Introductions to the International Activities on Water in JAXA

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Current JAXA Earth Observation Satellites

Climate Change

GCOM-C

Launched:
23 December 2017

Cloud/
Aerosols/
Vegetation

GOSAT

Launched: 2009

Greenhouse
Gases

GOSAT-2

Launched:
29 October 2018

GCOM-W

Launched: 2012

Water
Cycling

GPM

DPR:
Dual Frequency
Radar

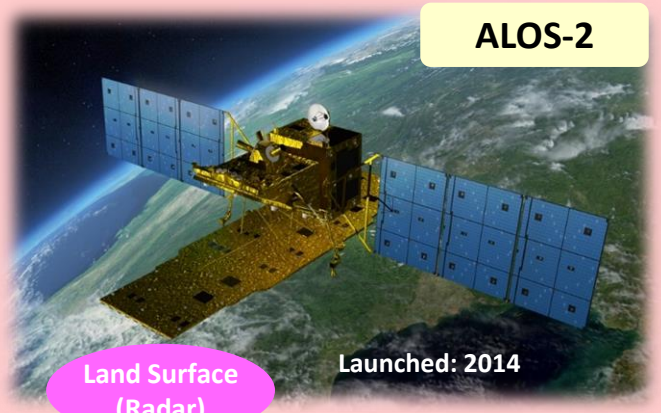
Precipitation

Launched: 2014

Courtesy of NASA

Disaster Risk Management

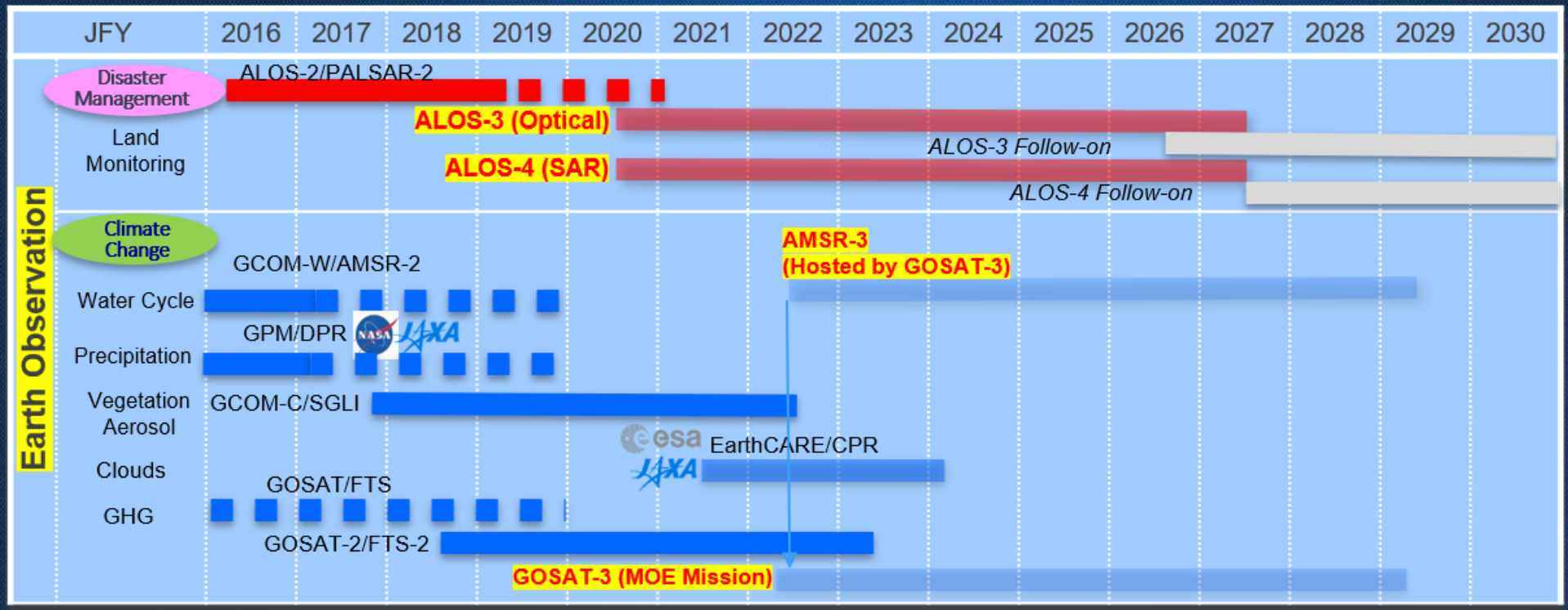
ALOS-2



Land Surface
(Radar)

Launched: 2014

JAXA's Satellite Development and Operation Schedule



JAXA's Priority Issues for Societal Benefit

Three Priorities

Disaster Risk Management

ALOS, ALOS-2
ALOS-3, ALOS-4

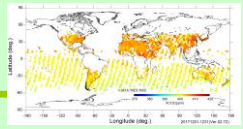

Volcan

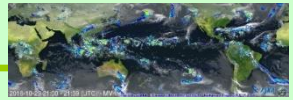

Earthquake

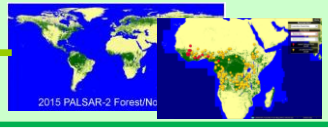

Flood/Landslid

Climate Change

- Greenhouse Gases
- Precipitation (GSMaP)
- Forest


GOSAT
GOSAT-2


GCOM-W
GPM



ALOS/ALOS-2
ALOS-4

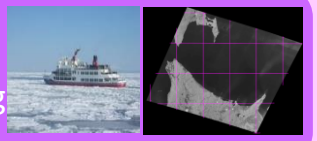
Ocean Monitoring

SAR

Oil Spill Monitoring

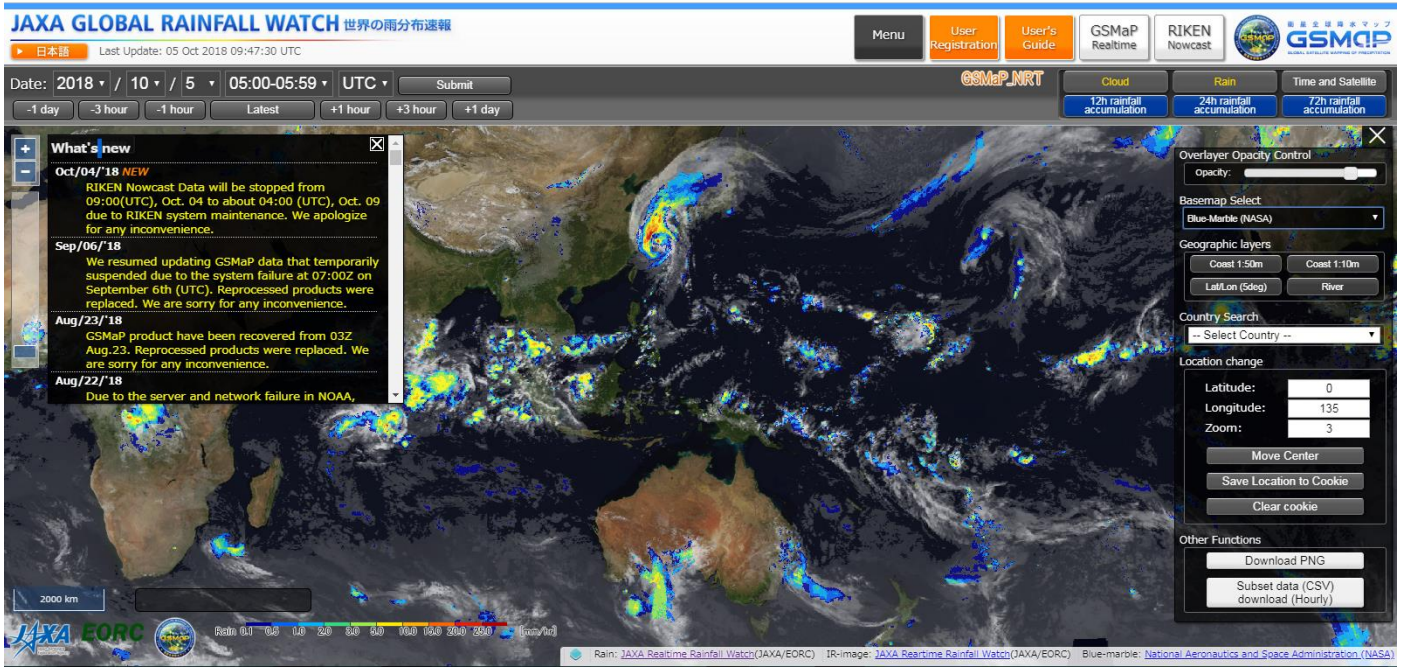

ALOS-2
ALOS-4
SPAISE(AIS)

Sea Ice Monitoring


ALOS-2
ALOS-4

Global Satellite Mapping of Precipitation (GSMaP)

http://sharaku.eorc.jaxa.jp/GSMaP/



Registered users:
5282 users
127 counties
(Sep. 2019)

- GSMaP is a blended Microwave-IR product and has been developed in Japan for the GPM mission.
  - Improved NRT-basis Gauge-adjusted GSMaP product (v6) was open to the public in Dec. 2018.
    - We completed reprocessing of past 19yr data record (since Mar. 2000).
  - Real-time version, GSMaP_NOW has been extended to the whole globe since Jun. 2019.

Extension of the GSMaP_NOW

Real-time version, GSMaP_NOW has been extended to the whole globe since Jun. 2019!

Nov.2015
Open to the public
Within Himawari region

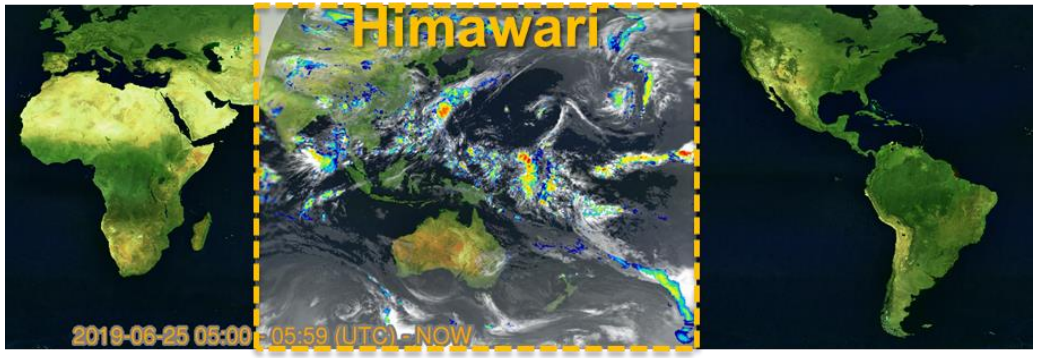
Data collection by the JAXA-EUMETSAT MOU

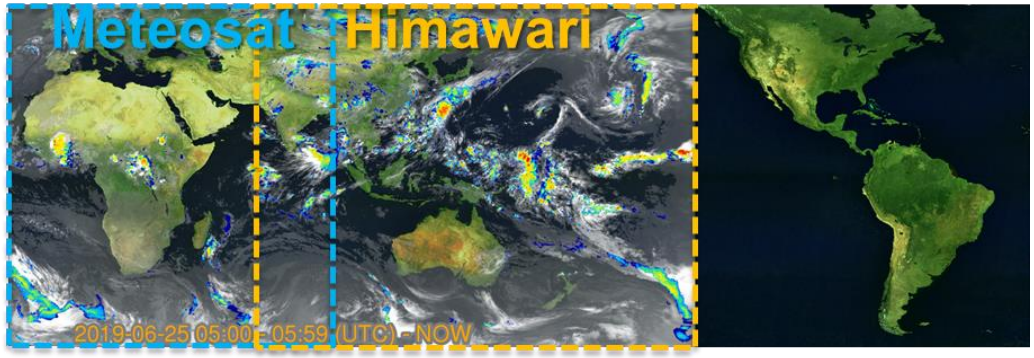
Nov.2018
Extended to Meteosat region

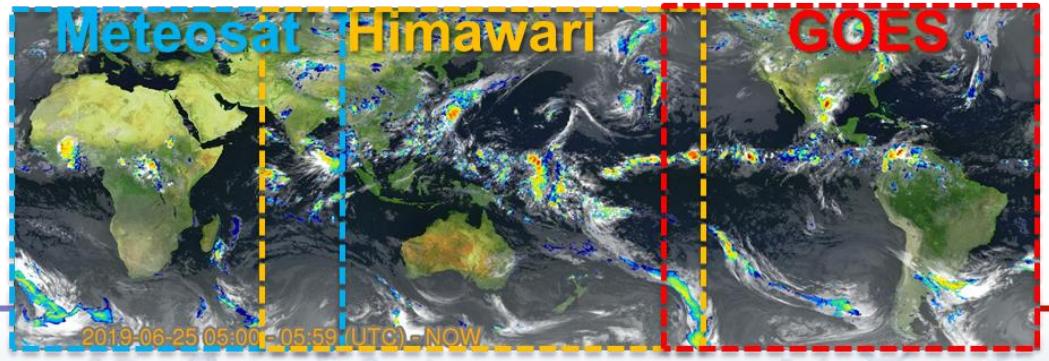
Data collection with the INPE, Chiba Univ. & JMA

Jun.2019
Extended to GOES region

=Whole globe!



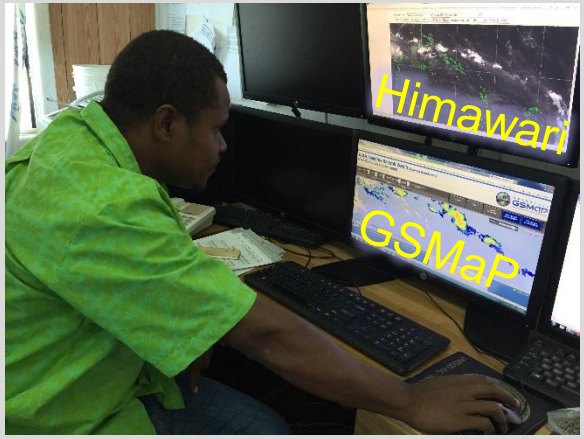




Contributing to rainfall monitoring in Asia-Pacific regions

Met. agencies in the Pacific Islands utilize GSMaP for rainfall monitoring.

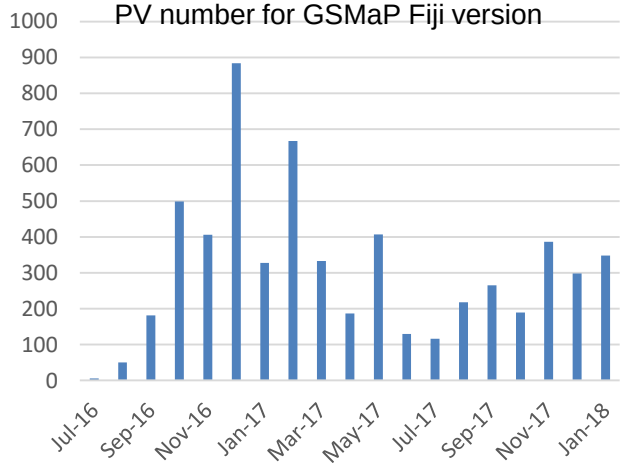
Forecaster monitoring weather by using Himawari and GSMaP



Himawari cast by JMA has been installed and used over many Asia-Pacific countries. Combination utilization of cloud information by Himawari and rainfall information by GSMaP is effective for monitoring weather.

- GSMaP is useful for monitoring the rainfall around their Islands and over the remote small islands.

Fiji Met Service Website
http://www.met.gov.fj/



GSMaP Fiji ver. website has much access every month. During cyclone season (Dec.2016), the PV number is 824, and local continuous utilization has been confirmed.

(Photos were taked in each met service)

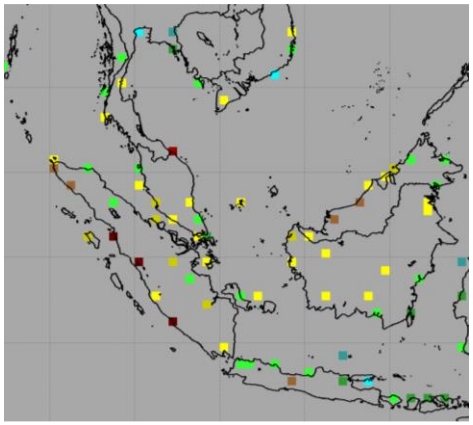
Examples of Satellite-based Climate Extremes Monitoring

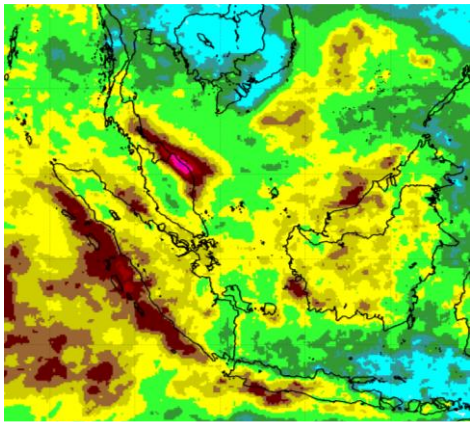
Reporting gauges (0.5 deg)

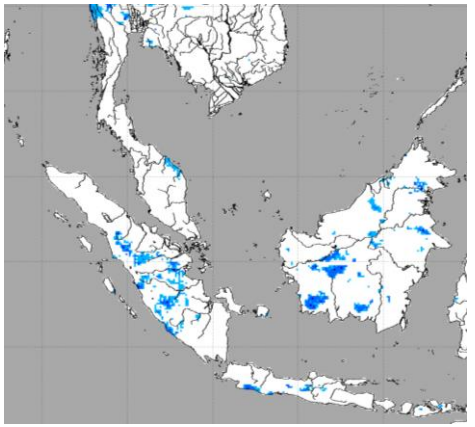
GSMaP (v6) Gauge-NRT (0.1 deg)

Satellite Detected Region of Extreme Heavy Rainfall based upon percentiles from past 18-yr data

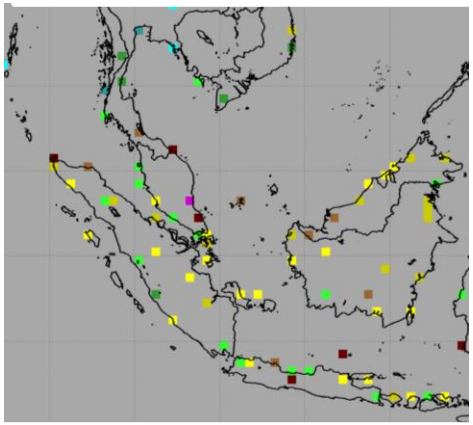
Nov 2014

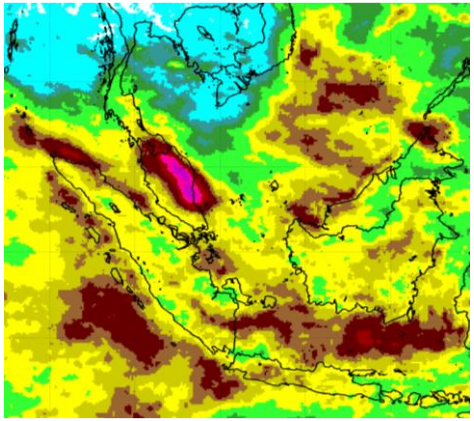


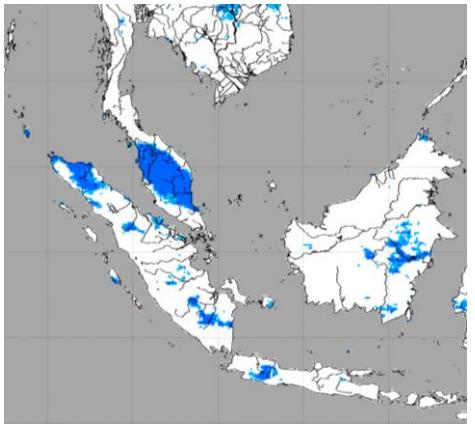


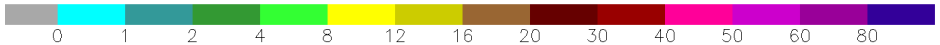


Dec 2014







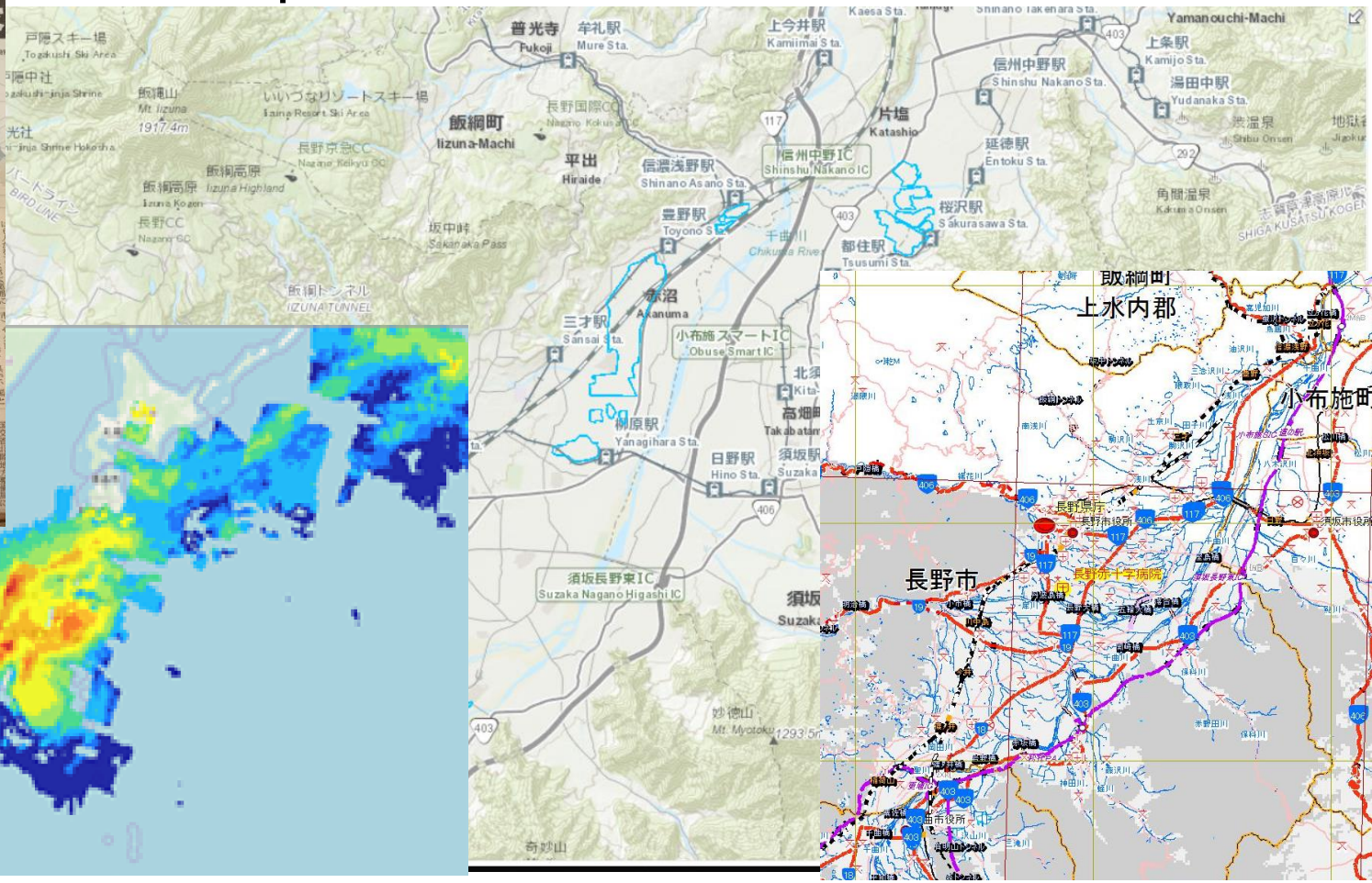


(mm/day)

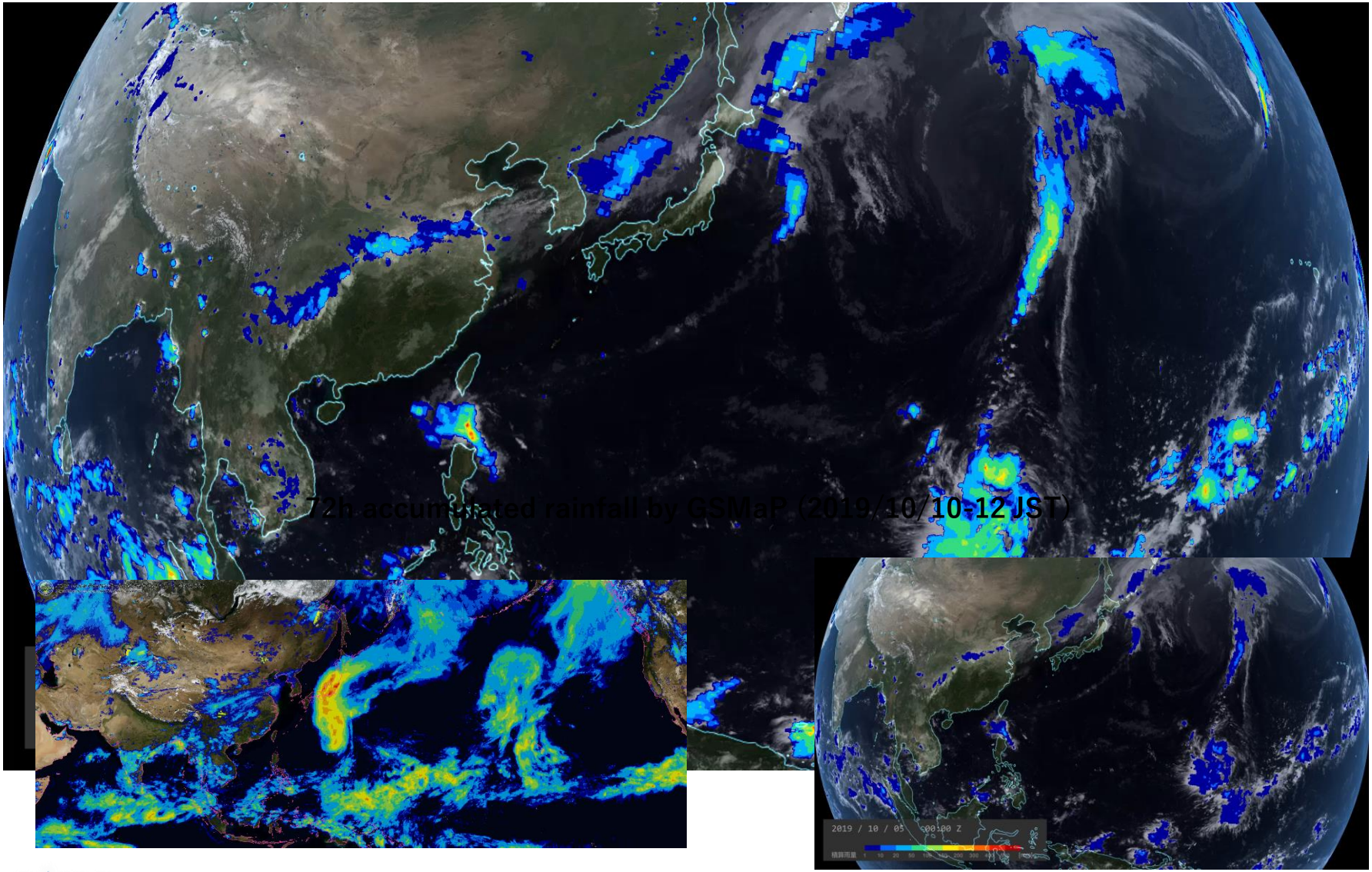
> 90th percentile
> 95th percentile
> 99th percentile

JAXA

TYPHOON 19 in Japan – Flood area estimation



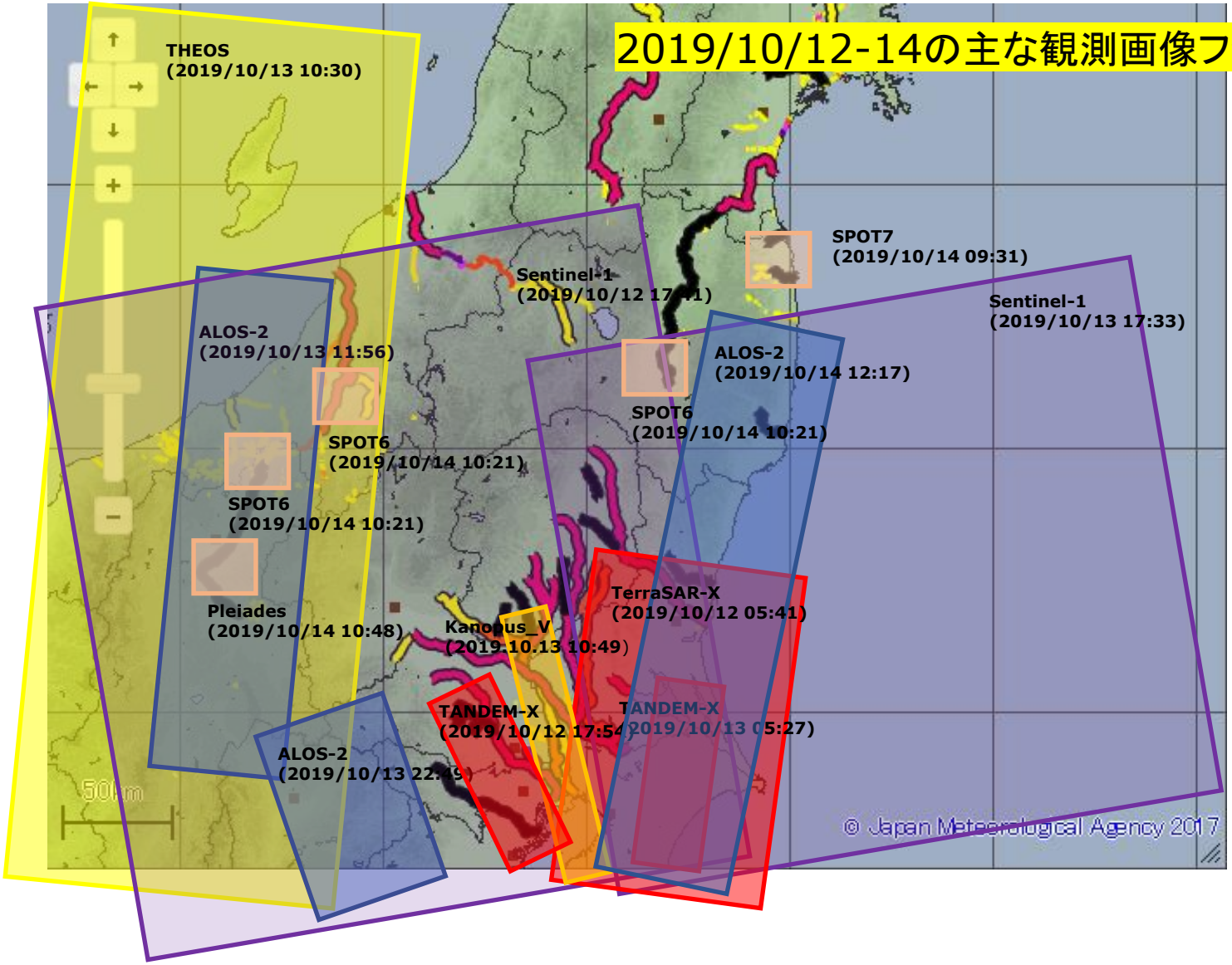
Hourly and accumulated Rainfall by GSMaP
Typhoon “Hagibis”



Houly GSMaP (2019/10/5-13 UTC)

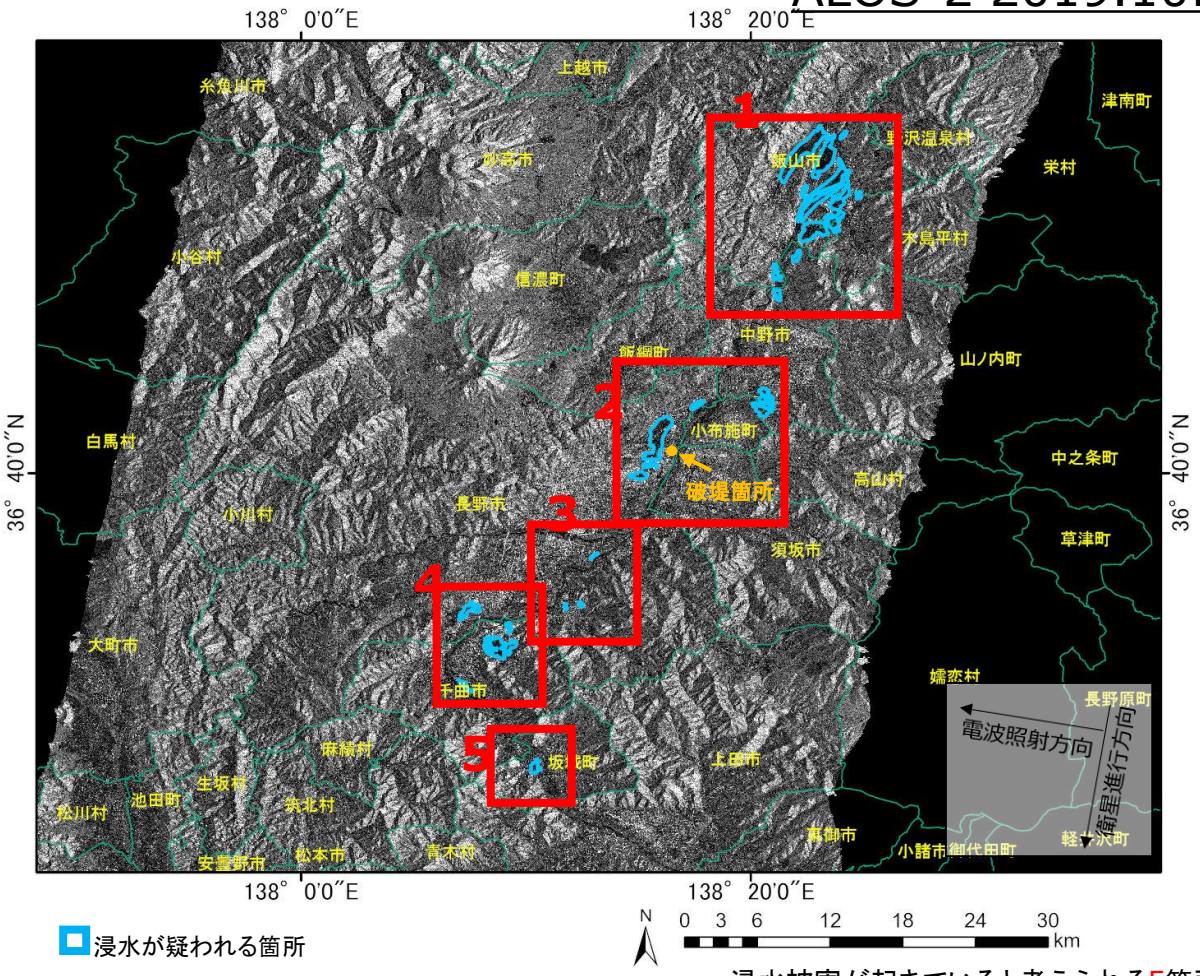
Accumlated GSMaP (2019/10/5-13 UTC)

2019/10/12-14の主な観測画像フットプリント



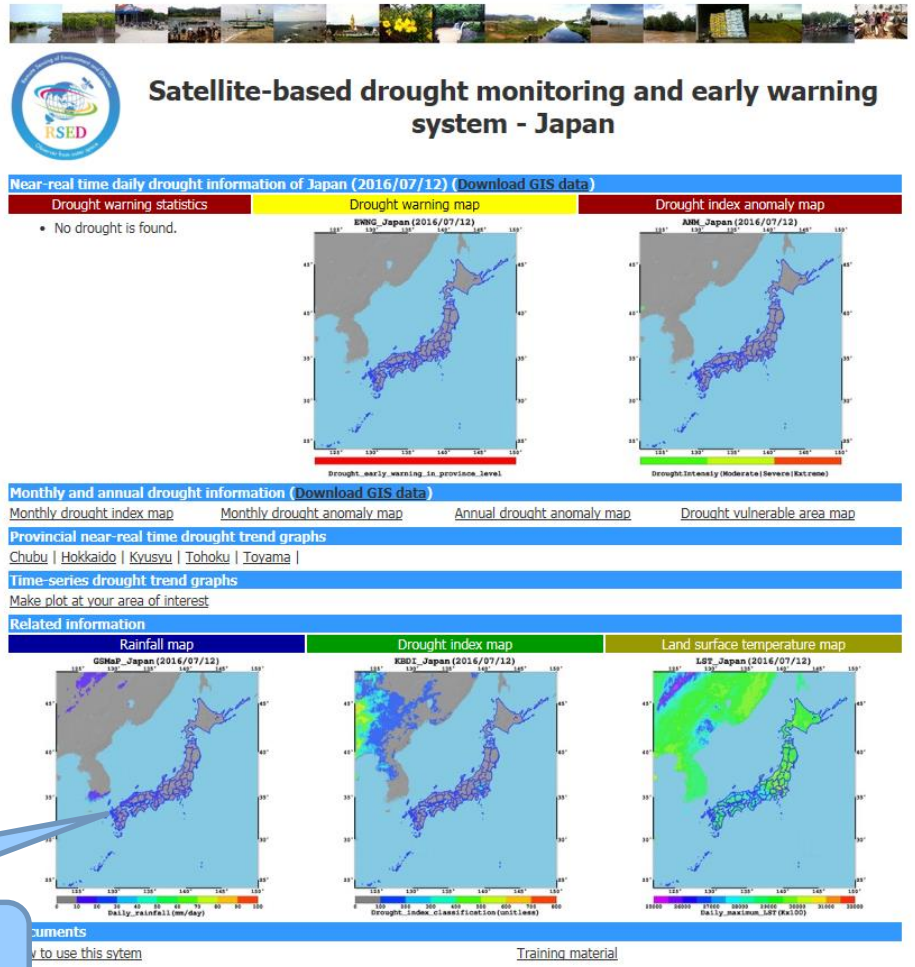
ALOS-2 observation for flood area

ALOS-2 2019.10.13　昼パス観測



Satellite-based drought monitoring

- Prof. Takeuchi (Univ. of Tokyo) developed drought monitoring system using the GSMaP rainfall and land surface temperature from the Meteorological satellite and operates the website (http://wtlab.iis.u-tokyo.ac.jp/DMEWS).



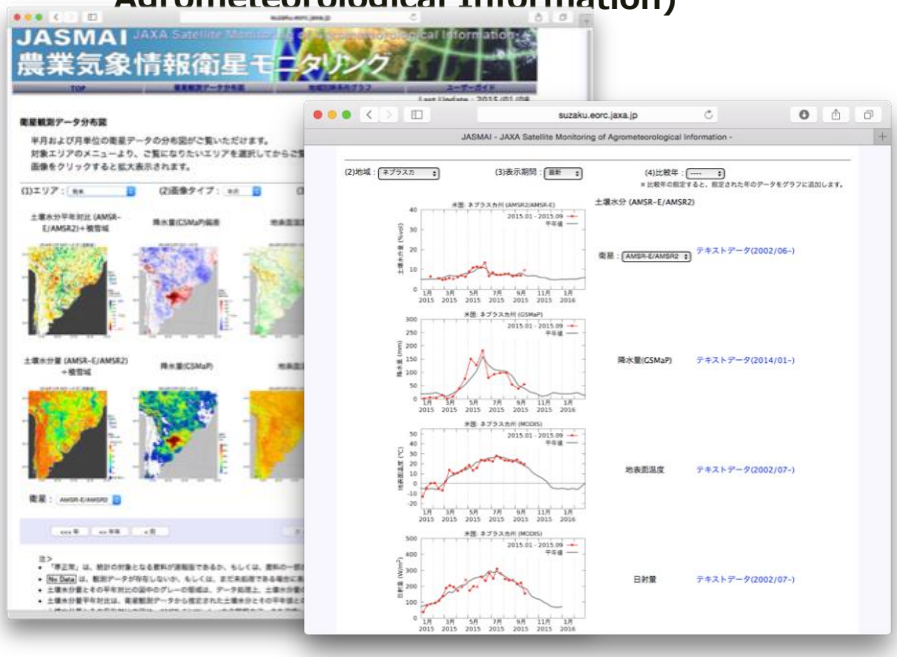
Display drought index in addition to the rainfall amount

Agro-met Data Utilization in MAFF, Japan

- Food self-sufficiency rate of Japan is only 40% and highly depend on food import.
- JAXA provides agro-met data including GSMaP to MAFF (Ministry of Agriculture, Forestry and Fisheries in Japan) for watching crop situation all over the world.

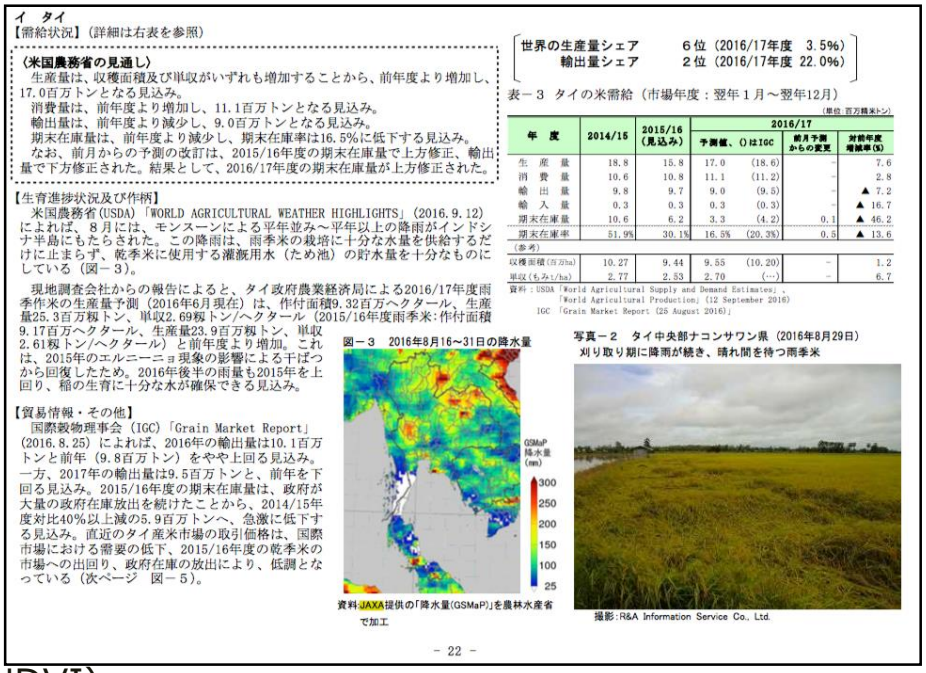
JASMAI

(JAXA Satellite Monitoring of Agrometeorological Information)



(Soil Moisture, Solar Radiation, Precipitation, LST, NDVI)

MAFF Monthly Report



イ　タイ

【需給状況】（詳細は右表を参照）

（米国農務省の見通し）

生産量は、収穫面積及び単収がいずれも増加することから、前年度より増加し、17.0百万トンとなる見込み。

消費量は、前年度より増加し、11.1百万トンとなる見込み。

輸出量は、前年度より減少し、9.0百万トンとなる見込み。

期末在庫量は、前年度より減少し、期末在庫率は16.5%に低下する見込み。

なお、前月からの予測の改訂は、2015/16年度の期末在庫量で上方修正、輸出量で下方修正された。結果として、2016/17年度の期末在庫量が上方修正された。

【生育進捗状況及び作柄】

米国農務省(USDA)「WORLD AGRICULTURAL WEATHER HIGHLIGHTS」(2016.9.12)によれば、8月には、モンスーンによる平年並み～平年以上の降雨がインドシナ半島にもたらされた。この降雨は、雨季米の栽培に十分な水量を供給するだけに止まらず、乾季米に使用する灌漑用水（ため池）の貯水量を十分なものにしている（図－3）。

現地調査会社からの報告によると、タイ政府農業経済局による2016/17年度雨季作米の生産量予測（2016年6月現在）は、作付面積9.32百万ヘクタール、生産量25.3百万籾トン、単収2.69籾トン/ヘクタール（2015/16年度雨季米：作付面積9.17百万ヘクタール、生産量23.9百万籾トン、単収2.61籾トン/ヘクタール）と前年度より増加。これは、2015年のエルニーニョ現象の影響による干ばつから回復したため。2016年後半の雨量も2015年を上回り、稲の生育に十分な水が確保できる見込み。

【貿易情報・その他】

国際穀物理事会（IGC）「Grain Market Report」(2016.8.25)によれば、2016年の輸出量は10.1百万トンと前年（9.8百万トン）をやや上回る見込み。一方、2017年の輸出量は9.5百万トンと、前年を下回る見込み。2015/16年度の期末在庫量は、政府が大量の政府在庫放出を続けたことから、2014/15年度対比40%以上減の5.9百万トンへ、急激に低下する見込み。直近のタイ産米市場の取引価格は、国際市場における需要の低下、2015/16年度の乾季米の市場への出回り、政府在庫の放出により、低調となっている（次ページ　図－5）。

世界の生産量シェア　6位（2016/17年度　3.5%）
輸出量シェア　2位（2016/17年度　22.0%）

表－3　タイの米需給（市場年度：翌年1月～翌年12月）

（単位：百万精米トン）

年度	2014/15	2015/16（見込み）	2016/17			
			予測値、○はIGC	前月予測からの変更	対前年度増減率(%)	
生産量	18.8	15.8	17.0	(18.6)	-	7.6
消費量	10.6	10.8	11.1	(11.2)	-	2.8
輸出量	9.8	9.7	9.0	(9.5)	-	▲ 7.2
輸入量	0.3	0.3	0.3	(0.3)	-	▲ 16.7
期末在庫量	10.6	6.2	3.3	(4.2)	0.1	▲ 46.2
期末在庫率	51.9%	30.1%	16.5%	(20.3%)	0.5	▲ 13.6
（参考）						
収穫面積（百万ha）	10.27	9.44	9.55	(10.20)	-	1.2
単収（もみt/ha）	2.77	2.53	2.70	(…)	-	6.7

資料：USDA「World Agricultural Supply and Demand Estimates」、「World Agricultural Production」(12 September 2016)
IGC「Grain Market Report」(25 August 2016)

図－3　2016年8月16～31日の降水量

資料：JAXA提供の「降水量(GSMaP)」を農林水産省で加工

写真－2　タイ中央部ナコンサワン県（2016年8月29日）
刈り取り期に降雨が続き、晴れ間を待つ雨季米

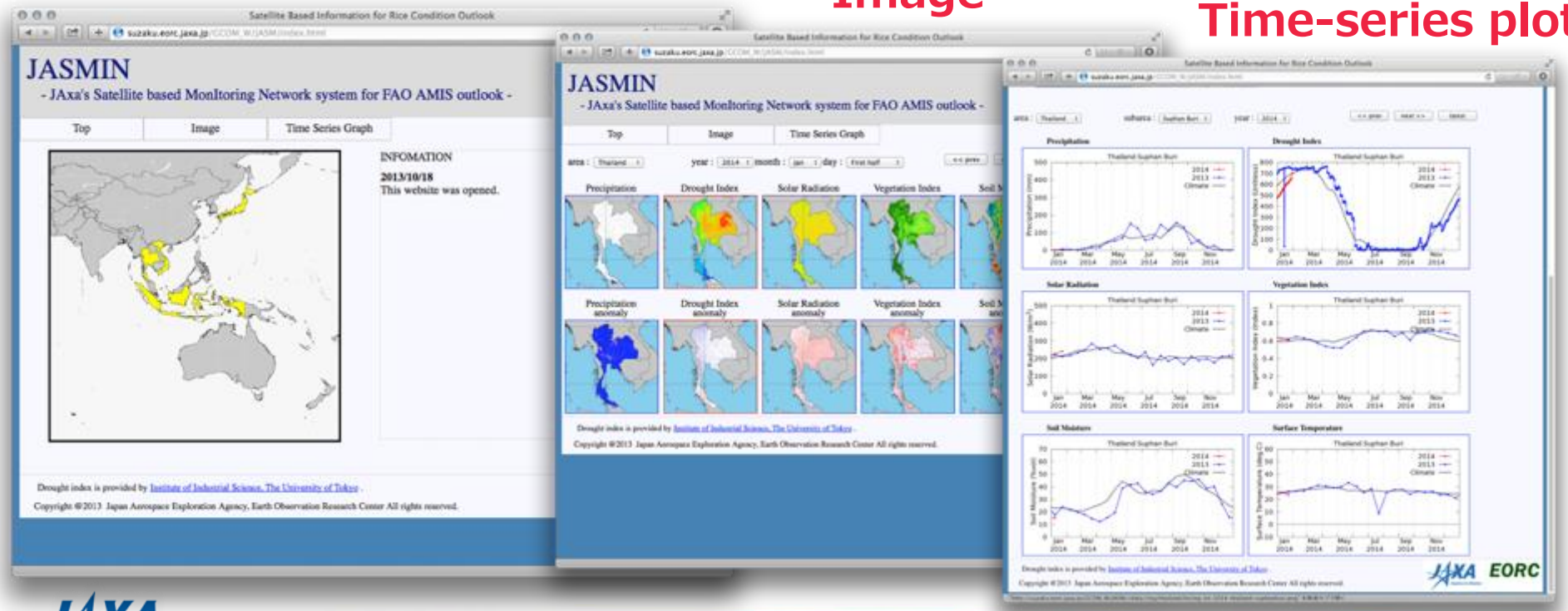
撮影：R&A Information Service Co., Ltd.

MAFF, Japan operationally utilizes these agro-met information in their practical work.

Agromet Information Database System: JASMIN

- **JASMIN (JAxa's Satellite-based Monitoring Network system)** provides GSMaP and satellite-based drought index, solar radiation, land surface temperature, soil moisture, and vegetation index (update twice a month).
- These information are used to generate monthly rice growing outlook which is reported to FAO(Food and Agriculture Organization of the United Nations) through GEOGLAM(GEO Global Agricultural Monitoring Initiative).

Top Page **Image** **Time-series plot**



http://suzaku.eorc.jaxa.jp/JASM/index.html

[Oyoshi et al., JSPRS., 2016]