Marine Observations Using JAXA Satellites

January 26th, 2016

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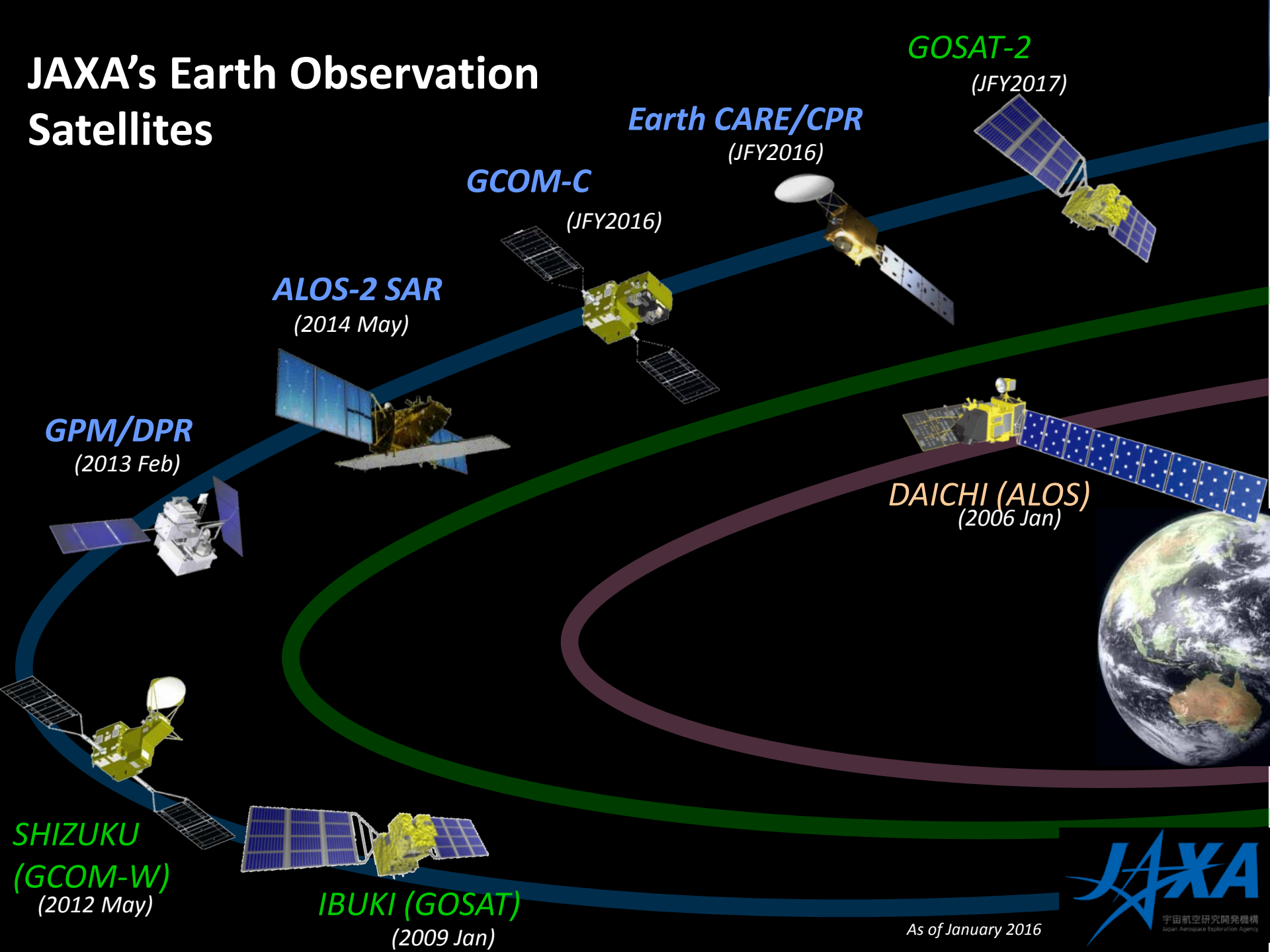
Japan Aerospace Exploration Agency

JAXA's Earth Observation Satellites



As of January 2016

JAXA
宇宙航空研究開発機構
Japan Aerospace Exploration Agency

JAXA's Marine Observation Satellites

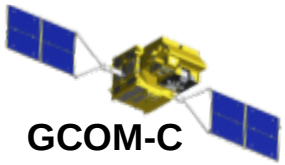
Optical (Vis&IR)

1987-1995

1990-1996

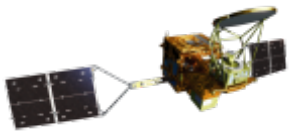
1996-1997

2002-2003



Microwave Radiometer

2002-（2011）



SAR

1992-1998

2006-2011

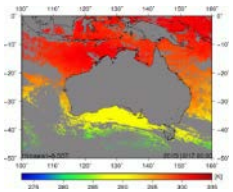
AIS receiver

(Automatic Identification System)

Products and Applications

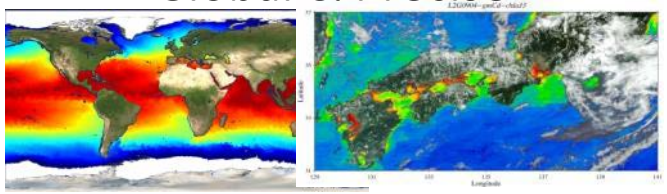
Optical (Vis&IR)

Regional &Frequent



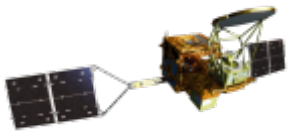
Sea Surface Temperature

Global & Precise

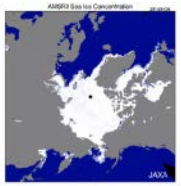


Sea Surface Temperature & color

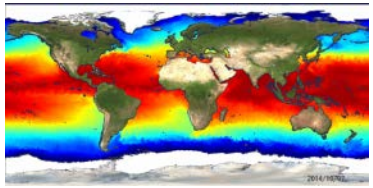
Microwave Radiometer



Cloud free & Global



Sea Ice

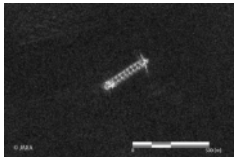


Sea Surface Temperature

SAR

Cloud free & High resolution

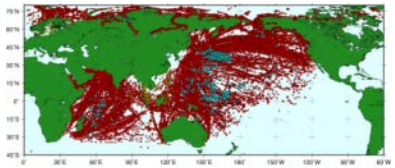
Sea Ice



Ship image

AIS

Global



Ship information

Sea State

Climate Change

Safety routing

Fishery

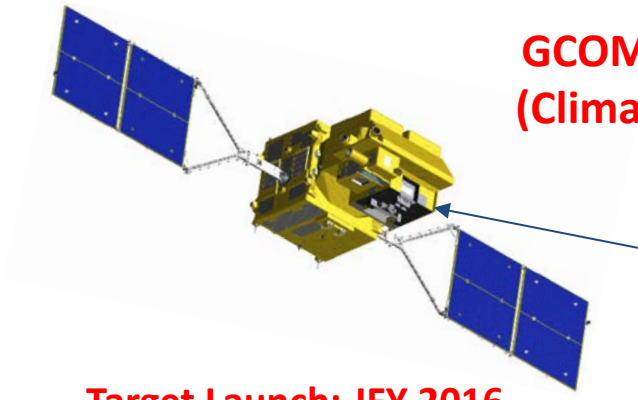
etc.

Global Change Observation Mission (GCOM)

- Long-term observation (over 10 years) for global climate change and water cycle
- Two satellite series;
  - ✓ **GCOM-W** : Microwave observation using AMSR2 (AMSR-E follow on) for observing water cycle (water vapor, precipitation, soil moisture, sea surface temp., wind speed, etc.)
  - ✓ **GCOM-C** : Optical multi-channel observation using SGLI (GLI follow on) for radiation budget and carbon cycle (aerosol, clouds, ocean color, vegetation, snow ice, etc.)

GCOM-W (Water) or "SHIZUKU"

Launched: May 18th, 2012 (All data has been released since May 17th, 2013)



GCOM-C (Climate)

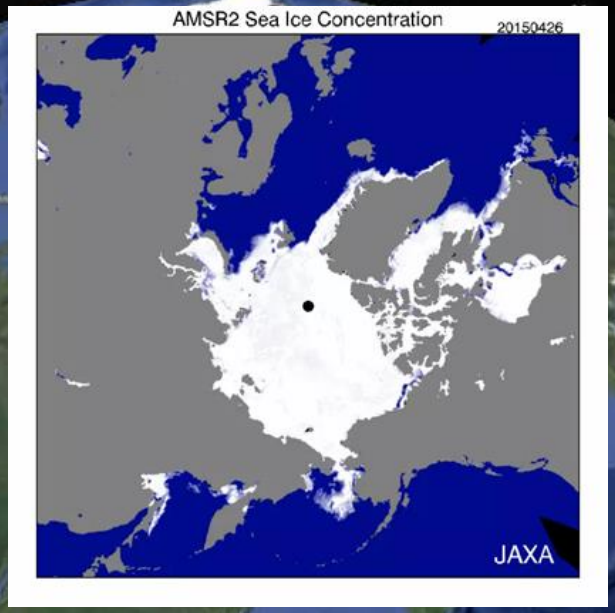
Target Launch: JFY 2016

Sensor	Advanced Microwave Scanning Radiometer 2 (AMSR2)

Sensor	Second generation GLobal Imager (SGLI)

Arctic Sea Ice monitoring

From April to October in 2015



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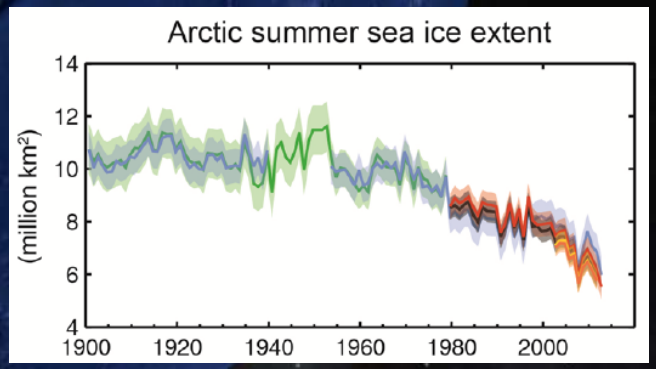
In September, the 3rd Lowest Record next to 2012 & 2007

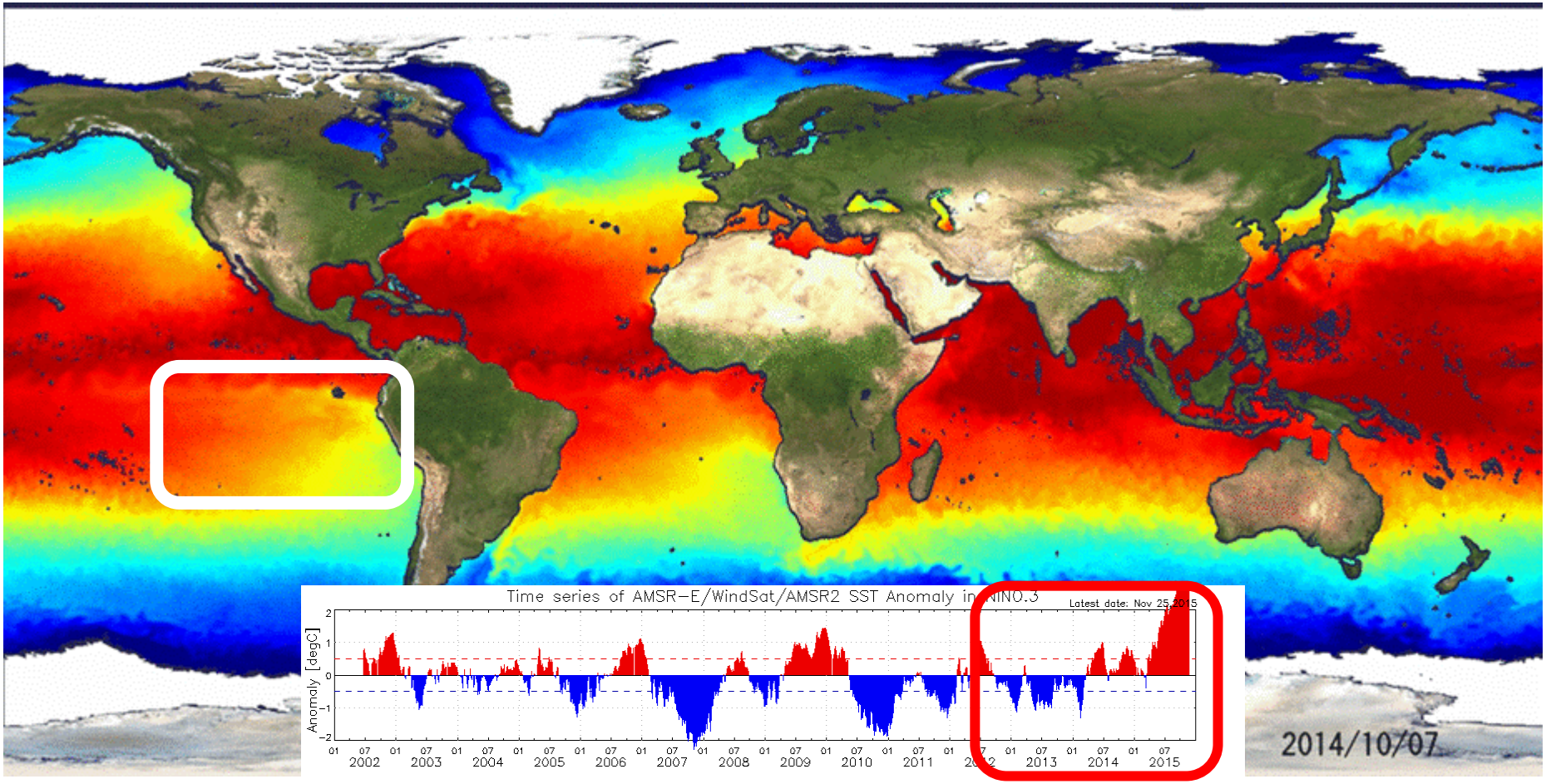
IPCC AR5 Report (2013)



GCOM-W Data Providing Service http://gcom-w1.jaxa.jp

El Niño monitoring

Global Sea Surface Temperature (SST)



2002 Jun

2015 Nov

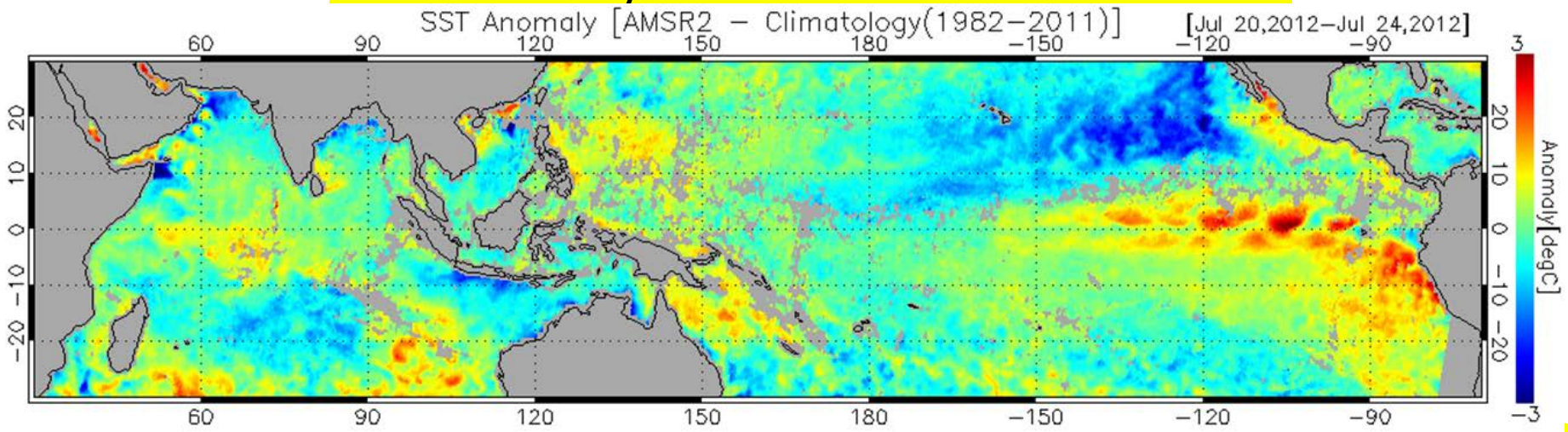
SST Difference from average

ENG http://www.eorc.jaxa.jp/en/earthview/2015/tp151130.html

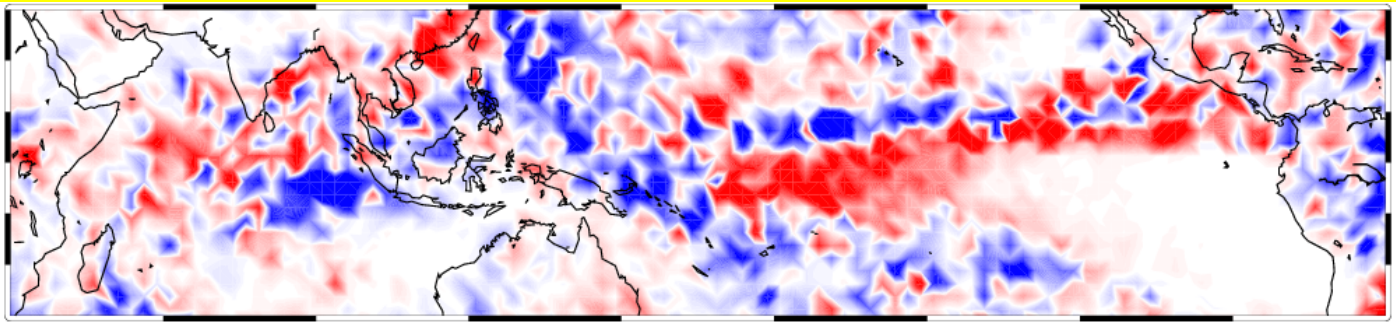
JPN http://www.eorc.jaxa.jp/earthview/2015/tp151130.html

El Niño monitoring

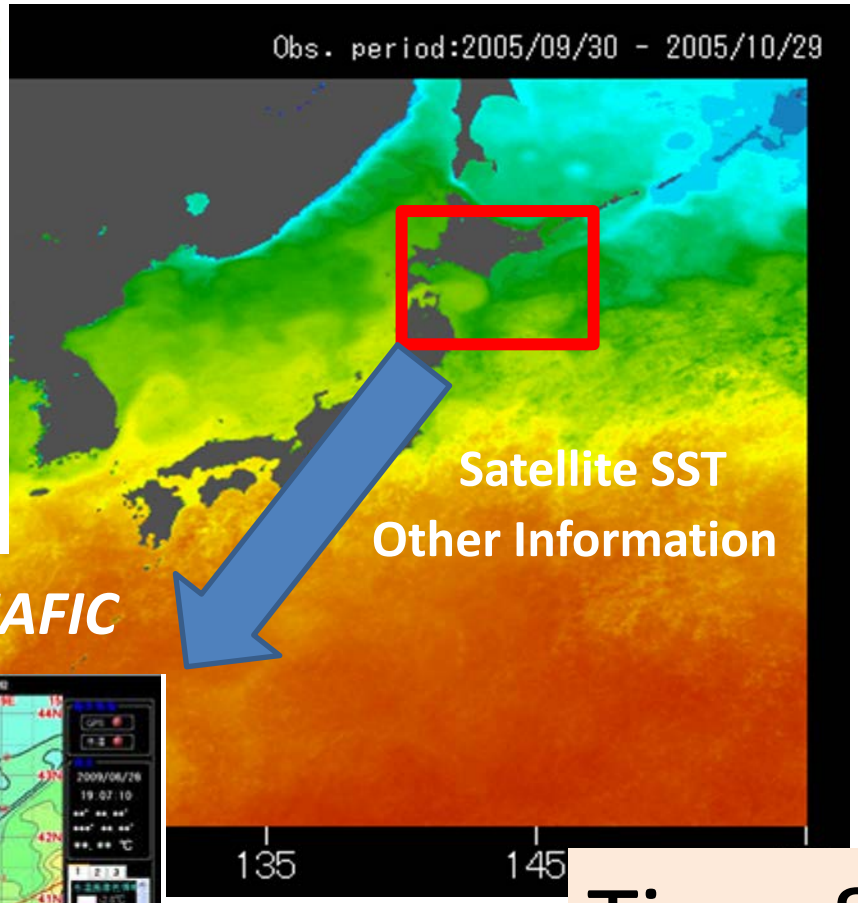
SST Difference from average (1982-2011)
From July 2012 to November 2015



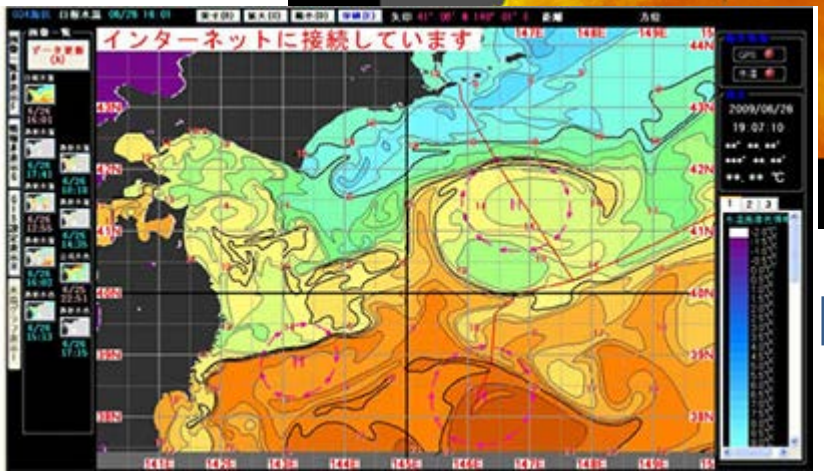
Accumulated Rain Difference between 2014 and 2015
in the same period (May-October)



Fishery



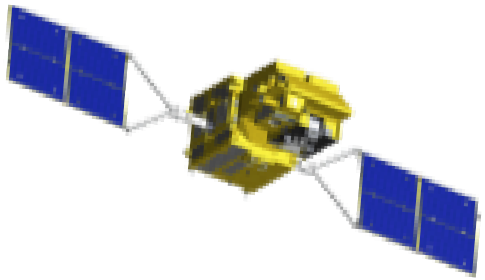
Courtesy of JAFIC



Fishing boats

Time & Fuel Effective

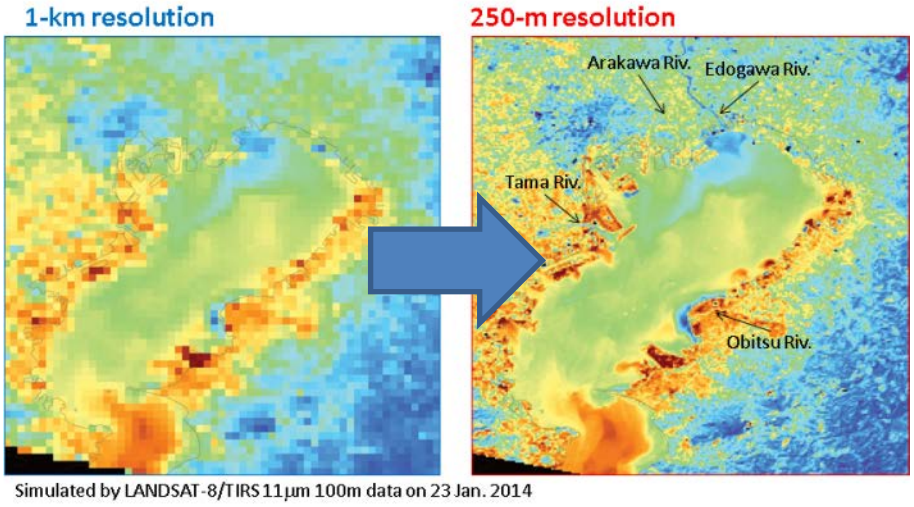
Expecting New Comer : GCOM-C



GCOM-C

JFY2016

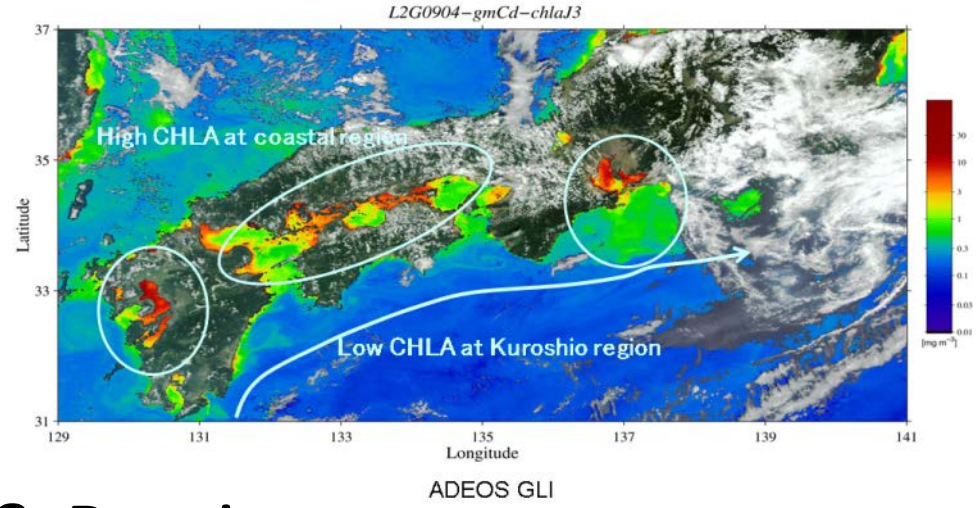
250m SST



Simulated by LANDSAT-8/TIRS 11μm 100m data on 23 Jan. 2014

250m Color

Chlorophyll a concentration

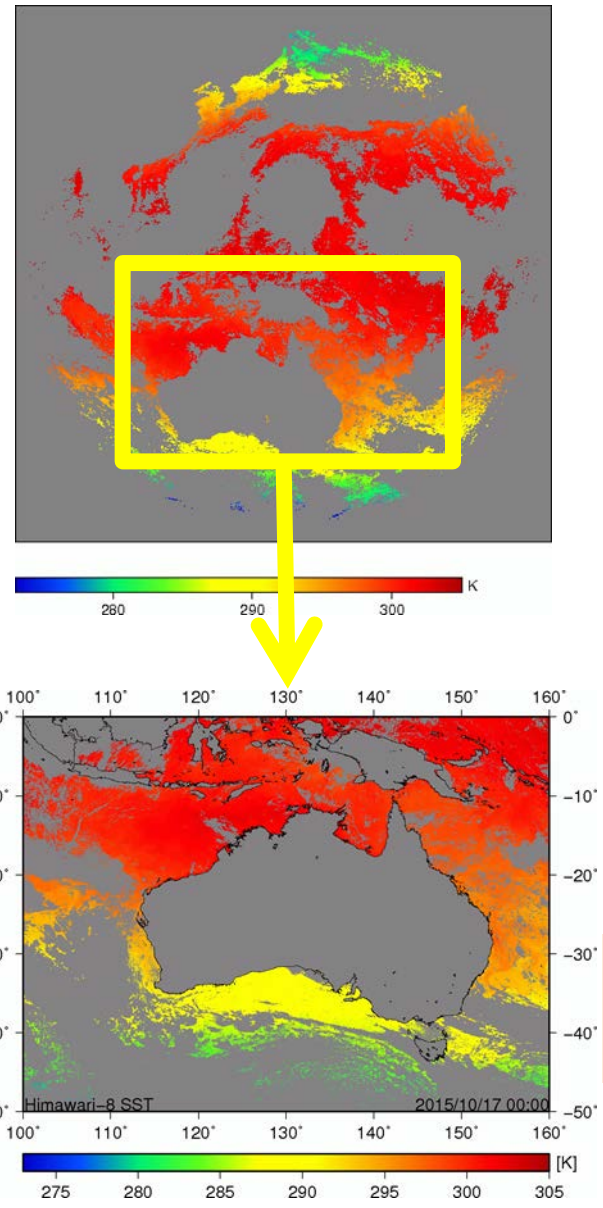


ADEOS GLI

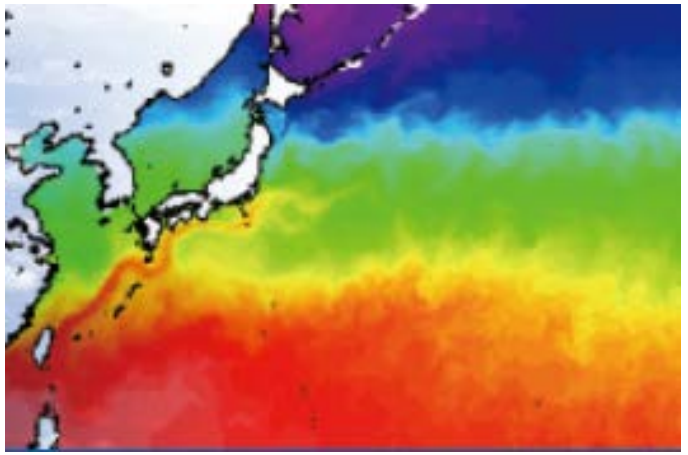
Global & Precise

Sea State, Climate Change, Fishery, etc.

Himawari-8 & Modering /Forecasting



Himawari-8 SST is available
at JAXA EORC website since August, 2015.
（Updating every 10 minutes）

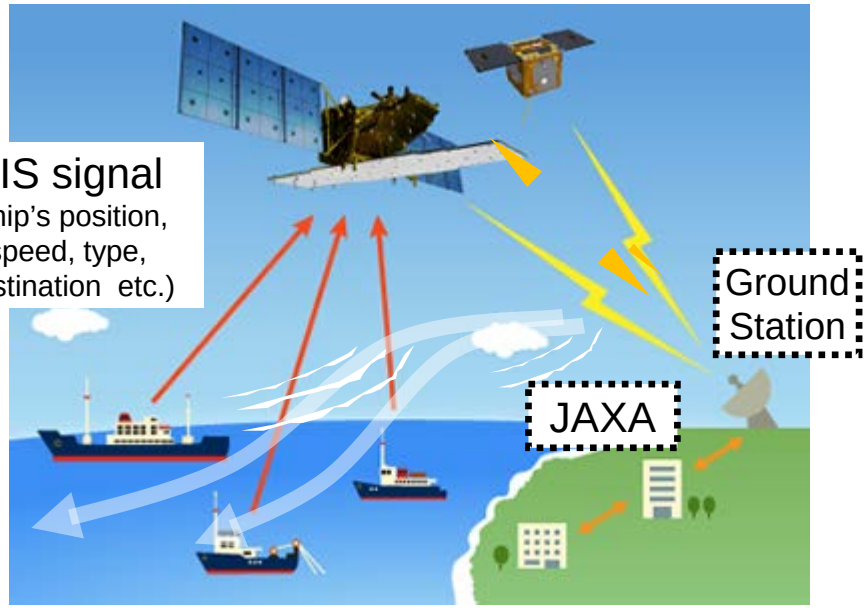


In the near future,
Assimilation Data into Ocean model
will be provided.

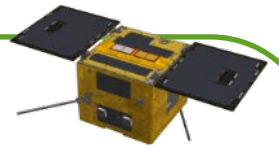
Nowcasting & Forecasting

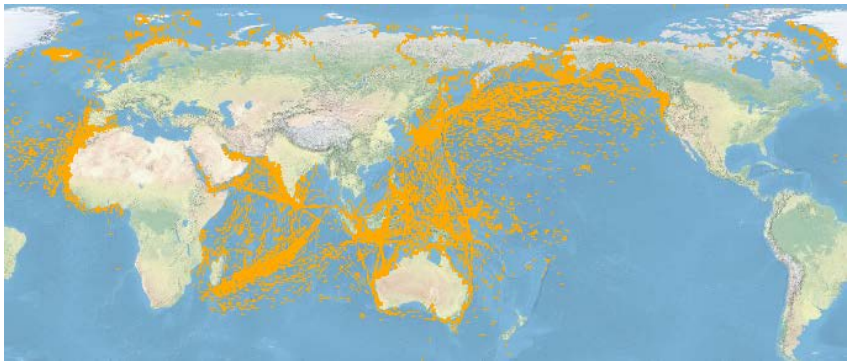
Ocean version of GSMaP

SPAISE (SPace based AIS Experiment) Missions



SPAISE1 (2012/5 ~)

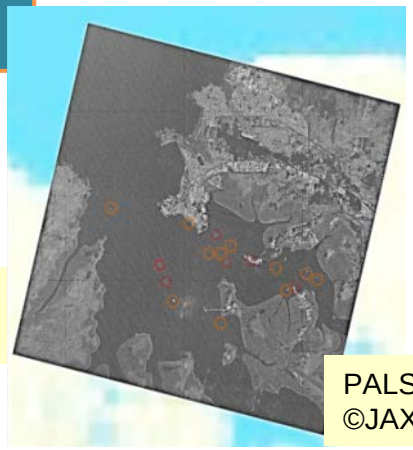




AIS data plot of 1 week

SPAISE2 (2014/5 ~)

AIS&SAR matching @Darwin

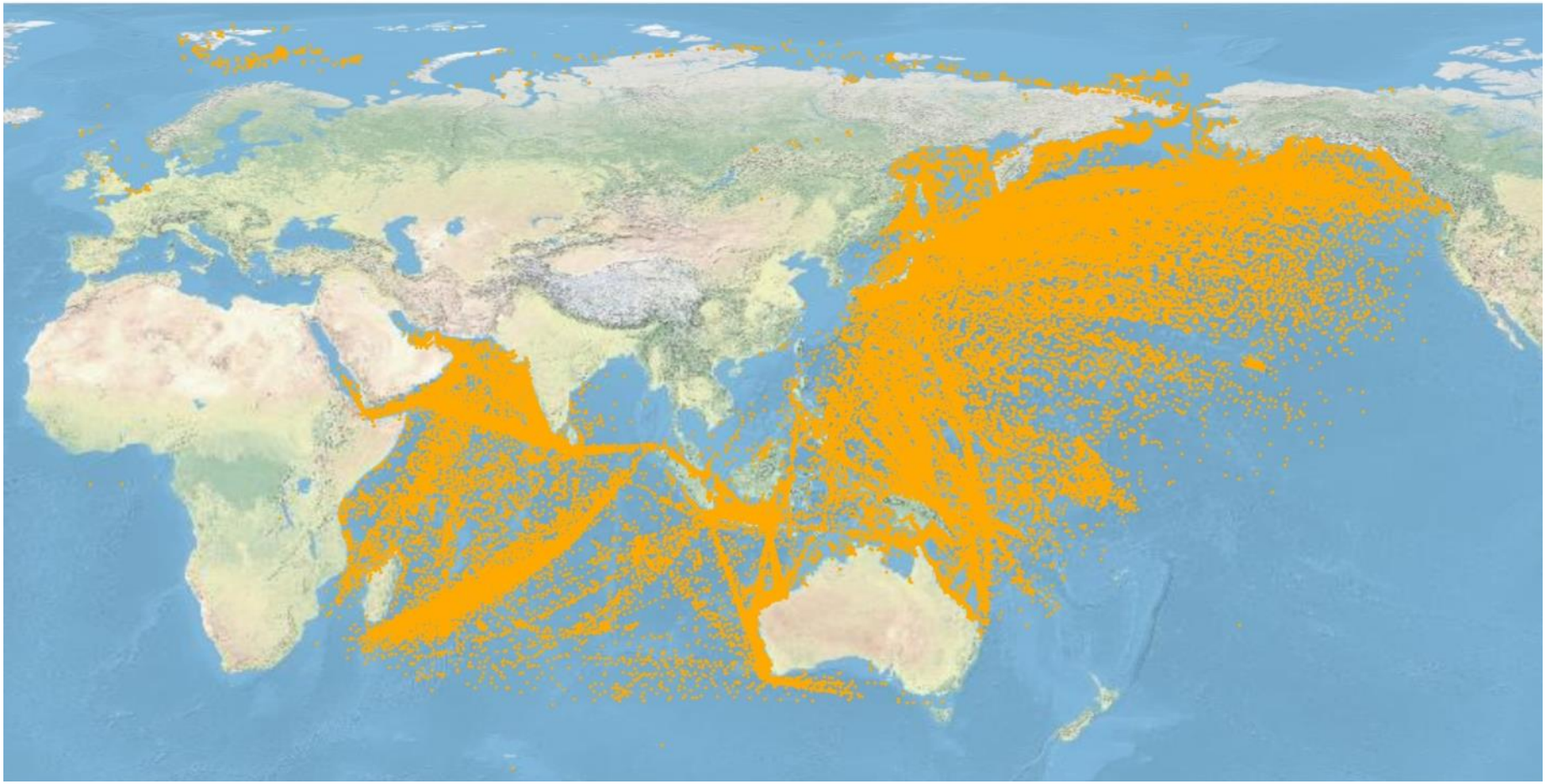


○ AIS signals (SPAISE2)
○ Detected ships (PALSAR2)

PALSAR2 ©JAXA

・Receiver sensitivity is improved more than SPAISE1 and can get more AIS signals.
・Receiving new satellite AIS channels (#3,#4).
・Matching between AIS&SAR data from the same satellite the first in the world

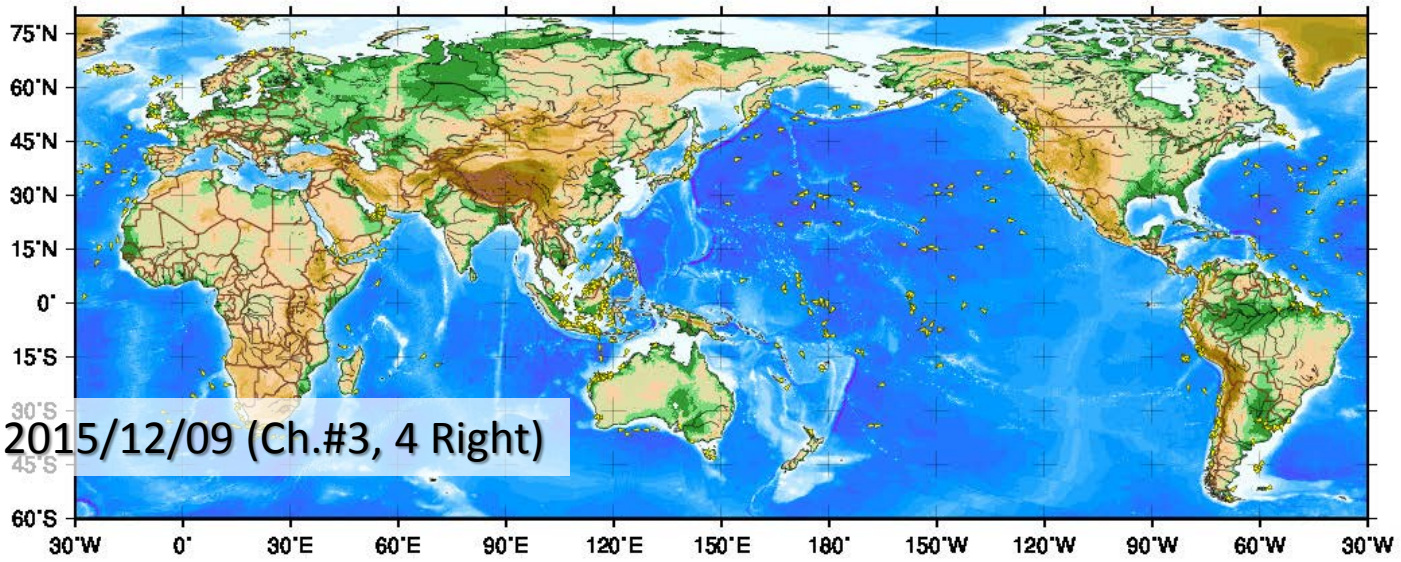
Observation results of AIS1,2 (2weeks)



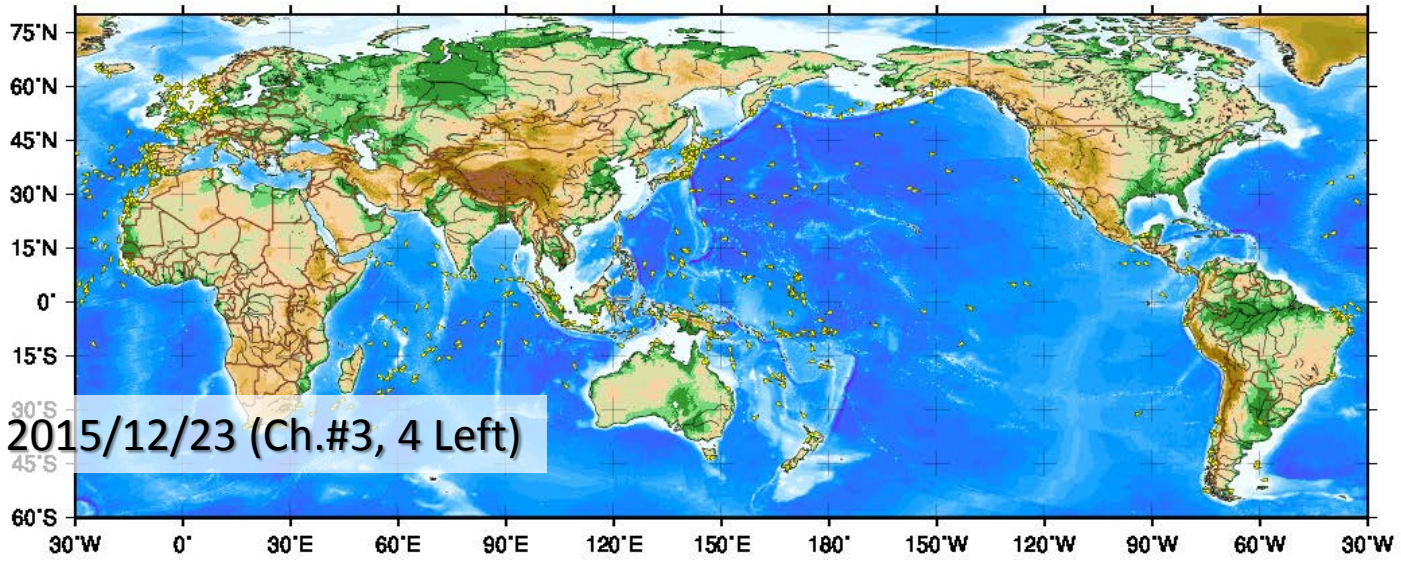
Observed area is from Northern Pacific to Indian Ocean

Observation results of AIS3,4

AIS3, 4 (satellite AIS channels), daily



2015/12/09 (Ch.#3, 4 Right)



2015/12/23 (Ch.#3, 4 Left)

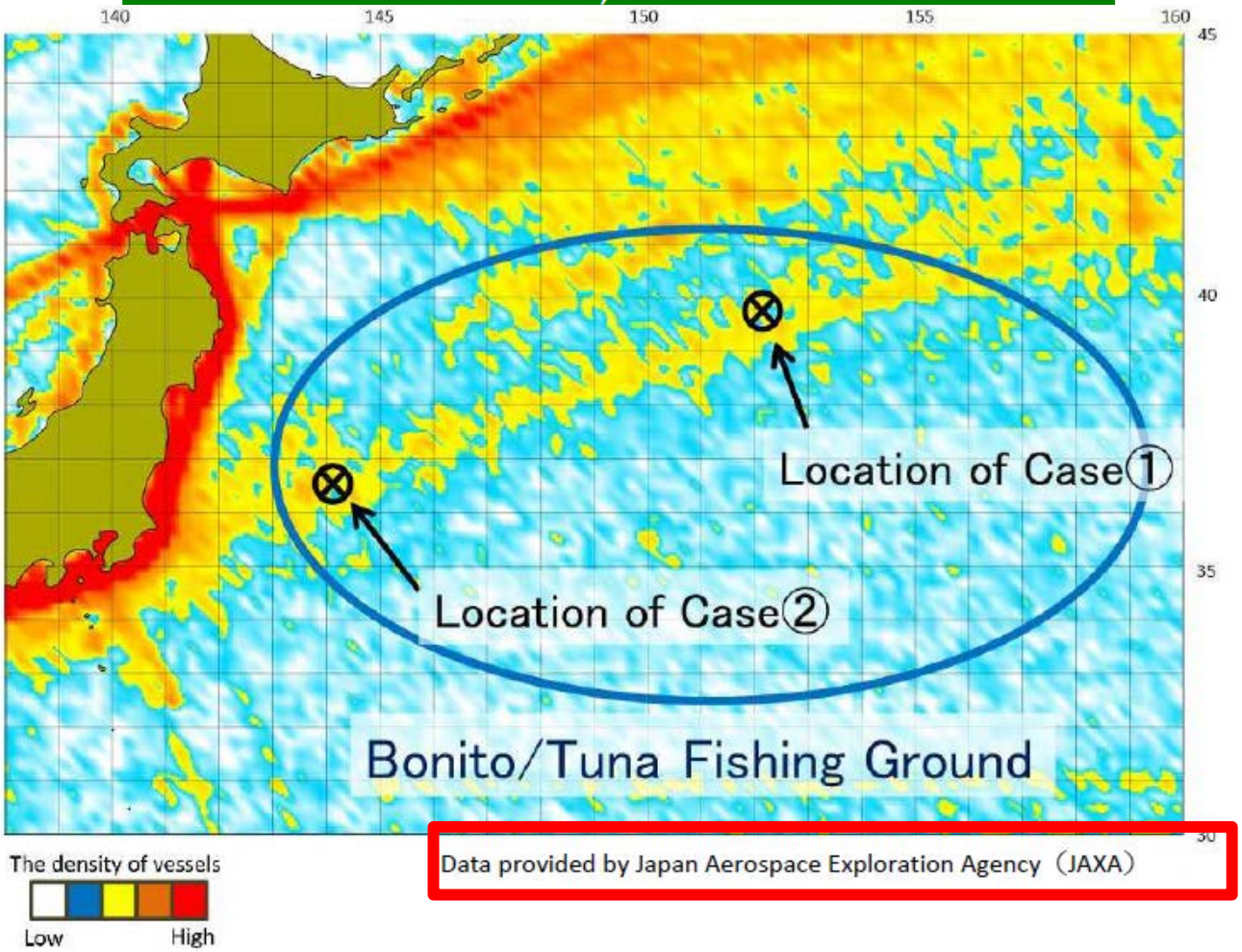
AIS information from ships

外航船用 資料３

“North Pacific Ocean Route”

Be Cautious of Collisions with Fishing Boats!!

—Wherever vessels sail, collision risk does exist—



http://www.kaiho.mlit.go.jp/02kanku/saishin/h26leefretenglishcargo.pdf