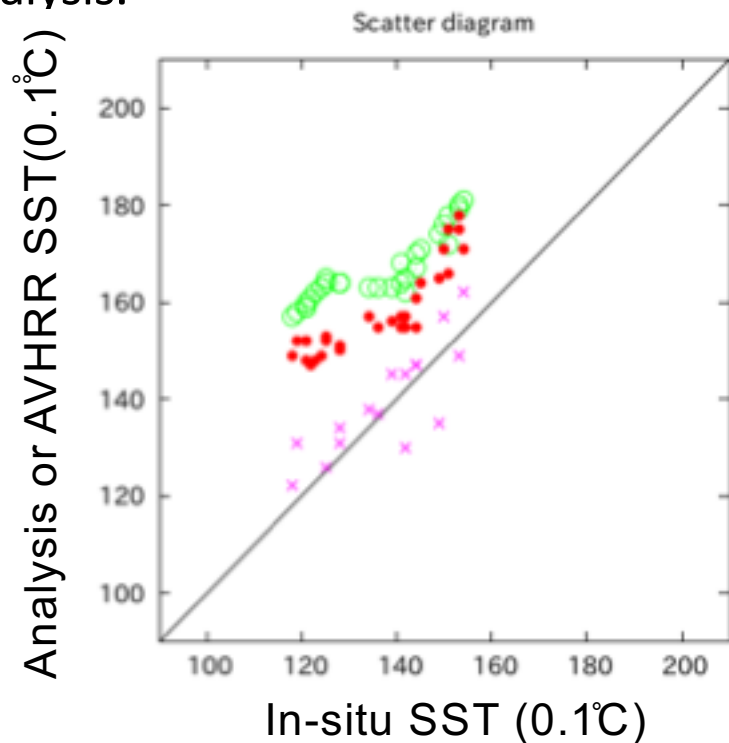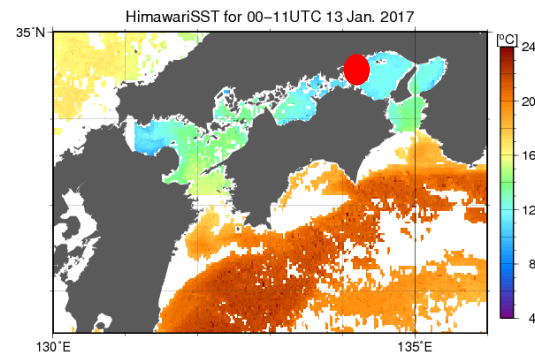
● Location: Boze (stationary buoy)

http://www.hyogo-suigi.jp/suion/pc_mnsui.htm

Main activities since GHRSST XVIII

- We investigated the impact of assimilating NOAA ACSPO VIIRS L3U SST (ver.2.40)
  - For the delayed-mode MGDSST analysis
  - For the period from 02 Feb. 2016 to 30. Jun. 2016.
  - RMSE for test run was improved by 0.016 K in global area. The improvement was relatively large in the southern mid- and high- latitude.
  - We will make an impact test for prompt analysis of MGDSST and HIMSST.

- JMA super computer system will be updated on 5th June 2018.

- # Towards a global 0.1 degree analysis

  – Natural extension of HIMSST (0.1 deg., north western Pacific).

  – We need SST data from other geostationary satellites such as GOES-16, GOES-17, MSG, MTG in near-real time basis.

  – GOES-16/ABI SST (NOAA/ACSPO v2.50) data have been downloaded since Jan. 2018 from NOAA CoastWatch/OceanWatch Ftp site.

GOESSST for 10 Apr. 2018
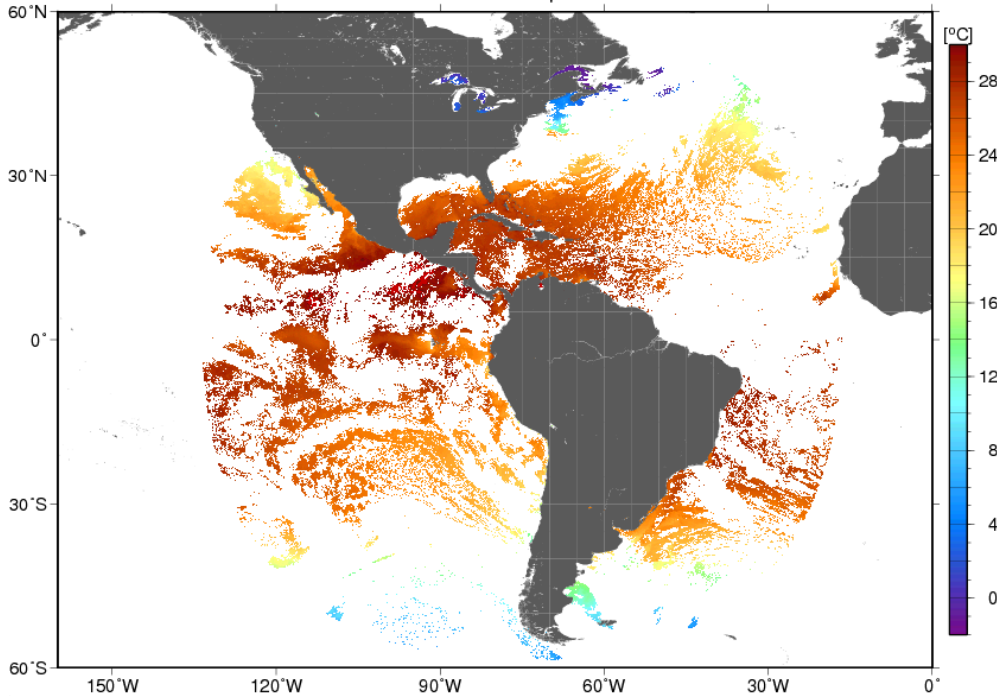
Example figure of NOAA ACSPO GOES-16 SST for 00Z 10 Apr. 2018.
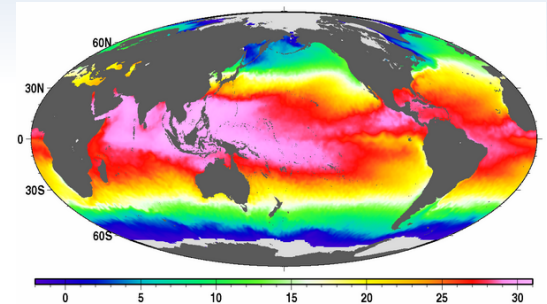
Data availability

- ## MGDSST (L4 product)

  – GDS 2.0 implementation is underway.

  – Available via NEAR-GOOS Database:

    - http://ds.data.jma.go.jp/gmd/goos/data/database.html

    - Text format
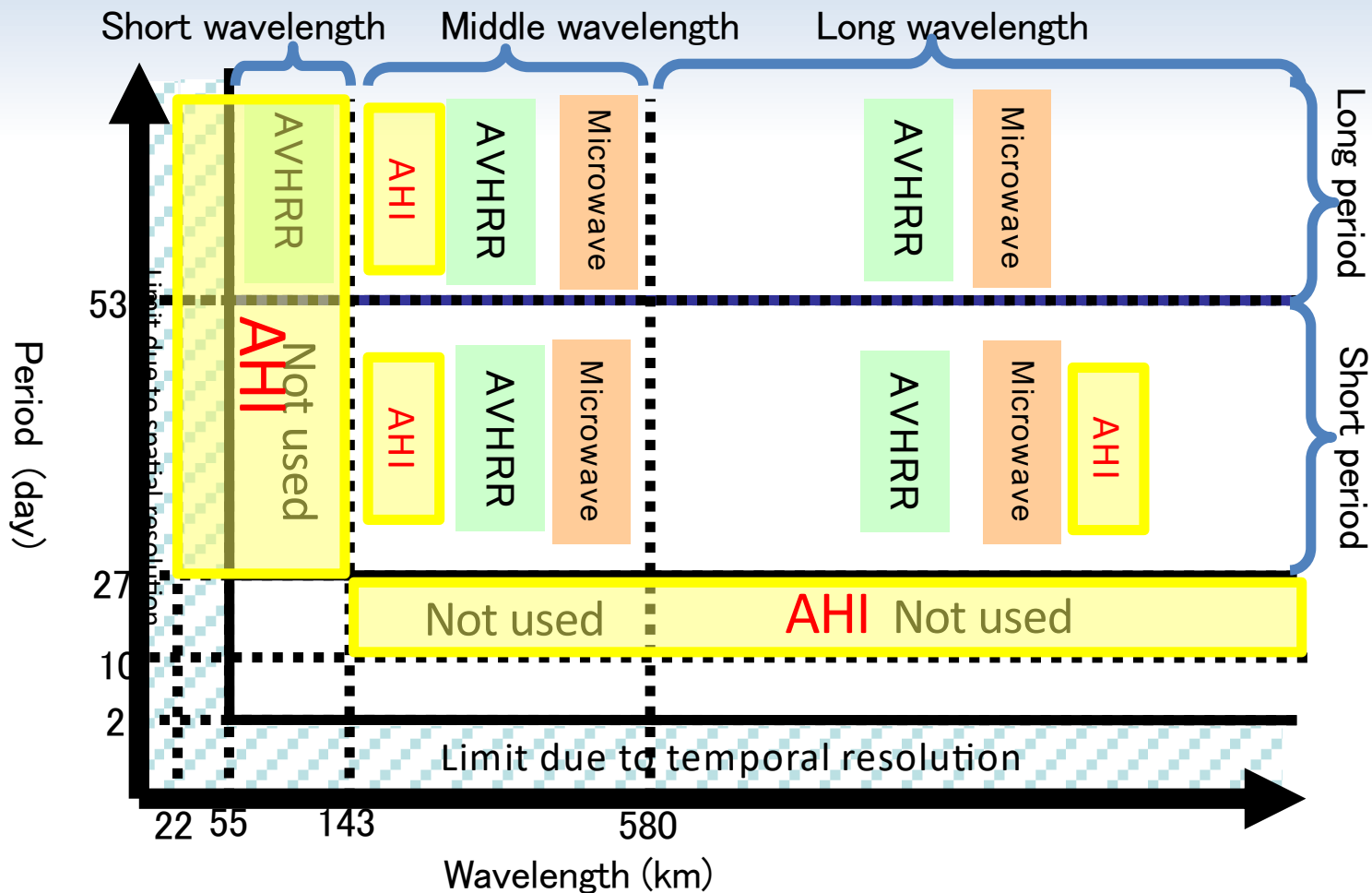
- ## HIMSST (L4 product)

  – Available via NEAR-GOOS Database (text format).

Thank you for your attention

Spatial-temporal scale decomposition

- HIMSST utilizes the shorter and smaller scale components, which are not used in MGDSST.