International Ocean Colour Science Meeting 2025

Advancing Global Ocean Colour Observations

JAXA GCOM-C research and applications

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Japan Aerospace Exploration Agency (JAXA)

International Ocean Colour Science Meeting 2025

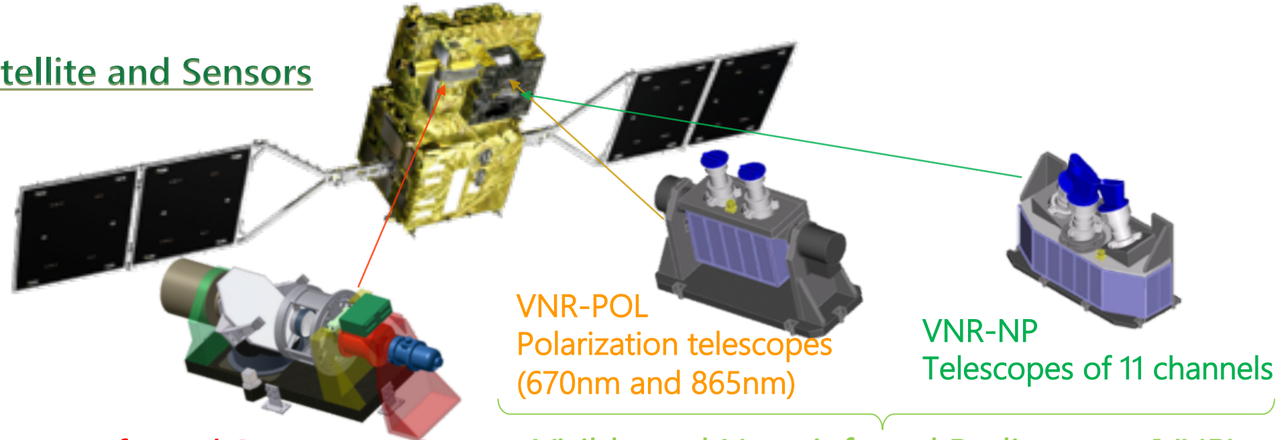
Agenda

1. GCOM-C SGLI
2. GCOM-C products
3. GCOM-C research & application
4. Response to Recommendations

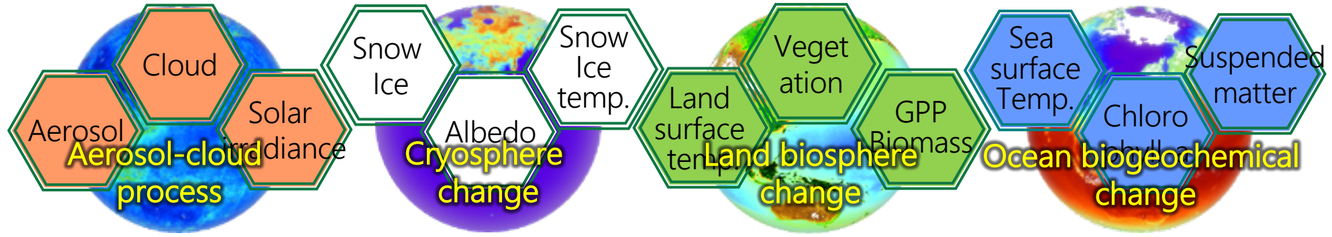
1. GCOM-C SGLI

Global Change Observation Mission – Climate, "SHIKISAI" (GCOM-C) Second-generation Global Imager (SGLI)

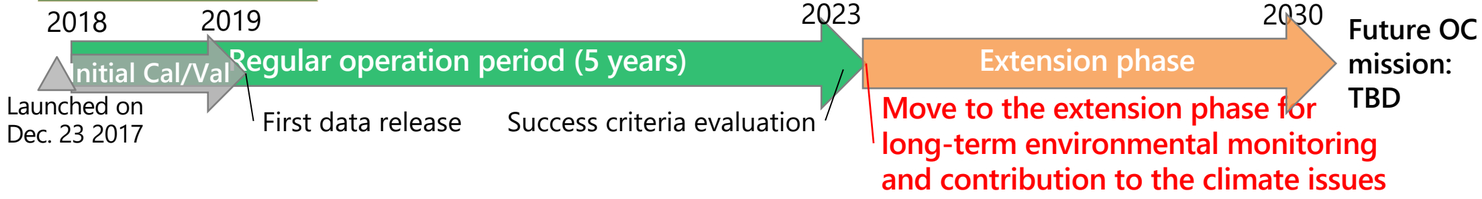
◆Satellite and Sensors



◆GCOM-C observation products



◆Mission timeline



GCOM-C characteristics	
Launch Date	23 Dec. 2017 (data available **since 1 Jan 2018**)
Orbit	Sun-synchronous (descending local time: **10:30am**), Altitude: 798km, Inclination: 98.6deg

SGLI channel specification

swath	CH	λ	Δλ	L_{std}	L_{max}	SNR@L_{std}	IFOV
km		nm		W/m²/sr/μm K: Kelvin		- K: NEΔT	m
1150km (VNR: push-broom electric scan)	VN01	380.0	10.6	60	240-241	624-675	**250** /1000
	VN02	412.5	10.3	75	305-318	786-826	**250** /1000
	VN03	443.2	10.1	64	457-467	487-531	**250** /1000
	VN04	489.8	10.3	53	147-150	858-870	**250** /1000
	VN05	529.6	19.1	41	361-364	457-522	**250** /1000
	VN06	566.2	19.8	33	95-96	1027-1064	**250** /1000
	VN07	672.0	22.0	23	69-70	988-1088	**250** /1000
	VN08	672.1	21.9	25	213-217	537-564	**250** /1000
	VN09	763.1	11.4	40	351-359	1592-1746*	**250 /1000***
	VN10	866.8	20.9	8	37-38	470-510	**250** /1000
	VN11	867.1	20.8	30	305-306	471-511	**250** /1000
	PL01	671.9	20.6	25	293	609	**1000**@nadir
	PL02	866.2	20.3	30	396	646	**1000**@nadir
1400km (IRS: whisk-broom)	SW01	1055	21.1	57	289.2	951.8	**1000**
	SW02	1385	20.1	8	118.9	347.3	**1000**
	SW03	1635	195.0	3	50.6	100.5	250 /1000
	SW04	2209	50.4	1.9	21.7	378.7	**1000**
	TI01	10793	756	300K	340K	0.08K	250/**500**/1000
	TI02	11956	759	300K	340K	0.13K	250/**500**/1000

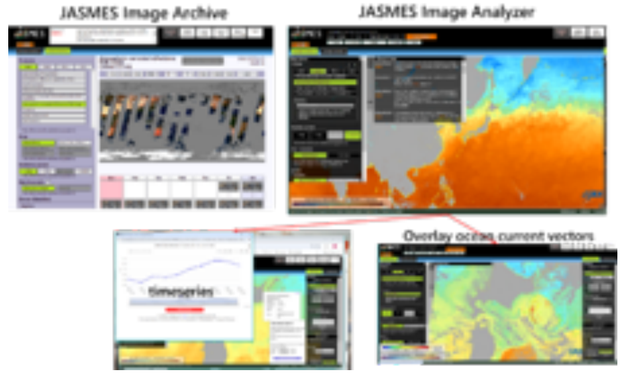
https://suzaku.eorc.jaxa.jp/GCOM_C/data/prelaunch/index.html

2. GCOM-C products

- ✓ All Ver.3 standard products (Level-1, 2, and 3 by HDF5 format) have been open to the public via JAXA data portal, **G-Portal** (search and direct SFTP)
- ✓ Validation by in-situ observations and other satellites https://suzaku.eorc.jaxa.jp/GCOM_C/data/validation.html
- ✓ Some products are available via JAXA multi-sensor data site, **JASMES** by binary or NetCDF

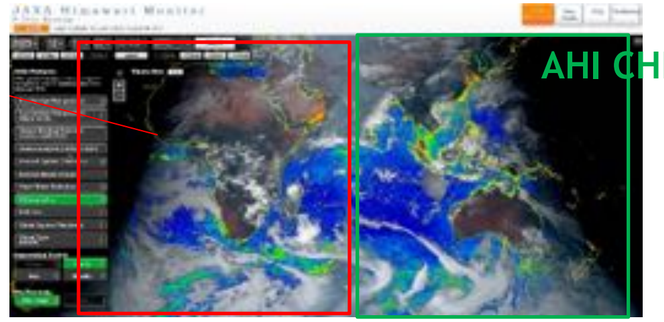
G-Portal
https://gportal.jaxa.jp/gpr/

gory	Product [ID*1]	Definition & Unit*2	Algorithm ID	Responsible Person	ATBD (update date)
Ocean Detail	Normalized water leaving radiance [NWLR(L***)] *** is wavelength.	•Def.: The upwelling radiance just above the sea surface. •Unit: W/m2/str/um or 1/sr	O2AB	M. Toratani	Ver.1 (Jan. 2019) Ver.2 (Jul. 2020) Ver.3 (Oct. 2021)
	Atmospheric correction param [NWLR(T***)] *** is wavelength.	•Def.: Aerosol optical properties for the atmospheric correction over ocean. •Unit: none			
	Photosynthetically available radiatioin [NWLR(PAR_)]	•Def.: Photon flux density within the visible wavelength range (400 to 700 nm) over ocean which is potencially available to plant for photosynthesis. •Unit: Ein/m2/day or mol photons/m2/day		R. Frouin, H. Murakami	Ver.1 (Oct. 2018)
	Chlorophyll-a concentration [IWPR(CHLA)]	•Def.: Concentration of the green pigment in phytoplankton in surface water. •Unit: mg/m3	O3AB	H. Murakami	Ver.1 (Oct. 2018) Ver.2 (Jan. 2020)
	Suspended solid concentration [IWPR(TSM_)]	•Def.: Dry weight of suspended matter in a unit volume of surface water which is the sum of organics such as phytoplankton and inorganics such as soil. •Unit: g/m3		M. Toratani	Ver.1 (Oct. 2011) Ver.2 (Jun. 2020)
	Colored dissolved organic matter [IWPR(CDOM)]	•Def.: Light absoption coefficient of organics dissolved in surface water at 412nm. •Unit: 1/m		T. Hirata	Ver.1 (Mar. 2019) Ver.2 (Mar. 2020) IOP (Mar. 2019)
	Sea surface temperature [SSTD/SSTN(SST_)]	•Def.: Temperature of sea surface. •Unit: deg.C)	O1AB	Y. Kurihara	Ver.1 (Oct. 2018) Ver.2 (Oct. 2018) Ver.3 (Oct. 2021)



JASMES: https://kuroshio.eorc.jaxa.jp/JASMES/

MTG CHL



Himawari monitor: https://www.eorc.jaxa.jp/ptree/

2. GCOM-C products

Under development

Area	Product [ID※1]	Definition & Unit	Proposer	Last	ATBD/Data Download
Ocean	Euphotic zone depth [EZD]	•Def.: The sea depth where photosynthetic available radiation (PAR) is 1% of its surface value. •Unit:m	T.Hirata	Mar. 2017	PDF
	Inherent optical properties [IOP]	•Def.: Optical properties of sea water such as spectral absorption, scattering, and backscattering coefficients for characterizing the marine optical environment and remote-sensing applications. •Unit:1/m	T.Hirata	Nov. 2011	PDF
	Ocean net primary productivity [ONPP]	•Def.: Net primary productivity which is gross photosynthetic carbon fixation minus the carbon respired to support maintenance requirements of the whole plant. •Unit:mgC/m2/day	T.Hirawake	Mar. 2016	PDF
			J.Ishizaka	Mar. 2011	PDF
	Phytoplankton functional type [PHFT]	•Def.: Conceptual groupings of phytoplankton species, which have a ecological functionality in common such as nitrogen fixation, calci?cation, silici?cation, DMS production and so on. •Unit: none	T.Hirata	Mar. 2012	PDF
			T.Hirawake	Mar. 2016	PDF
	Redtide [RTD]	•Def.: Detection of a red tide phenomenon known as an algal bloom. •Unit: none	J.Ishizaka	Mar. 2011	PDF
	Multi sensor merged ocean color parameters	•Def.: Multi-sensor merged chrollophyl-a concentration product with higher temporal resolution than that of SGLI original product. •Unit:mg/m3	TBD	-	-
	Multi sensor merged sea surface temperature [MSST]	•Def.: Multi-sensor merged seasurface temperature product with higher temporal resolution than that of SGLI original products. •Unit: ℃	TBD	-	-
	Sea surface nitrate and nitrate based new production	•Def.: Sea Surface Nitrate and Nitrate Based New Production. •Unit:TBD	J. I. Goes	Mar. 2017	PDF
	Floating Algae Index (FAI)	•Def.: An index for floating algae on the sea surface derived from near-infrared reflectance •Unit: none	H.Murakami	Dec. 2019	PDF (ATBD of JASMES/SGLI near-real time data FAI) PDF (ATBD of JASMES/SGLI near-real time ocean color)

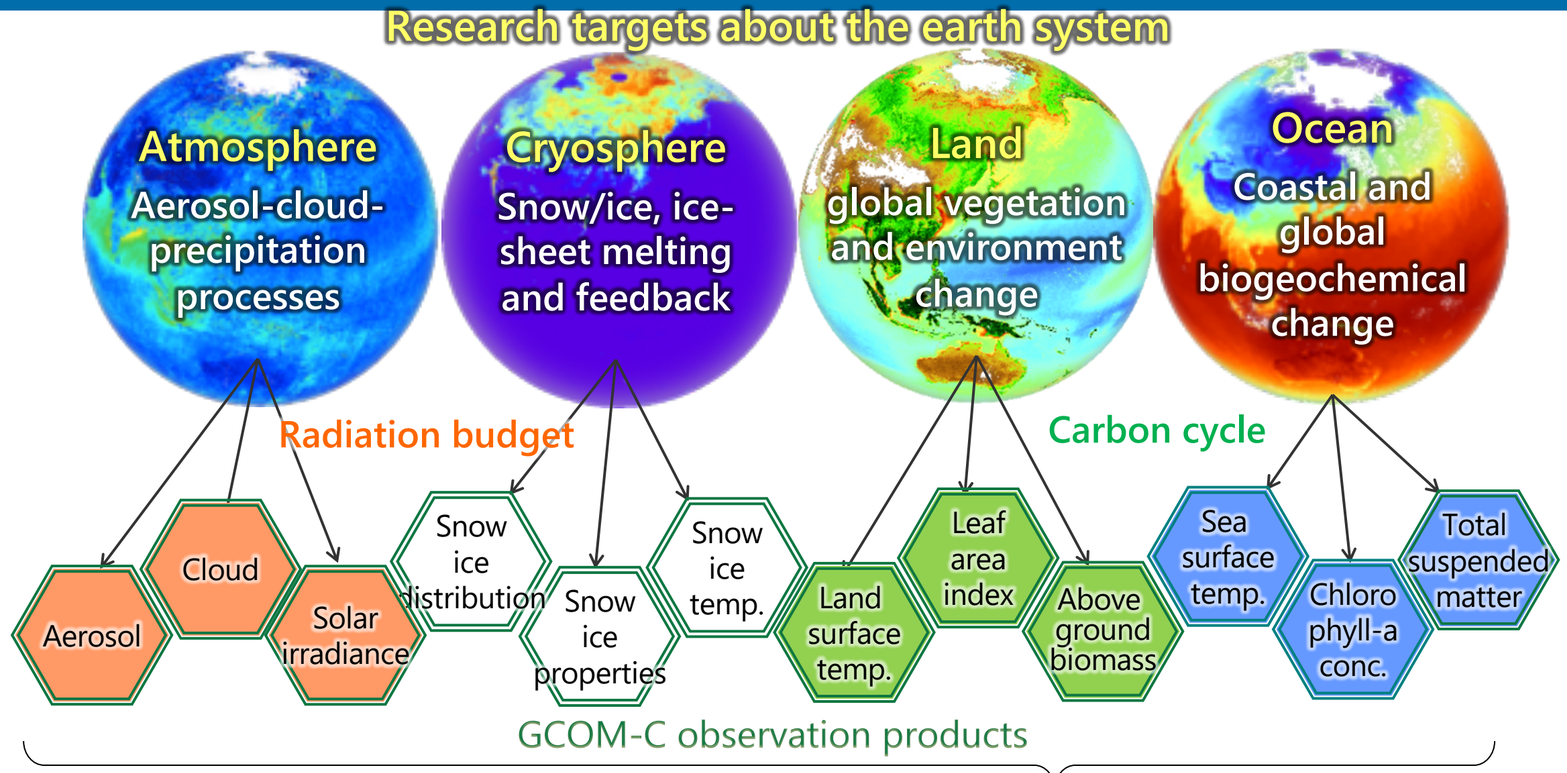
3. GCOM-C research & application

Research targets (to create outcomes) of the extension phase:

(1) "Earth system research related to climate change" and "polar environmental change" in science areas,

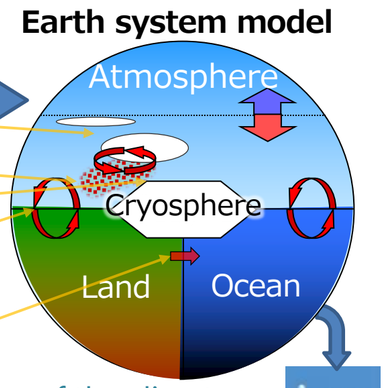
(2) Fundamental research bridging to operational applications especially for "fishery", "volcano" and "agriculture"

(3) Research for development of long-term continuous and high accuracy products supporting the above targets



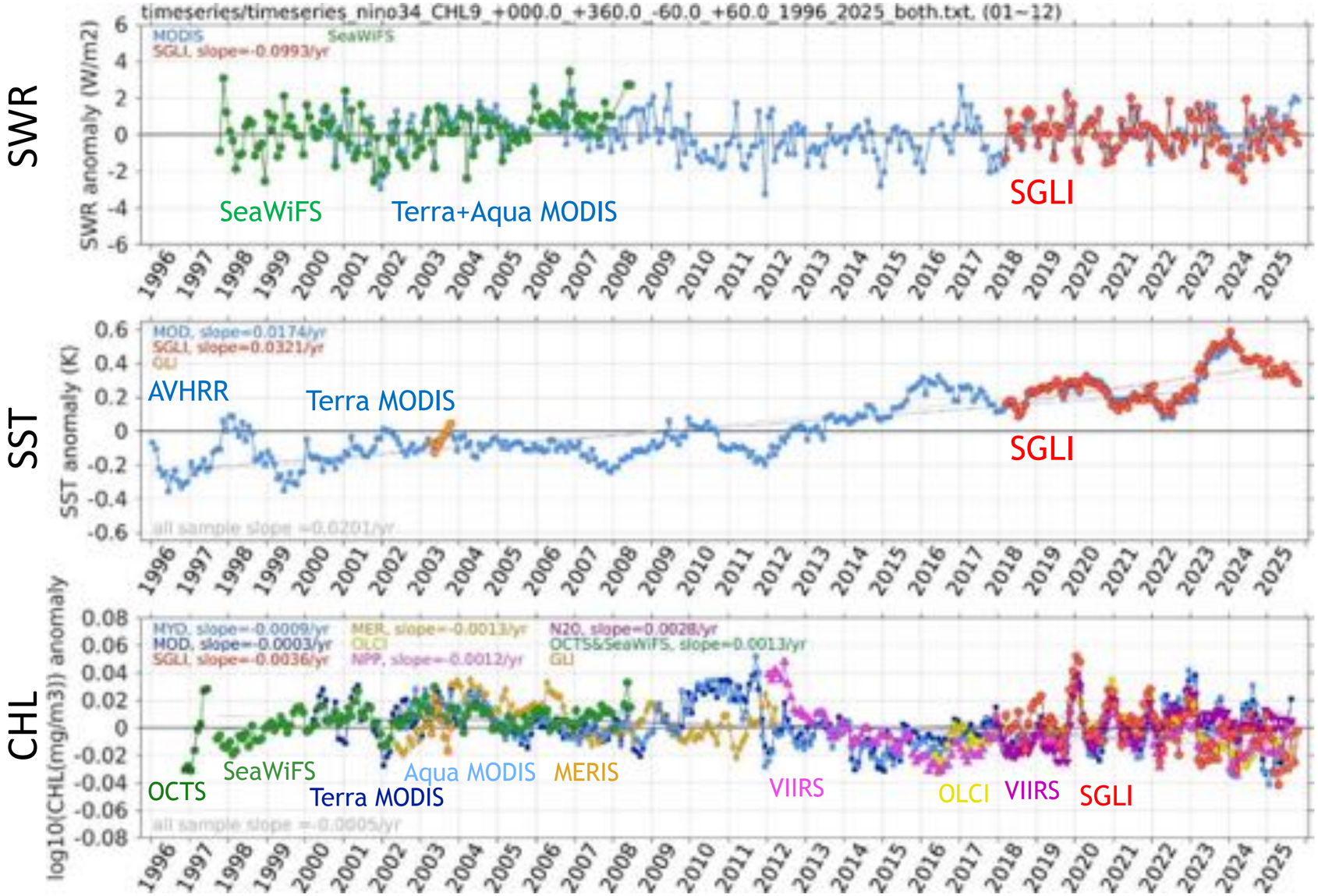
Examples of the current research focus:

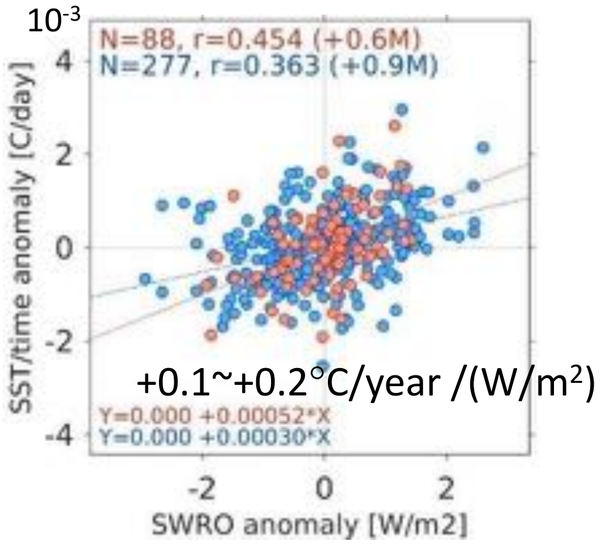
- ✓aerosol-cloud-precipitation processes
- ✓wildfire processes including land cover and emission
- ✓arctic change including Greenland ice sheet
- ✓seasonal and year-to-year change of the vegetation
- ✓ocean ecosystem and carbon cycle including land-ocean I/F

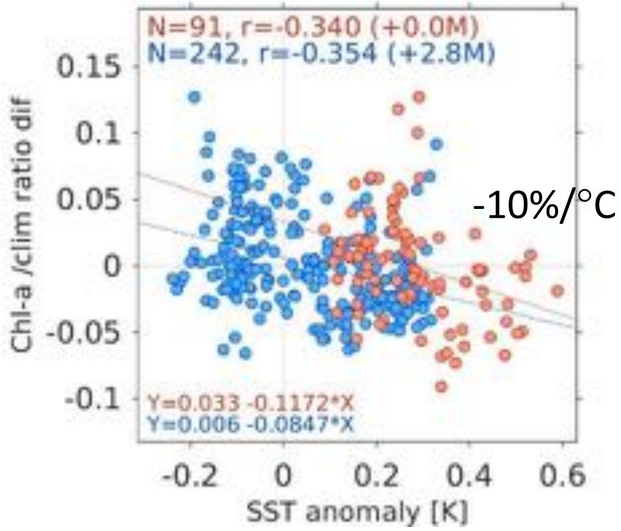


Contribution to the international evaluation cycles of the climate monitoring, prediction, prevention, and adaption measures (e.g., AR7)

GCOM-C research: e.g., long-term timeseries







Monthly anomalies of SWR, SST and CHL from 1997 to 2025

3. GCOM-C research & application

GCOM-C data are widely contributing to our daily lives as well as the climate research

Fishery

SST and OC data are useful for searching fishing grounds and estimating marine biological resources for sustainable use.

Red tide survey by Fisheries Agency

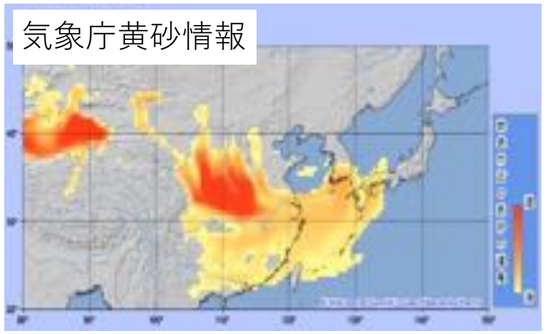
Fisheries Support

Aquaculture support business

Chlorophyll-a conc. with red tide in the Ariake Bay observed by GCOM-C on 22 July 2020.

Air quality

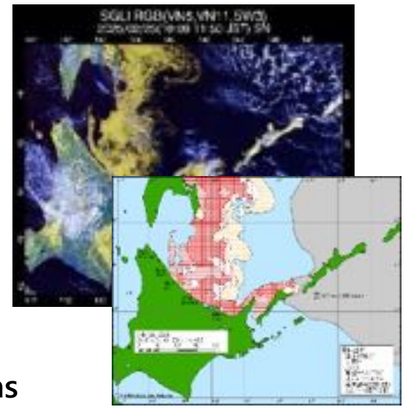
Aerosol data are used to improve the accuracy of prediction models for atmospheric environments such as yellow dust



In collaboration with the JMA/MRI and NIES, aerosol assimilation models have developed and used for public information.

Sea state

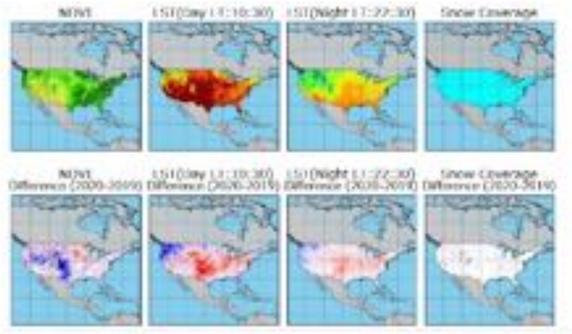
Sea ice condition chart is made by Japan Coast Guard combination with other satellites and airplane observations



Sea ice information by JCG on 25 Feb. 2025

Agri-culture

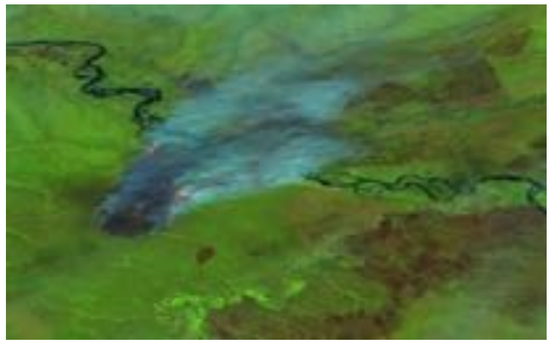
Vegetation, LST, SWR, snow cover etc. can be used for assessment of crop growth and international food supply.



Environmental information in USA early July 2020 (upper panels) and deviation from the chronology (lower ones) (JASMIN/JASMAI)

Wildfire

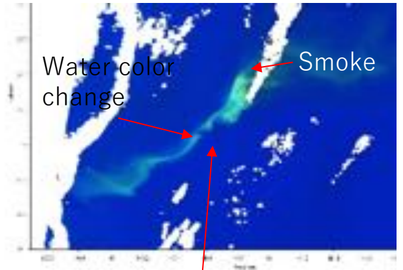
Observation of heat, smoke, and vegetation changes is useful for monitoring and risk assessment of wild fires



Forest fires in eastern Siberia on June 30, 2021 (red: high temperature, green: vegetation, dark brown: burned area, light blue: aerosol s)

volcanic island

Ocean color could capture distribution of discolored water around the active volcanic island.



Nishi-no-Shima on 17 July 2020

Strategic priority themes of JAXA earth observation

Aiming to contribute to the "Basic Plan on Space Policy (ensuring space security, strengthening national resilience, responding to global agenda, and creating innovation)", JAXA has defined strategic initiatives that can identify specific goals, methods and milestones endorsed with specific collaborative partners as "Strategic priority themes", and established implementation plan and organization structure in the 5th JAXA midterm plan from 2025 to 2031.

- **Natural Capital Assessment & Credit Generation**
  Utilize both governmental and private satellite data to quantify forest biomass and natural capital.
  Enable commercial sectors to lead in global nature-based credit markets.
- **Marine Monitoring and Maritime Domain Awareness**
  Strengthen integrated monitoring of Japan's surrounding seas and sea lanes via satellite networks
  Support the "Free and Open Indo-Pacific" vision and expand market opportunities.
- **Flood/Heavy rain Disaster & Water Resource Management**
  Deploy Japan-originated solutions to address water-related challenges in Global South countries.
  Enhance diplomatic relationship and create industrial benefits through strategic partnerships.
- **Infrastructure Management & Disaster Prevention through DX**
  Utilize high-resolution 3D terrain data and satellite-based infrastructure monitoring to effective land management and improve disaster resilience, and build global businesses based on the advanced geospatial technologies.
- (future additional candidate) **Food Security (smart and sustainable food supply system)**
- (Basis/long-term targets) **Climate Science & Climate Resilience**

GCOM-C/Ocean research will be conducted especially with the themes of "Climate" and "Marine Monitoring"

Consortium for Satellite Earth Observation CONSEO

CONSEO will:

(1) contribute to policy agendas, such as the Basic Plan on Space Policy and the Implementation Plan, by offering comprehensive strategic recommendations in the field of Japanese satellite Earth observation across industry, academia, and government;

(2) lead global efforts in addressing climate change by leveraging Japan's strengths in Earth observation and Earth science;

(3) aim for the growth of the space industry in Japan by promoting concrete collaboration among industry, academia, and government, and by expanding CONSEO's participation across diverse industries.

CONSEO
衛星地球観測コンソーシアム
Consortium for Satellite Earth Observation

https://earth.jaxa.jp/conseo/en/

Activities

- Facilitate comprehensive discussion and formulate strategic recommendations in the field of Satellite Earth Observation across industry, academia, and government
- Promote co-creation related to satellite development/demonstration and data use among industry, academia and government, and promote end-user expansion including non-space sector
- Collect and share domestic and international information among members
- Promote networking and develop human resources, and disseminate information on outcomes
- Other activities necessary to achieve the objectives of the Consortium

4. Response to Recommendations

Recommendation ID	Recommendation	Executor	Status	JAXA response
2013.02.3	Planned sensors should complement spectral measurements from UV to SWIR with multi-angular and multi-polarized instruments	Agency	Actioned	SGLI has **380nm channel** and 2-channel (red, NIR) polarimetry (0,+60,-60)
2013.02.4	Efforts should be made by space agencies to make the new techniques more visible and accessible, e.g., via inter-comparison activities, implementation in SeaDAS etc.	Agency	Actioned	Attending LTTS. SGLI Level-3 data are copied to GEE.
2013.02.5	Parallel processing lines with standard and improved schemes may help users understand advantages and limitations of individual techniques, define the quality of final products, and allow for continuity.	Agency	Actioned	Some products are made by research systems, but the processing volume is limited due to the resources.
2013.02.6	Synergy between instruments/missions should be considered, in particular OLCI (visible NIR) and SLSTR (SWIR) (1b or 1c co-registered).	Agency	Actioned	Cross calibration among SGLI, AHI, MODIS etc. has been conducted.
2013.02.7	New techniques suggest sensors should not saturate over Sun glint and clouds, and that it may not be necessary to tilt them, but strategy should keep continuity while allowing improvements based on gained knowledge.	Agency	Actioned	They will be investigated for future JAXA missions.
2013.02.8	Aerosol altitude is an essential variable to compute atmospheric effects at ocean colour wavelengths, especially in the presence of absorbing aerosols, and efforts should be made to determine this variable in future ocean colour missions. Measuring NO2 is definitely needed to perform accurate atmospheric correction in the coastal zone	Agency	Actioned	Aerosol model data assimilating EarthCARE will be available in the future. NO2 change is not considered in the SGLI processing but will be investigated.
2013.02.9	Aerosol model determination (size distribution, index of refraction) is useful to at least constrain the ill-posed inverse ocean-colour problem, but errors may be too large to compute the perturbing signal with sufficient accuracy, i.e., it is desirable to estimate the perturbing signal more directly. Yet aerosol information is required for studies of aerosol/ocean interactions (e.g., iron fertilization)	Agency	Actioned	No progress made in the OC processing. But in the atmospheric aerosol retrievals, an optimal estimation of aerosol using predicted aerosol properties from the assilimation model has been operated.
2013.03.1	Broader distribution and application of GOCI data is recommended to demonstrate the utility of geostationary ocean colour radiometry data.	Agency	Actioned	NA
2013.04.2	Space agencies should continue the pursuit and support of international multi-agency collaborations.	Agency	Actioned	Agencies continue this through bilateral agreements, and under CEOS and IOCCG
2013.04.5	Space agencies/data providers should commit to providing global Level-3 composites of ocean colour climate variables to facilitate sensor intercomparison and global biogeochemical modeling and research.	Agency	Actioned	JAXA'a Level-3 of SGLI are produced and distribute freely.
2013.05.1	The quality of operational ocean colour data is of critical importance. Operational agencies should develop and maintain infrastructure and scientific and technical activities to ensure that the accuracy and long-term stability requirements are met globally and across regions.	Agency	Actioned	Cal/val of SGLI is continued, and efforts are on-going for all agencies.
2013.05.2	Assure data continuity and sustainability of product delivery. Distribute NRT data as well as consistent long-term time series of ocean colour observations.	Agency	Actioned	Both NRT and standard products are produced. However, SGLI reprocessing capability is limited due to the resource limitation.
2013.05.3	Produce and distribute Level-3 data.	Agency	Actioned	Completed for JAXA: Level-3 of SGLI are produced and distribute freely.
2013.05.4	Ensure that operational capabilities are achieved soon after launch and enable early data access to marine service and cal/val users, even if the data are not yet well calibrated.	Agency	Actioned	We had distributed SGLI data for PIs and operational use within 1-year, and to the public after 1 year.
2013.05.5	Provide open source modular software that matches the operational processor and that can be run in batch mode on local user computers; preferably multi-mission software.	Agency	Actioned	JAXA is starting to the direction but step by step; one research AC algorithm has been open by GitHub.
2013.05.6	Provide all data online for downloading (instead of a limited rolling archive).	Agency	Actioned	JAXA all data is available in G-portal through both GUI and SFTP.
2013.05.7	Expand the core product suite; keep algorithms state-of-the-art.	Agency	Actioned	SGLI latest version, Ver 3, has been released in 2021 and reprocessed in 2022. We have to find another system for future revisions due to resource limitation.
2013.05.8	Consolidate ocean colour requirements for services, ecosystem and management applications.	Agency	Actioned	IOCCG reports cover some part of the requirements.
2013.07.2	Provide training on software and tools to support use of VIIRS and OLCI data, as well as other new missions	Agency	Actioned	SGLI interface has been included in SeaDAS by NAXA's activities.
2013.07.3	EUMETSAT's role in training may be best focused on the operational users and potentially those involved in the management / decision making processes.	Agency	Actioned	NA
2013.07.5	Training and outreach activities aimed at the policy/decision making level	Agency	Actioned	Consortium for Satellite Earth Observation CONSEO has established for gathering players from industry, academia and government, to envisage the future of Satellite Earth Observation and realize it through co-creation.
2013.08.1	The vicarious calibration of VIS bands with respect to NIR bands, with the application of highly accurate *in situ* VIS data, should be considered for the forthcoming missions.	Agency	Actioned	In progress

4. Response to Recommendations

International Ocean Colour Science Meeting 2025

Recommendation ID	Recommendation	Executor	Status	JAXA response
2013.08.2	The importance of involving National Reference Laboratories in the characterization of field radiometers and SI traceability of measurements is essential.	Agency	Actioned	In progress
2013.08.3	The analysis of legacy constraints for *in situ* measurements and sites supporting system vicarious calibration suggests that spatial homogeneity of the measurement site(s) is an essential requirement. The constraint on the aerosol optical thickness lower than 0.1 in the visible could be likely “relaxed” as long as the atmospheric conditions are well characterized. It is additionally recommended that the availability of supplementary atmospheric measurements at the vicarious measurement site(s) (e.g., vertical characterizations of the atmospheric components) are of potential aid to system vicarious calibration.	Agency	Actioned	Ongoing consideration
2013.08.4	The use of commercial systems to support system vicarious calibration imposes the generation of *in situ* traceable measurements through fully characterized hyperspectral systems. This requires comprehensive characterizations of commercial hyperspectral systems whose performances often need thorough verification.	Agency	Actioned	Not reached yet
2013.08.5	The standardization of system vicarious calibration is a necessary strategy for the generation of CDRs from multiple satellite instruments. Current system vicarious calibration exercises involving NASA and ESA sensors appear to indicate that the lack of standardization between institutions (not only for the system vicarious calibration process) may lead to significant differences in derived satellite data products not compatible with the creation of CDRs from independent missions. However, standardization using current technologies should consider that forthcoming advanced systems like PACE may benefit from additional measurement capabilities (e.g., polarization) with respect to current space sensors.	Agency	Actioned	Ongoing in OC-SVC TF
2013.08.6	Results from this Splinter Session should be the start for additional international actions aiming at detailing specific requirements and methods for System Vicarious Calibration of new missions like PACE and Sentinel-3.	Agency	Actioned	Session fed into OC-SVC TF
2013.09.1	Calculation of uncertainties, including bias, in the time series of ocean-colour products is vitally important. Space agencies should ensure resources are made available to support these developments.	Agency	Actioned	SGLI project has a PI team investigating the validation and uncertainties.
2013.10.1	Agencies should support PFT algorithm development, validation and intercomparisons as well as activities to merge different techniques and multi-mission data sets, in order to develop a new “standard product” of ocean colour.	Agency	Actioned	SGLI project has a PI team investigating the theme.
2013.10.4	The validation of HPLC-PFT data sets should be supported by all agencies: a single method may not be globally applicable.	Agency	Actioned	Individual efforts; SGLI project partially supports PIs measurements. Agencies continue to support HPLC datasets.
2013.11.1	All space agencies should adopt the netCDF4/CF format for their ocean-colour data.	Agency	Actioned	SGLI is by HDF5 (readable by NC4 routines) and some data sets are distributed by NC4.
2013.11.2	Space agencies should continue to support the existing line of data processing, analysis and exploitation tools (i.e. SeaDAS, BEAM and ODESA), and continue them for future sensors. This should include further development as well as training of users.	Agency	Actioned	SGLI collaborates with SeaDAS. Training is available.
2013.11.3	Space agencies should support large volume, batch data access and download (e.g., through established means such as ftp/http), as well as more targeted access through protocols such as THREDDS/OpenDAP.	Agency	Actioned	SGLI can be accessed by SFTP and some Level-3 products are on GEE.
2015.01.2	Investment in additional phytoplankton composition observations	Agency	Actioned	On-going: SGLI PI team is investigating the theme.
2015.04.4	Future sensors such as the Landsat and Sentinel 2 series should incorporate additional narrow spectral channels to enable accurate observations of chlorophyll and cyanobacterial pigments concentrations.	Agency	Actioned	through experience of hyper spectral sensor they will be investigated in the future missions
2015.05.2	Remote sensing observations (airborne or satellite platforms) at higher spatial resolution (<100 m) are needed to resolve the highly dynamic processes and strong bio-optical complexity of high latitude coastal waters	Agency	OPEN	through experience of current higher spatial resolution sensors they will be investigated with user needs in the future missions
2015.05.3	Increase the number of remote sensing observations over polar seas include: the use of geosynchronous satellites with inclined orbit (or other orbits permitting longer integration times in polar seas such as elliptical), Lidar technology and other means of measurements to complement ocean colour remote sensing (airborne radiometers, gliders, drones, unmanned autonomous vehicles).	Agency	OPEN	Not reached yet
2015.05.4	A rapid action to increase the annual period of observation would be to increase the sun angle threshold (to 75° instead of 70° currently used) in processing software	Agency	Actioned	SGLI Level-2 data include sun zenith angle more than 75 deg.

4. Response to Recommendations

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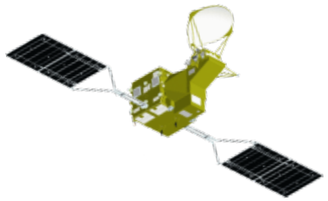
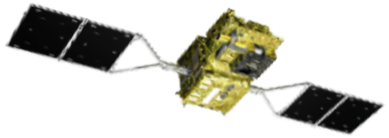
Recommendation ID	Recommendation	Executor	Status	JAXA response
2015.06.1	The ocean colour community should be better represented at the formulation stage of high spatial resolution missions (Landsat-10+ and Sentinel-2E+)	Agency	Actioned	through experience of current higher spatial resolution sensors they will be investigated with user needs in the future missions
2017.02.2	Need for hyperspectral above-water reflectance data for both validating tricho algorithms but also to improve the atmospheric correction techniques	Agency	Actioned	Not reached yet
2017.04.10	Promote consistency in pre- and post-launch sensor calibration across multiple missions and multiple space agencies to enable robust blending of data products from a constellation of satellites.	Agency	Actioned	JAXA is attending IOCCG Task Force on Sensor Calibration (and CEOS/WGCV, GSICS) aiming to do this.
2017.08.2	SeaBASS should add a flag to indicate whether data is validation quality, or had been compromised in some way to make it useful, but not of sufficient quality for validation.	Agency	Actioned	JAXA encourage to collaborative PIs to provide their data to the common data base.
2017.09.2	Implement quasi / pre operational Rrs products on open-ocean POC, coastal SPM with clear indication of uncertainty.	Agency	Actioned	JAXA OC procfucts includes SPM but not yet POC.
2019.03.1	A constellation of ~30-m resolution with land-sat radiometric performance and OLCI-like spectral coverage would serve a wide range of applications	Agency	Actioned	Not reached yet
2019.03.2	Space agencies should coordinate mission formulations, and pre-launch calibration to minimize differences in products	Agency	Actioned	working in CEOS/WGCV and OCR-VC
2019.06.1	Users want single consistent and stable time series, long-term to NRT, merged from multiple sensors, as well as anomaly products	Agency	Actioned	Establish and attend LTTS in IOCCG
2019.06.2	Need to actively engage with users through workshops and trainings	Agency	Actioned	on -going
2019.08.1	Every mission should evaluate if lunar observations can be acquired at least infrequently.	Agency	Actioned	SGLI is operating monthly lunar calibration
2019.08.2	Every mission should evaluate if for a newly launched sensor, a tandem flight is possible to evaluate calibration consistency	Agency	Actioned	recognized that but practically only SNO observation currently
2019.08.3	Gain calibration trends should not contain discontinuities that are not clearly supported by calibration measurements	Agency	Actioned	SGLI operates monthly lunar-cal and weekly solar/lamp cal.
2019.09.3	Deriving uncertainties should be a requirement when developing algorithms. This includes characterizing the input L1b uncertainties.	Agency	Actioned	Some algorithms consider this, but not all.
2023.01.1	Space agencies should develop a strategy for remote sensing of optically complex waters in dialogue with the scientific community within the next two years.	Agency	Actioned	IOCCG Aquatic Hyperspectral Remote Sensing TF is working on this
2023.01.3	Space agencies are requested to review and expand the use of FAIR and open source standards in their commissioning processes to promote more open data and software.	Agency	Actioned	data is already open and staring to direction to the open source science.
2023.05.3	Space agencies should consider how to treat high resolution optical sensors for water applications (e.g., Sentinel-2 or commercial high-res platforms) to meet the need for optical observations in waters with areas smaller than those covered by current sensors with the full suite of ocean colour bands. (See recommendations in IOCCG Report #17 on Water Quality)	Agency	Actioned	it is included in the future mission discussion.
2023.06.1	All missions should clearly identify which solar irradiance spectrum they are using to produce their science products	Agency	Actioned	Agreed by agencies at the IOCCG-28 meeting and already implemented by some.
2023.07.2	Space agencies should support cross-agency work to engage with stakeholders to refine needs/requirements (including spatial, vertical and temporal resolution) for essential biodiversity variables (EBV) and essential ocean variables (EOV)	Agency	Actioned	Establish and attend LTTS in IOCCG
2023.07.3	Space agencies and the community should ensure mission continuity and climate relevant datasets for biodiversity	Agency	Actioned	in aboves
2023.08.3	Space agencies and distribution services (in collaboration with the ocean colour and metrology communities) need to prioritise calculating and distributing uncertainties associated with all products (pixel-based and composite), and including propagation through AC and algorithms following metrological practices.	Agency	Actioned	Some algorithms consider this, but not all.
2023.08.5	Space agencies should advocate for mission design to ensure backwards compatibility to improve confidence in derived trends and ensure overlap between missions.	Agency	Actioned	it is included in the future mission discussion.
2023.09.3	Space agencies need to make daily Ocean L1 and L2 CALIOP and ATLAS archives available, with a portal to easily view and download the data (such as oceancolor.gsfc.nasa.gov) as soon as possible.	Agency	NA	NA
2023.09.4	The community needs to share current and past in-situ (shipborne, airborne, fixed platforms) lidar measurements.	Agency	NA	NA (we don't have them)
2023.09.5	Space agencies should fund, and the community should develop, in-situ oceanic profiling lidar (measurements up to the euphotic depth, Instruments to measure the back-scattering coefficient at 180° , Multi-wavelength : 355, 470, 532, 560 nm, Fluorescence profiles, Vertical resolution: ≤1 m, Temperature profiles)	Agency	OPEN	Not reached due to budget situation

5. JAXA EO missions

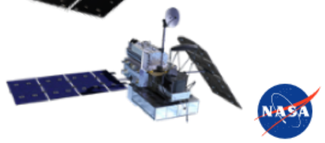
- GCOM-W 2012-, GOSAT-GW/AMSR3 2025-



- GCOM-C 2017-

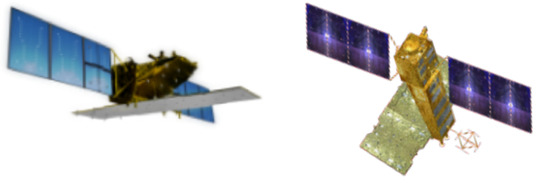


- GPM/DPR 2014-, AOS-PMM (2030)



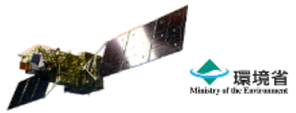
- EarthCARE/CPR 2024-

- ALOS-2 2014-, ALOS-4 2024-



- MOLI (2027)

- (GOSAT 2009-, GOSAT-2 2018-, GOSAT-GW/TANSO 2025-)



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Advancing Global Ocean Colour Observations

Thank you!

Questions and Answers