

Space-based solutions for Climate Action – JAXA's perspective

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8 December 2021

World Space Forum



Current JAXA Earth Observation Missions Contributing to Climate change



GCOM-C
since 2017

Cloud/
Aerosols/
Vegetation



GOSAT
since 2009

Greenhouse
gases



GOSAT-2
since 2018

Greenhouse
gases



GCOM-W
since 2012

Water Cycle



GPM-Core
since 2014

Precipitation



ALOS-2 (Radar)
since 2014

Disaster/
Forest

Main programs related to climate change

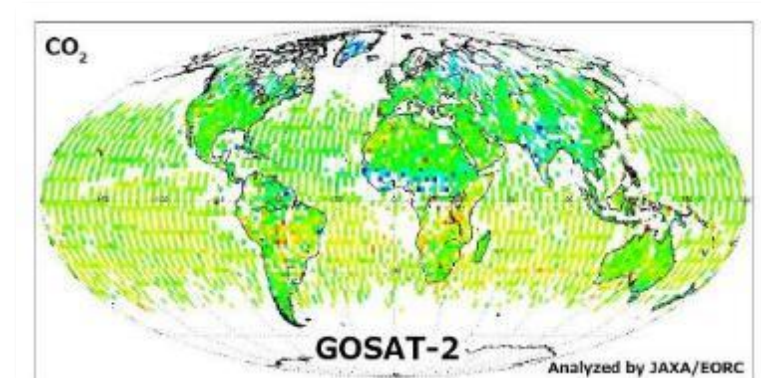
Global Satellite Mapping of Precipitation



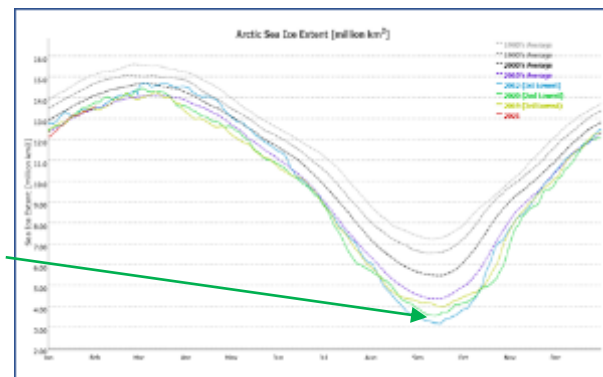
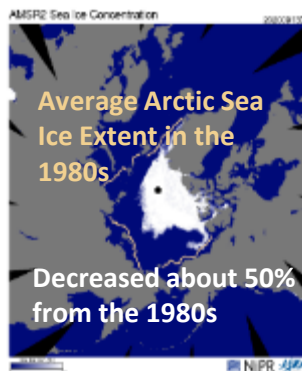
GSMaP provides global precipitation data hourly about 10km grid (0.1 degrees) in various formats. (Free of charge)

GHG Observation

Global CO₂ concentrations observed by GOSAT-2 (September 2019)



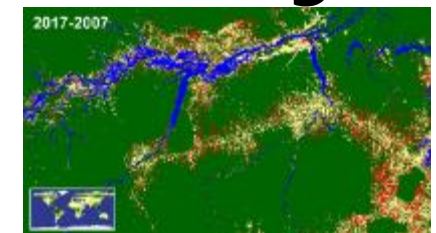
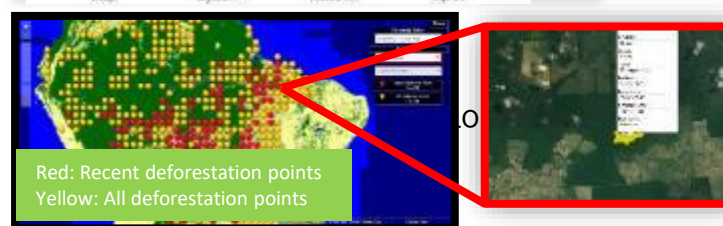
Sea Ice Observation



The Advanced Microwave Scanning Radiometer 2 (AMSR2) on GCOM-W revealed that Arctic sea ice extent reached the minimum in 2020. Radar satellite (ALOS-2) is capturing the movement of iceshelf and icebergs.

Forest Cover Monitoring

JJ-FAST website (http://www.eorc.jaxa.jp/jjfast//jj_index.html)



L-band Radar is suitable for detecting forest cover. The update of forest cover changes observed by ALOS-2 in global tropical forest is released about every 1.5 months.

A-decade-long GHG observation by GOSAT series

Greenhouse gases Observing SATellite (GOSAT) & GOSAT-2



Carbon & Material Cycle

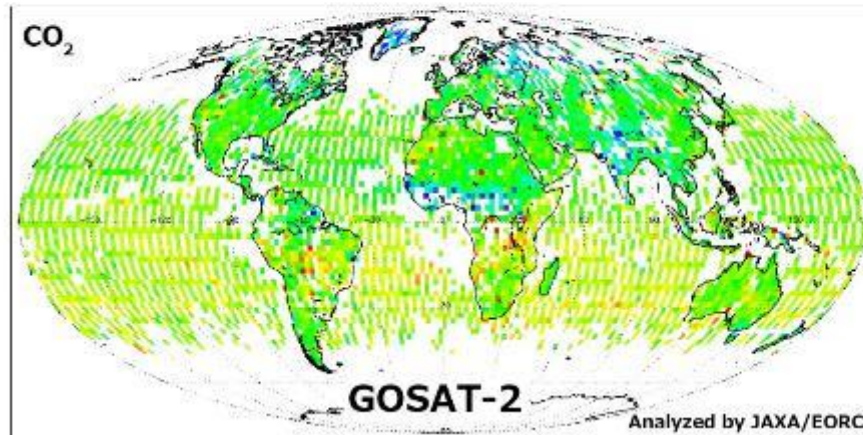
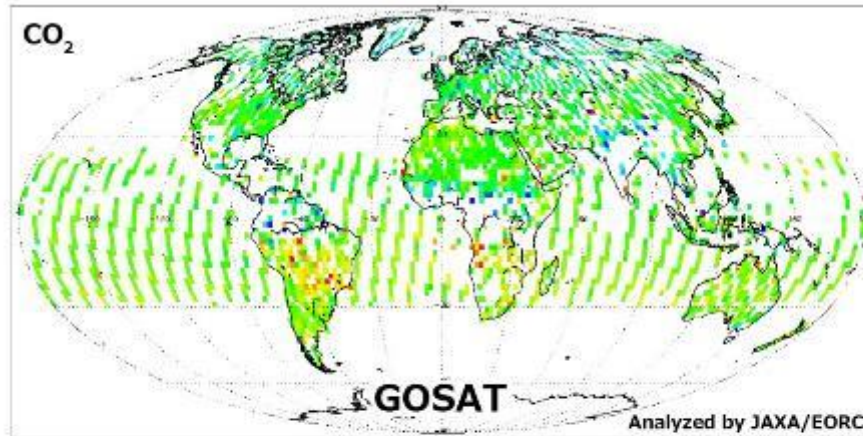


GOSAT 2009-Now

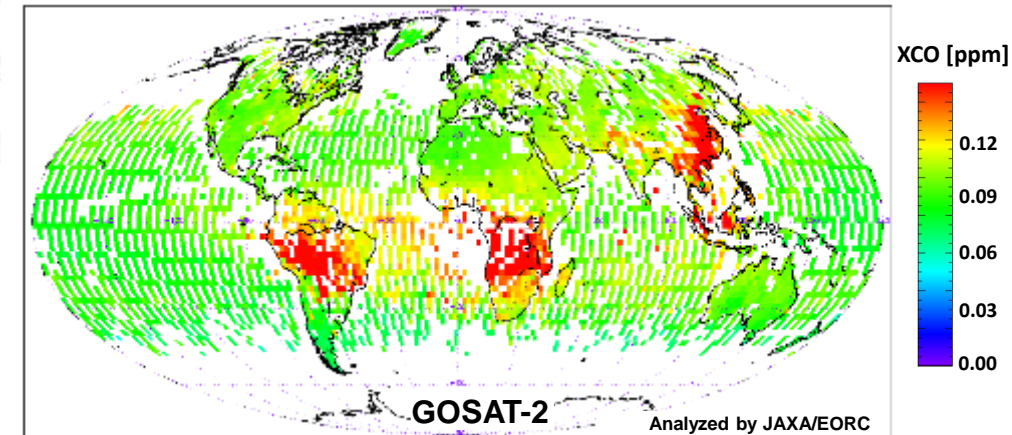
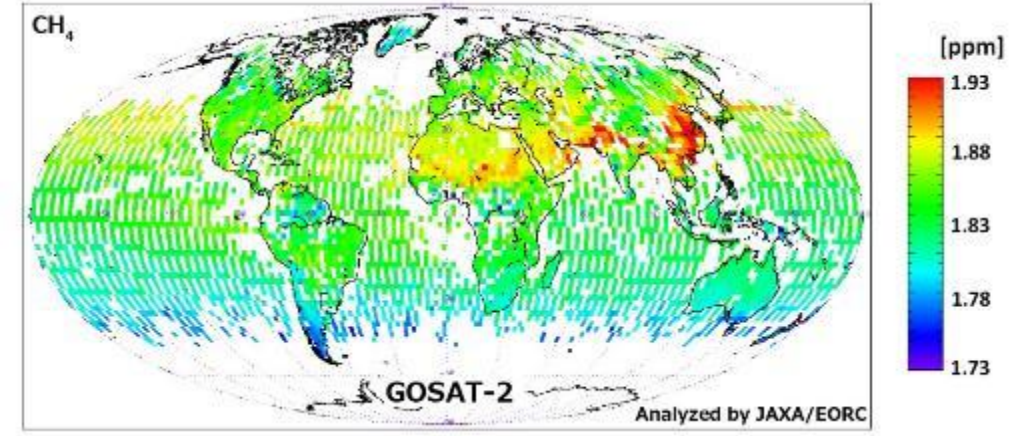


GOSAT-2 2018-Now

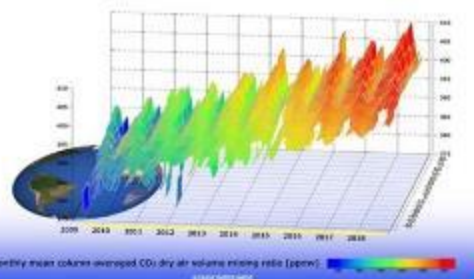
CO₂ Observation



CH₄ (upper) & CO (lower) Observation

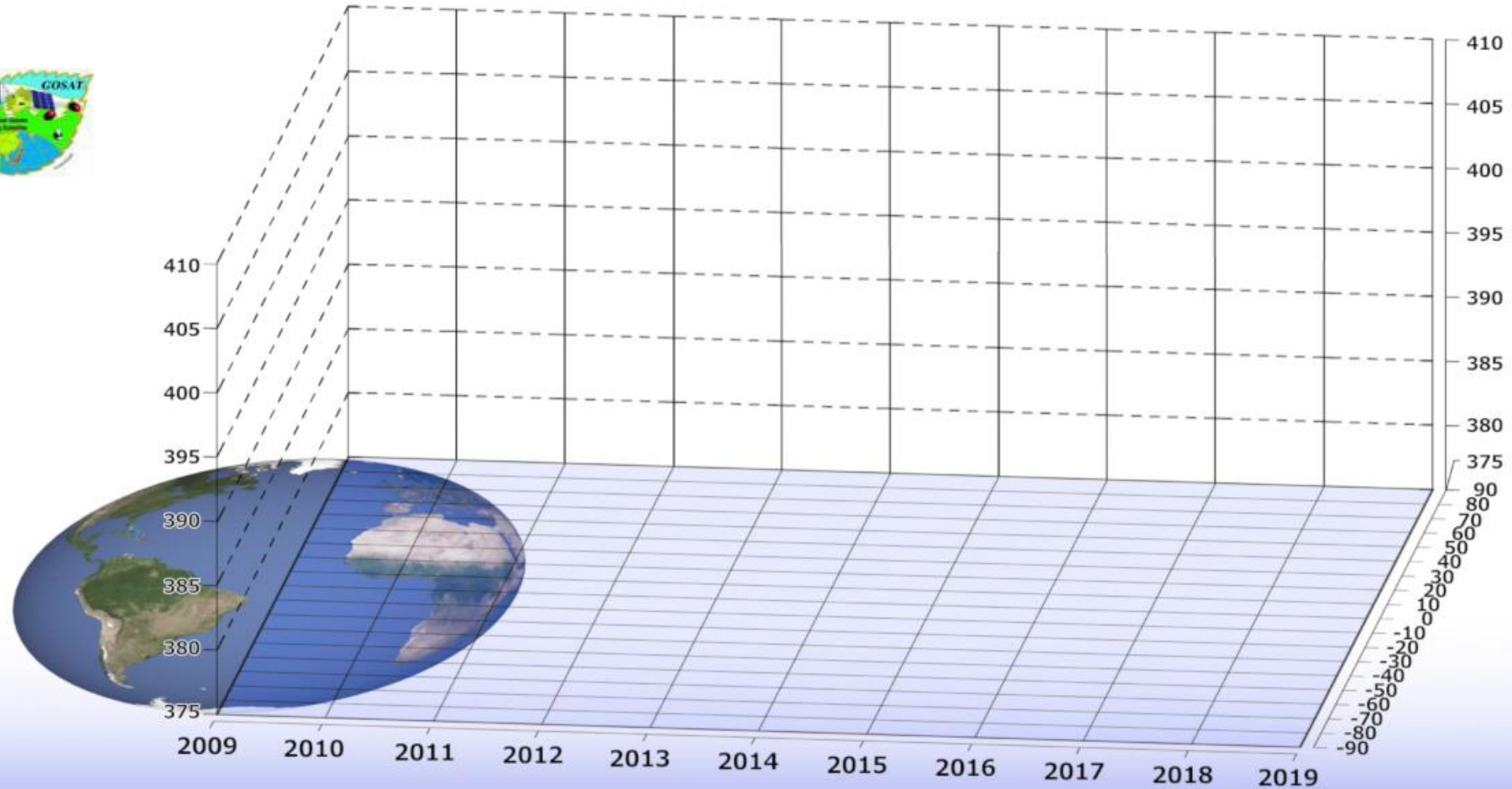
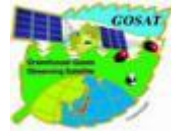


Global CO₂ concentrations observed by GOSAT and GOSAT-2, CH₄ and CO (September 2019)



A Decade-Long Global GHG Observation by GOSAT

Change in carbon dioxide concentration (2009-2019)



Monthly mean column-averaged CO₂ [ppmv]



Global Forest Change Monitoring by L-band SARs for Carbon Cycle Study

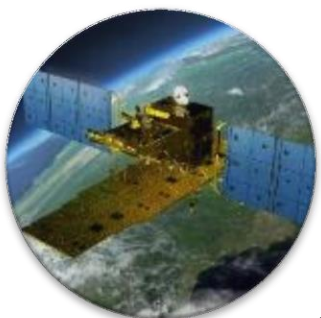
Carbon
& Material
Cycle



JERS-1/
SAR
(1992-1996)



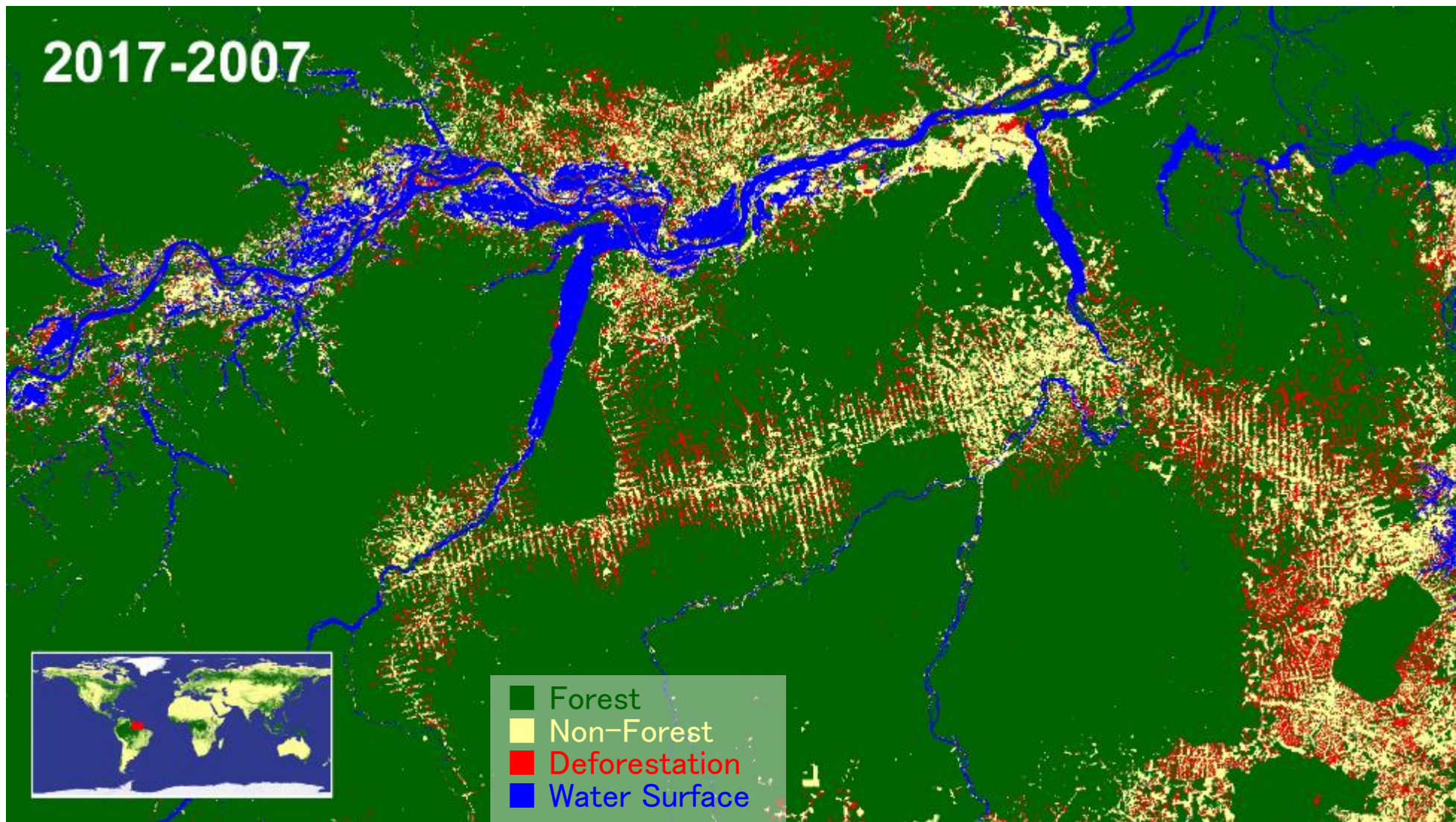
ALOS/
PALSAR
(2006-2011)



ALOS-2/
PALSAR-2
(2014-)



ALOS-4/
PALSAR-3
(To be 2021-)





United Nations
Climate Change

Paris Agreement



Transparency Framework

Global Stocktake

Mitigation

Adaptation

Means of
Implementation:
Finance, Technology,
Capacity Building

Cross-cutting:
Response measures,
Loss & Damage,
Equity

Systematic Observations for the Paris Agreement

Systematic Observations Community



WORLD
METEOROLOGICAL
ORGANIZATION



GCOS
GLOBAL CLIMATE OBSERVING SYSTEM



ECMWF



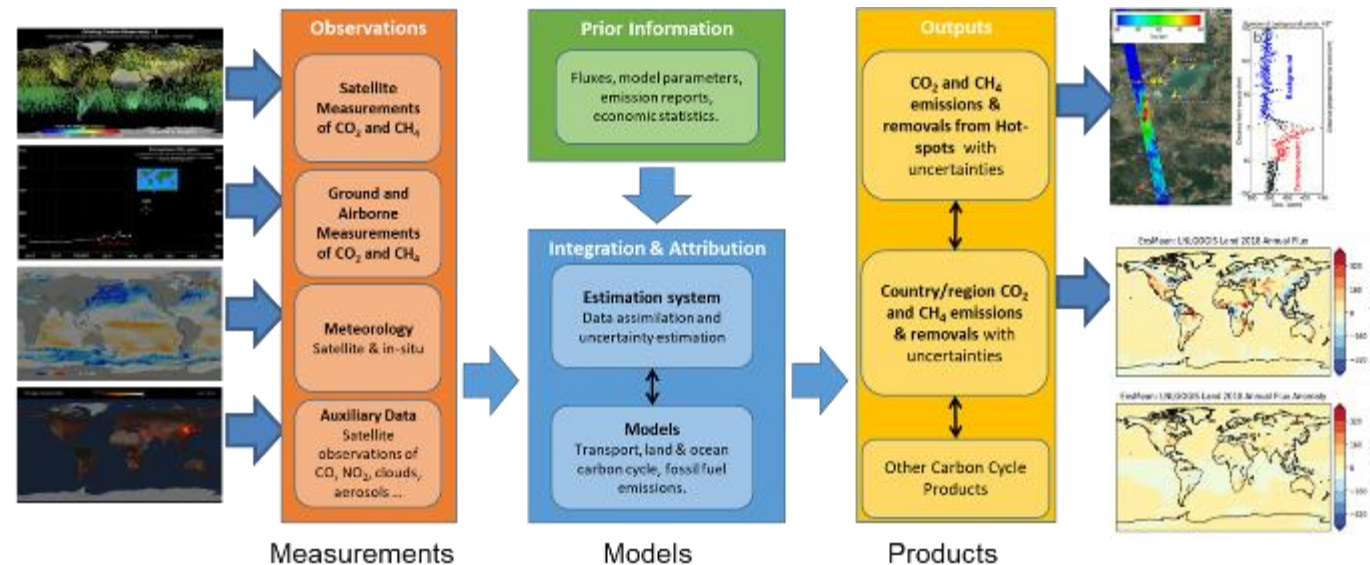
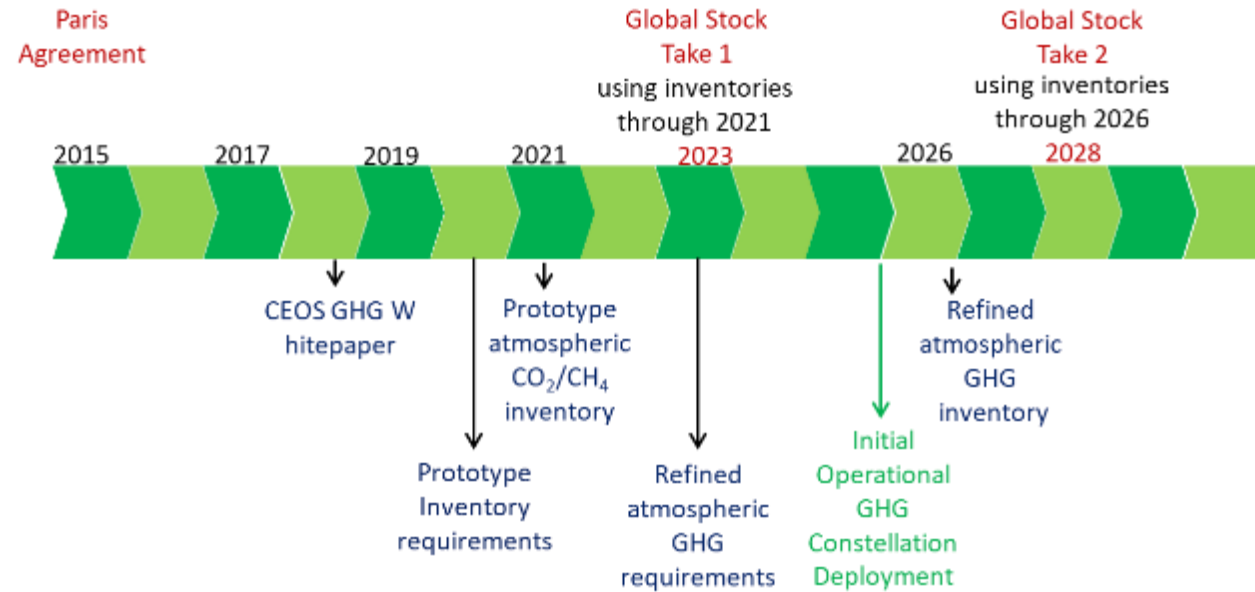
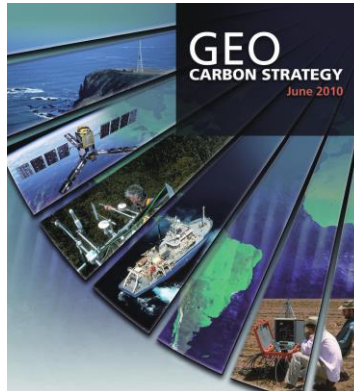
EUMETSAT



GROUP ON
EARTH OBSERVATIONS



Roadmap to Paris Global Stocktake





Essential Climate Variables (ECVs)

Measured by GCOM-W & C, GOSAT&GOSAT-2, GPM/DPR, and ALOS-2

Total Essential Climate Variables (ECVs)	54
ECVs measured by GCOM-C&W, GPM/DPR and GOSAT	26

- by GCOM-C
- by GCOM-W
- by GPM/DPR
- by GOSAT, GOSAT-2
- by ALOS-2

Atmosphere			Land		Ocean
Surface	Upper-air	Atmospheric Composition	Biosphere	Hydrosphere	Physical
Precipitation	Earth radiation budget	Aerosol and ozone precursors	Above-ground biomass	Groundwater	Ocean surface heat flux
			Albedo	Lakes	Sea ice Sea level Sea state
Pressure	Lightning	Aerosols properties	Evaporation from land	River discharge	Sea surface currents
Radiation budget	Temperature	Carbon dioxide, methane & other greenhouse gases	Fire	Anthroposphere	Sea surface salinity
			Fraction of absorbed photosynthetically active radiation (FAPAR)	Anthropogenic Greenhouse gas fluxes	Sea surface stress
Temperature	Water vapour	Cloud properties	Land cover	Anthropogenic water use	Subsurface salinity
Water vapour	Wind speed & direction	Ozone	Land surface temperature	Cryosphere	Sea surface temperature
Wind speed and direction			Leaf area index	Glaciers Snow	Subsurface currents
			Soil carbon	Ice sheets and ice shelves	Subsurface temperature
			Soil moisture	Permafrost	Biogeochemical
					Inorganic carbon Transient tracers
					Nitrous oxide Nutrients
					Ocean colour Oxygen
					Biological/ecosystems
					Marine habitat properties
					Plankton

JAXA's Earth Observation Data

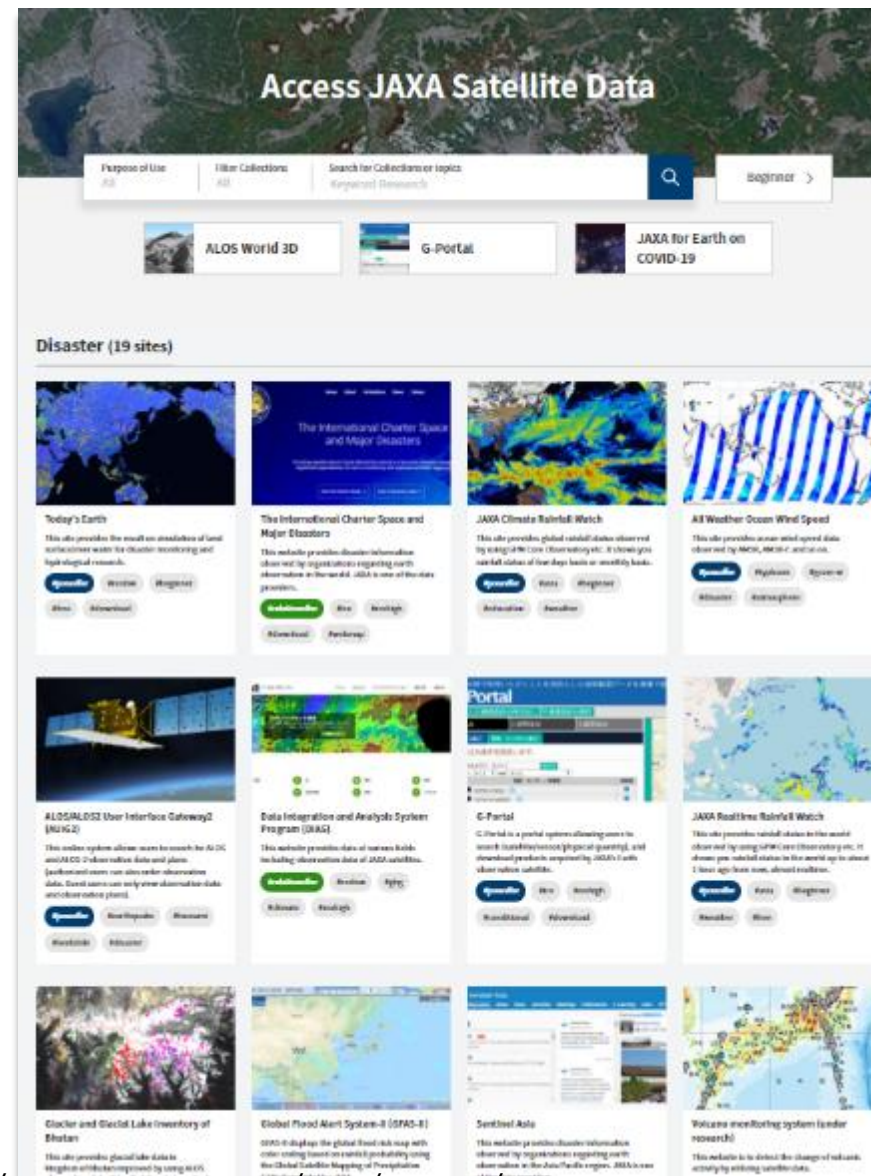
52
Collections

Open & Free

Number of Collections

Disaster	21 items
Meteorology/Environment	20 items
Education	15 items
Fisheries	10 items
Agriculture	6 items
Logistics	6 items
Energy	7 items
Civil Infrastructure	3 items
Public Health	2 items
Design	2 items

Note: the number includes duplications of items



The screenshot shows the 'Access JAXA Satellite Data' portal. It features a search bar with filters for 'Purpose of Use' (All) and 'Filter Collections' (All). Below the search bar are three featured tiles: 'ALOS World 3D', 'G-Portal', and 'JAXA for Earth on COVID-19'. The main content area is titled 'Disaster (19 sites)' and displays a grid of 12 data collection cards. Each card includes a thumbnail image, a title, a brief description, and navigation buttons like 'Available', 'Watch', 'Register', 'Download', and 'Feedback'.

Thank you for your attention.

JAXA's Earth observation missions:
<https://earth.jaxa.jp/en/index.html>

JAXA Satellite Data is available at:
<https://earth.jaxa.jp/en/data/index.html>

Visualizing our **Earth** from Space

