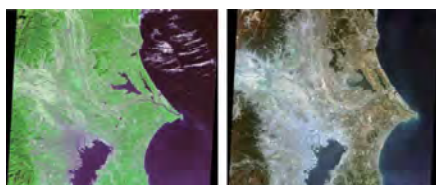


Analysis Technologies

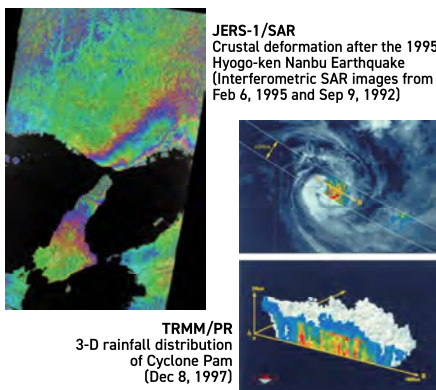
Japan's history of Earth observation began with visualizing images captured by foreign satellites such as Landsat. With the emergence of various sensors, visualization evolved from simply displaying raw observation data to converting it into physical variables through analysis. Eventually, the integration of satellite observations with numerical models enabled the of more useful and understandable "information".

1978



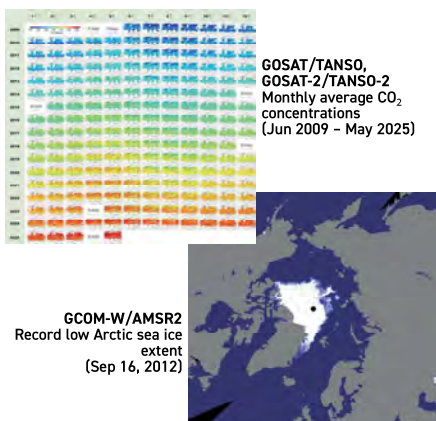
Initially, Earth observation was visualized using images captured by foreign satellites like Landsat.

1995



2005

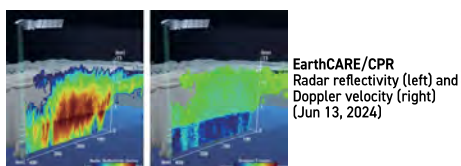
Later, with the development of various sensors, visualization techniques advanced to include not only raw data display but also conversion into physical quantities and information.



2015



2025



Data Provision

Over the past 30 years, the spread of the internet and improved communication lines have shifted data delivery from printed materials to web-based platforms. User interfaces for data publication evolved from fixed browse images to customizable displays, and now to platforms where users can freely visualize data online.



Post-eruption image of Mt. Pinatubo (Jan 1, 1992)

ADEOS Image Brochure (circa 1998)

Until the 1990s, satellite images were distributed to the public and media as printed materials.



Early TRMM Website (circa 2003)

Early Tropical Cyclone Database Website (circa 2008)

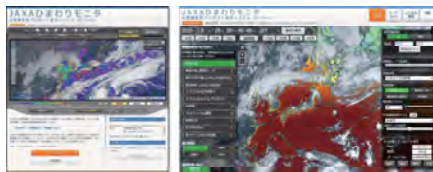
Initially, these sites only displayed browse images for specific events.



Early GSMaP Website (circa 2008)

Current GSMaP Website (2025)

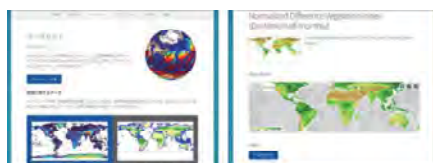
From the 2000s, websites emerged that allowed users to select dates and view browse images.



Early JAXA Himawari Monitor (circa 2016)

Current JAXA Himawari Monitor (2025)

Since 2010s, user customization features, such as zooming, overlaying variables, and time-series displaying, have become available.

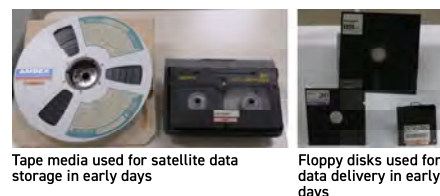


JAXA Earth API (2025)

Recently, new types of visualization platforms have emerged that allow users to visualize satellite data themselves via online using Application Programming Interfaces (APIs).

Data Storage

Data volume of satellite observation has also increased rapidly, supported by advancements in computing infrastructure. When the Earth Observation Research Center (EORC) was established in 1995, tape storage capacity was 30TB and large disk storage did not exist. As of 2025, our data storage capacity exceeds 14PB.



Tape media used for satellite data storage in early days

Floppy disks used for data delivery in early days

1995 EORC Data Analysis System (DAS) Phase 1 @ Roppongi First Building

Tape Storage: 30TB→60TB
Disk Storage: None



2001 EORC DAS Phase 2 @ Harumi Triton Square

Tape Storage: 130TB→430TB
Disk Storage: 4TB→10TB



2006 EORC DAS Phase 3 @ Tsukuba Space Center (TKSC)

Tape Storage: 600TB
Disk Storage: 100TB

2011 Basement of Earth observation Analysis Core and Hub system (BEACH) @TKSC

Working Disk (BENAS): 60TB

2012 BEACH Archive Storage System (BASS) @TKSC

Disk Storage: 1.5PB
Back up Tape Storage

2014 BASS-2 @TKSC→Chofu 2017

Disk Storage: 1.5PB

2015 BASS-2 @TKSC→Chofu 2017

Disk Storage: 0.7PB→2.6PB→4.3PB

2017 BASS-3 @TKSC

Disk Storage: 3.5PB→7PB

2022 BEACH Network File System (BNFS)-4 @TKSC

Archive Disk (BASS): 14.2PB
Working Disk (BENAS): 1.7PB

