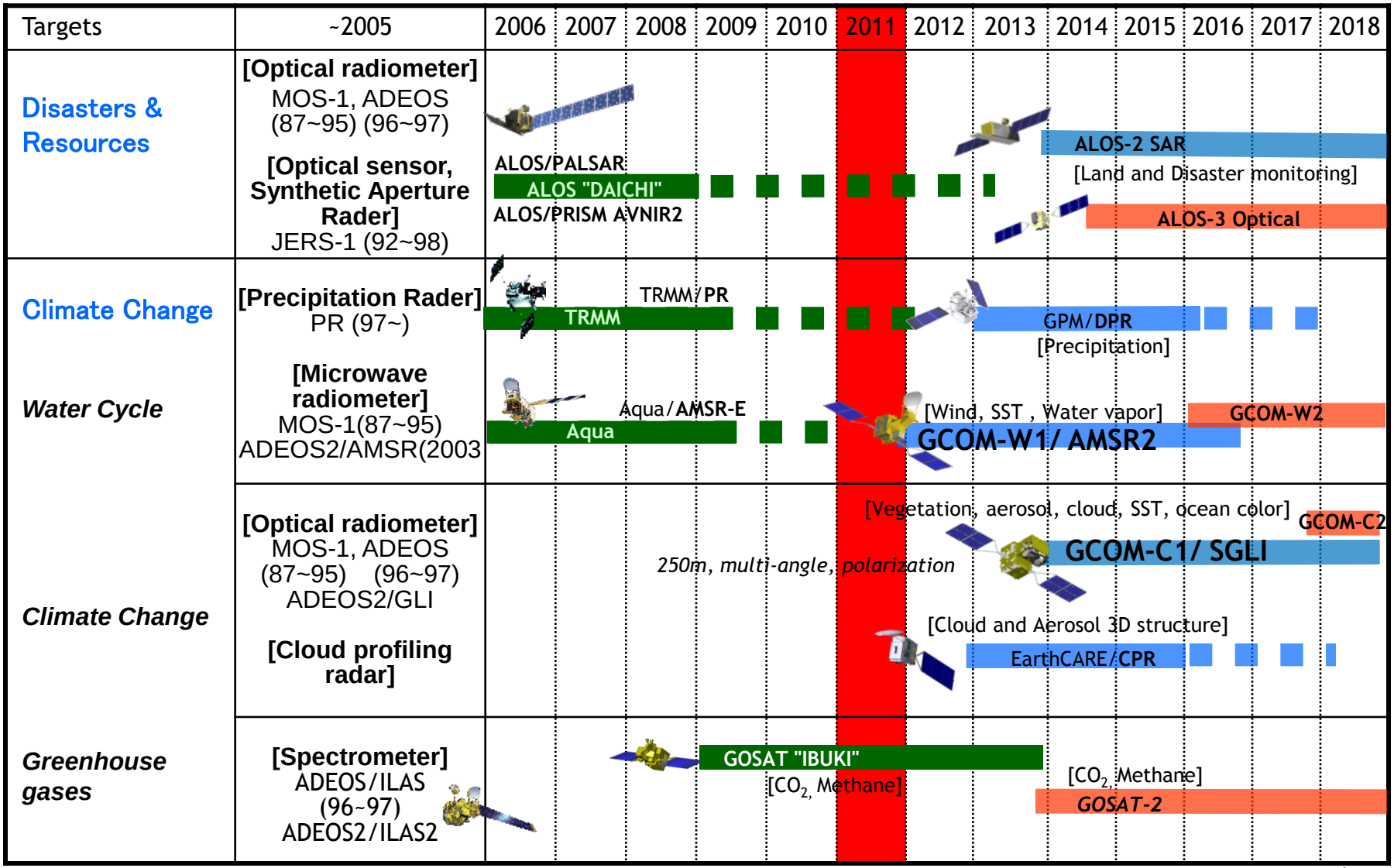
(Igarashi, private communication)

Long-Term Plan of Earth Observation

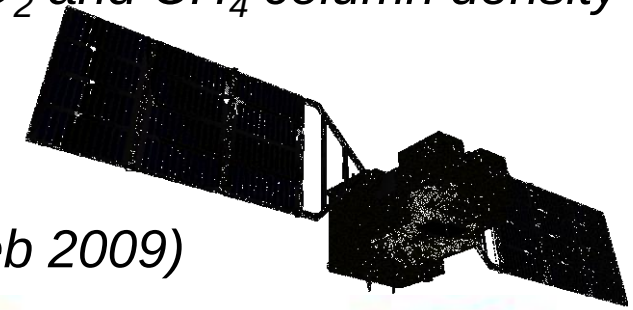


(Igarashi, private communication)

Greenhouse Gases Observing Satellite

GOSAT

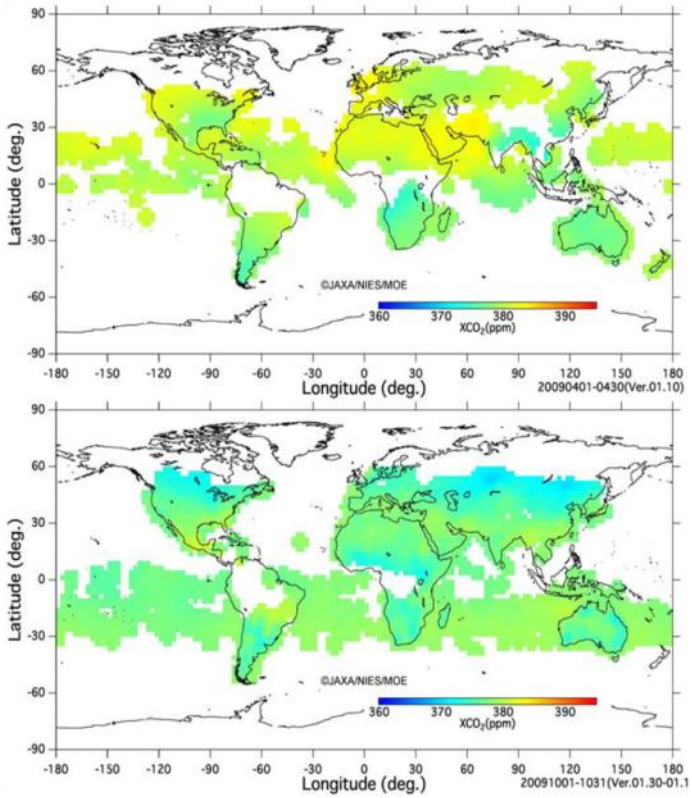
GOSAT enables global (with 56,000 points) and frequent (at every 3 days) monitoring CO_2 and CH_4 column density .



(launched in Feb 2009)

Simulated CO2 distribution as observed by GOSAT

by National Institute for Environmental Studies



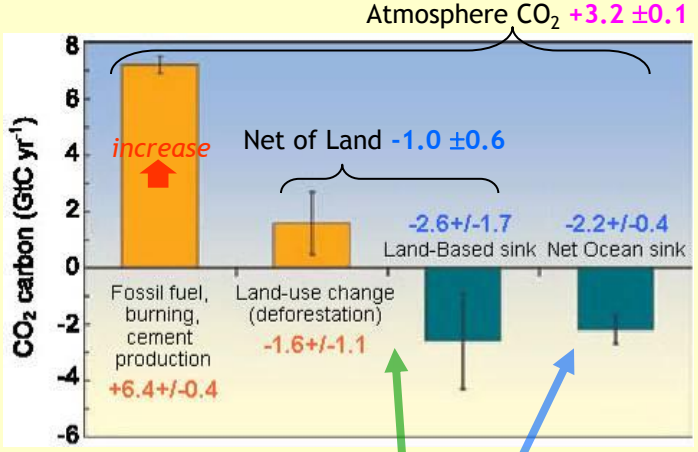
GOSAT global CO_2 column density distributions (Level 3) in April and November 2009 produced by JAXA, NIES, MOE

Mission Concept of GCOM-C / SGLI

Land and Ocean carbon sink and pool

Today's Carbon budget

Today's the most significant factor



Modified from the 4th IPCC report FAQ7.1

Future Carbon cycle

CO_2 increase and Global warming

Global environmental change

(irradiance, temperature, CO_2, precipitation)

Change of ecosystem capacity of CO_2 sink and pool

Several tens of % uncertainty in the global warming prediction

Land
- Photosynthesis production
  - Vegetation index
  - Leaf area index
  - Primary production
  - Above-ground biomass
- Land cover/use
- Soil respiration

Ocean
- Photosynthesis production
  - Phytoplankton chlorophyll-a
  - Sea surface temperature
  - PAR
  - Dissolved organic matter
- CO_2 solution, pH
- Sedimentation

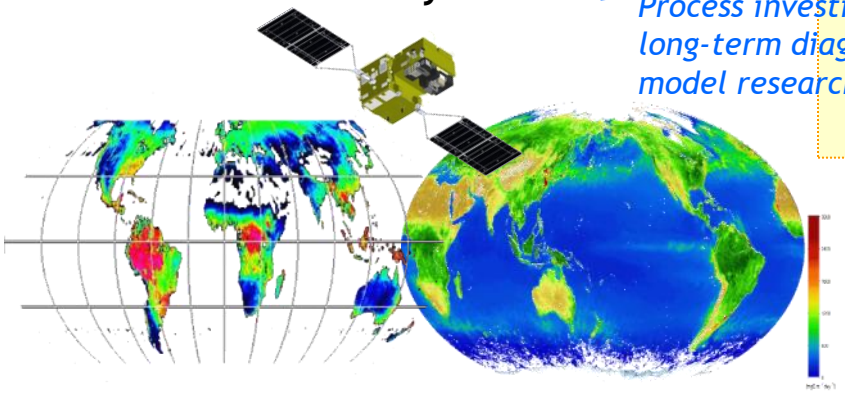
Feedback

Change of atmosphere CO_2

Monitoring of primary production

Contribution by GCOM-C

Process investigation and long-term diagnosis with model researches



Example of primary production estimation (ADEOS-II/GLI)
Left: 2003 land primary production (by Muramatsu)
Right: 2003 Apr.-Jun. ocean primary productivity (Kameda and Ishizaka)

(Igarashi, private communication)

Earth CARE/Cloud Profiling RADAR

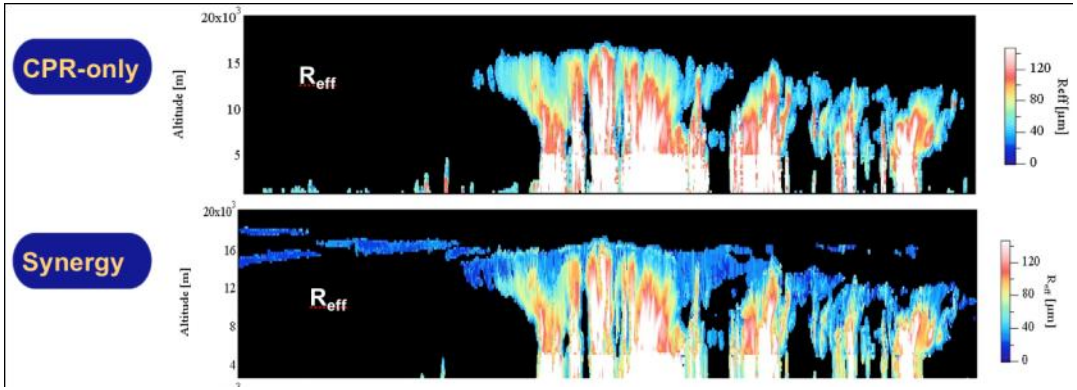
Climate monitoring of earth radiation, cloud and aerosol
Cooperation between ESA and Japan (JAXA/NICT)

- Mission
  - Vertical profile of clouds, aerosol
  - Interaction between clouds and aerosol
  - Cloud stability and precipitation
- Orbit
  - Sun synchronous
  - Equator crossing time 13:45
  - Altitude 400km
- Instrument
  - CPR (Cloud Profile Radar)
  - ATLID (Atmospheric LIDAR)
  - MSI (Multi-Spectral Imager)
  - BBR (Broad Band Radiometer)
- Task sharing
  - JAXA/NICT (CPR)
  - ESA (LIDAR, MSI, BBR, Spacecraft)
- Launch target
  - JFY2013

Global / 3D distributions of clouds and aerosols with EarthCARE and numerical models.

Cloud Retrieval with CPR-only and Synergy

Example of Reff derived from CloudSAT and CALIPSO



(Okamoto & Sato)

Aerosols Retrieval with ATLID and MSI

- Optical / Microphysical / Radiative properties (Extinction, Size distribution, Single scattering albedo, Optical thicknees, Ångström Exponent)
- Type (Soil Dust, Carbonaceous, Sulfate, Sea Salt)
- Component (Dust, Sea-salt, black carbon, etc)

(Igarashi, private communication)