Fifty years of innovation and cooperation in satellite meteorology

Jérôme Lafeuille
World Meteorological Organization

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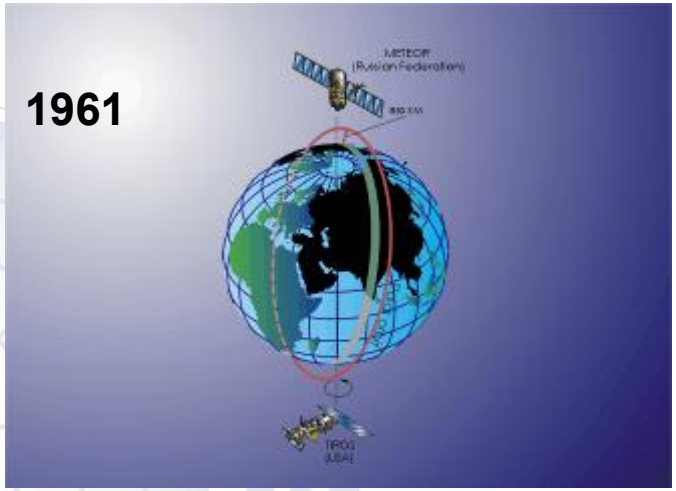
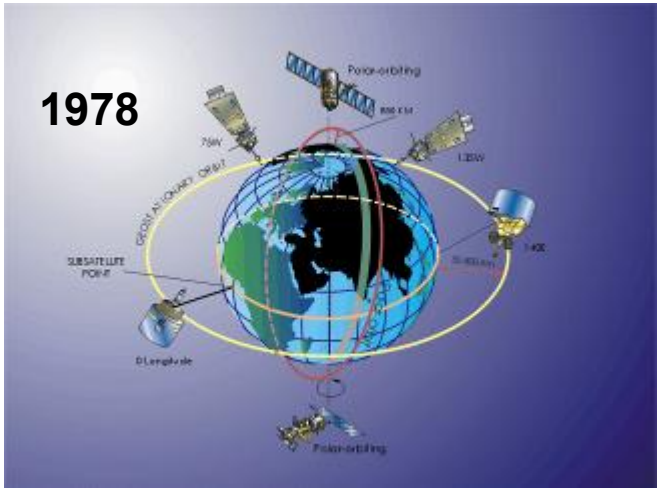
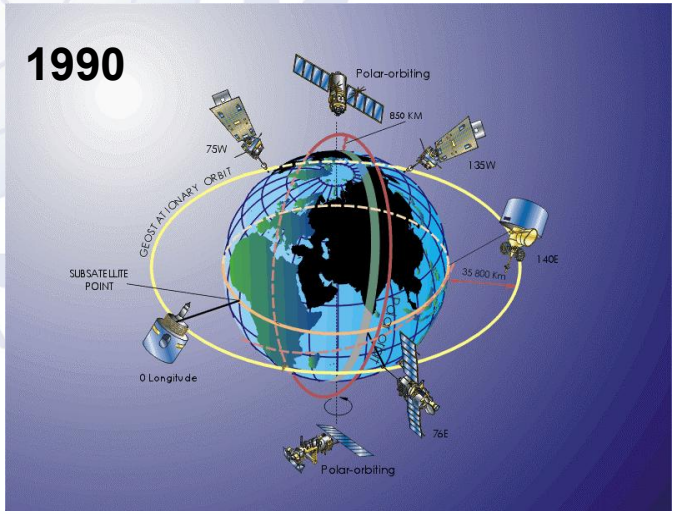
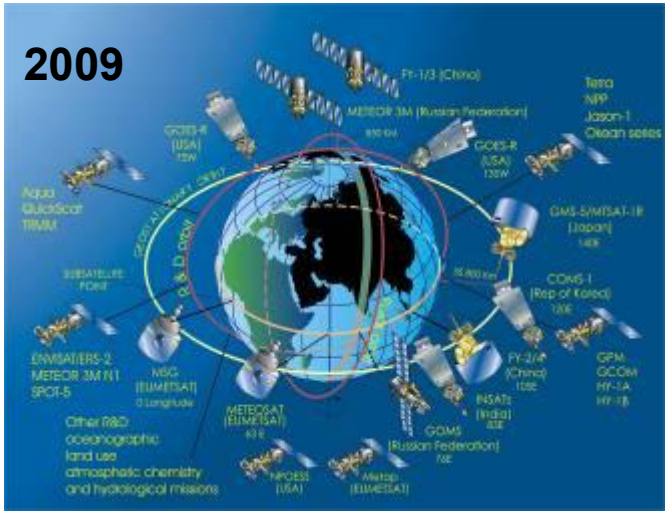
Space-based Global Observing System









A visionary approach: from science to applications

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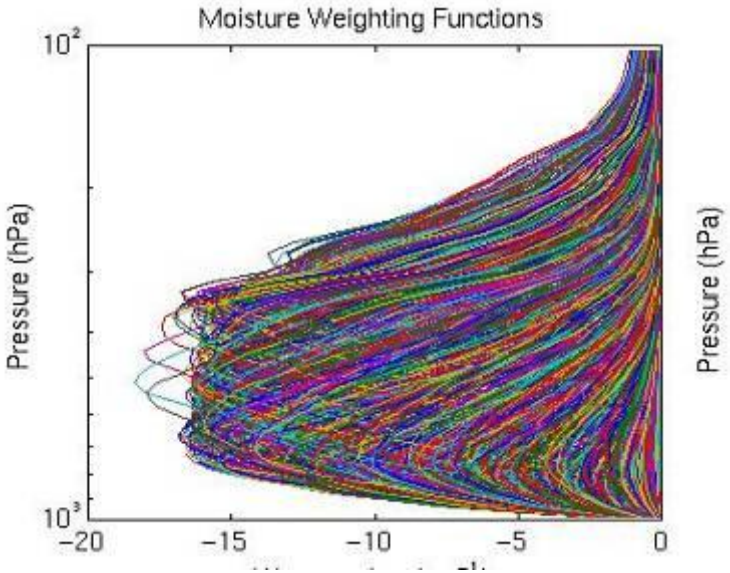
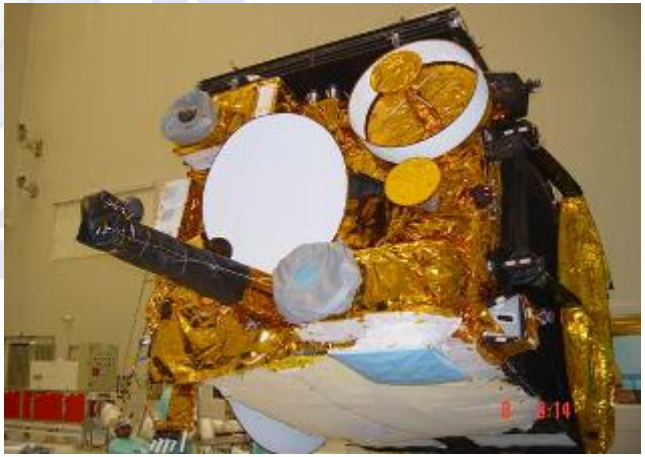
Crossroads of Science and Engineering

- Science
  - Radiative transfer
  - Product algorithms
  - Data assimilation

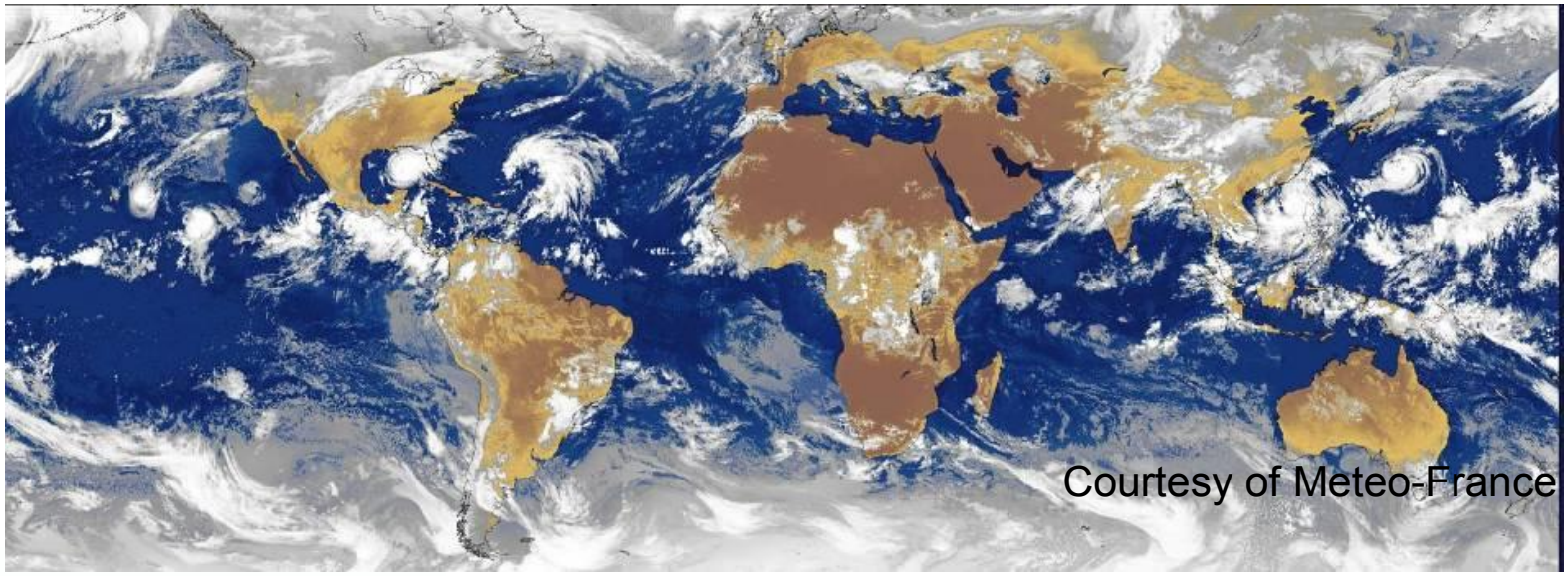




- Engineering
  - Sensor design
  - and performances

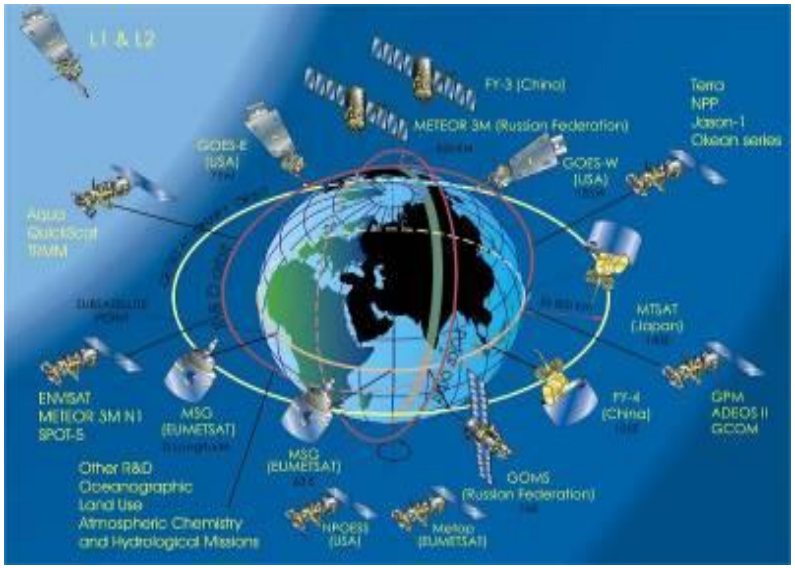
Visionary projects

- Flat Plate Radiometer: opened 50 years of Earth Radiation measurements for climate monitoring
- Geostationary imagery: unique vantage point for weather monitoring and nowcasting
- Education and user tools : McIdas

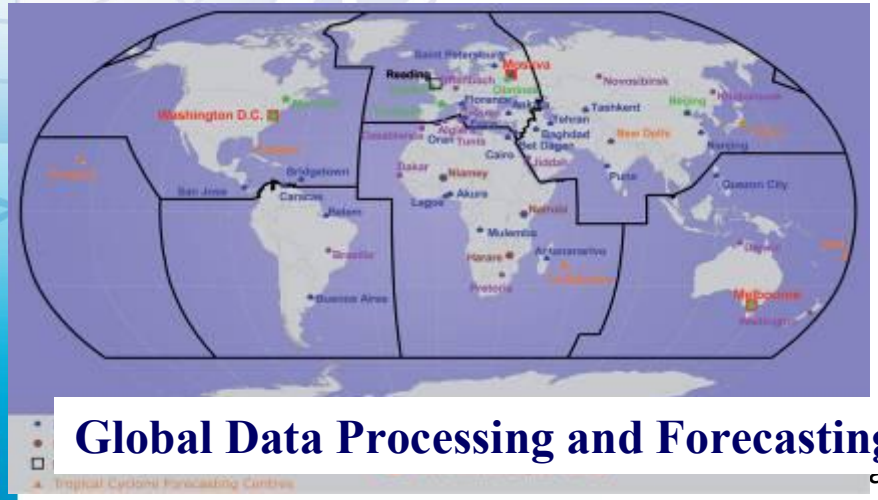


Satellites in the global meteorological infrastructure

Global Observing System



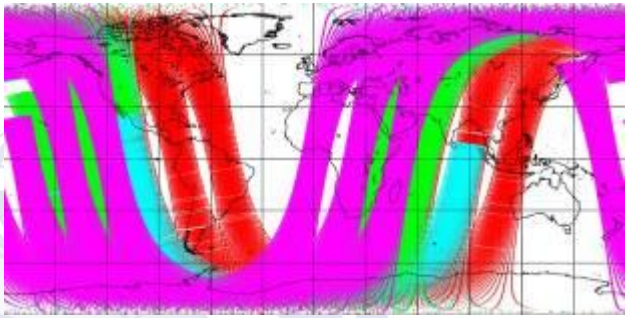
Coordinated Satellite Activities



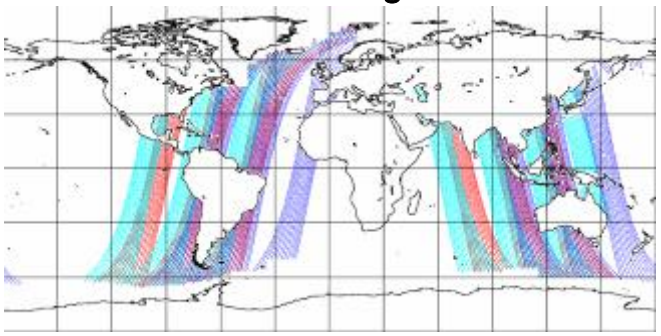
Global Data Processing and Forecasting

Major data source for NWP

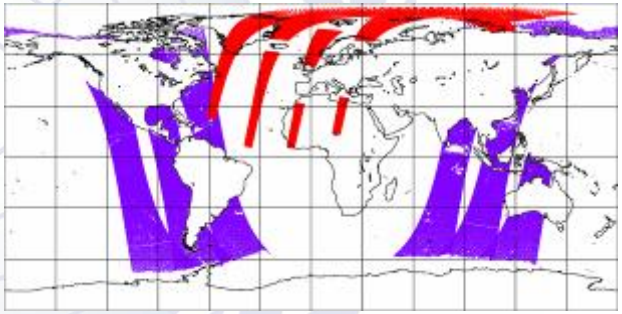
LEO Sounders



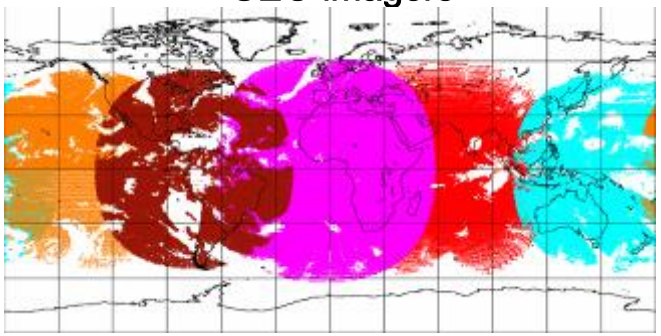
LEO Imagers



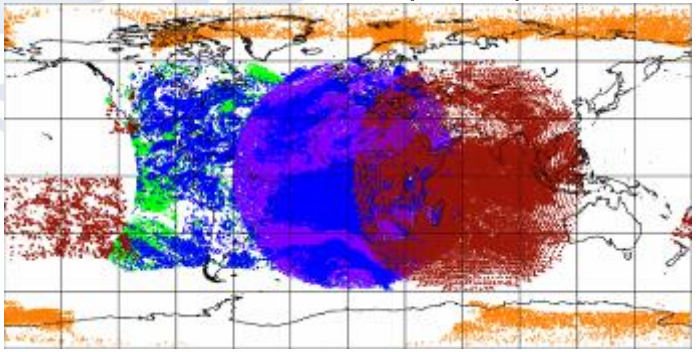
Scatterometers



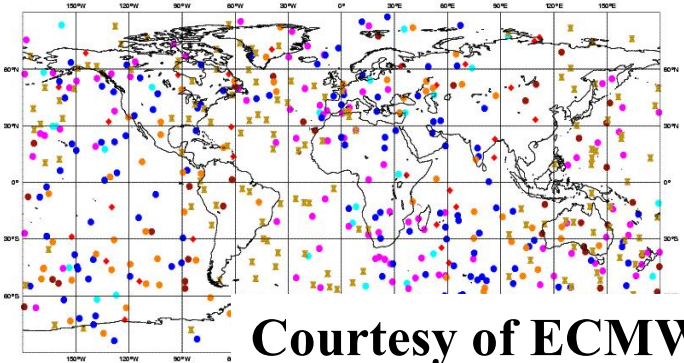
GEO imagers



Satellite Winds (AMVs)

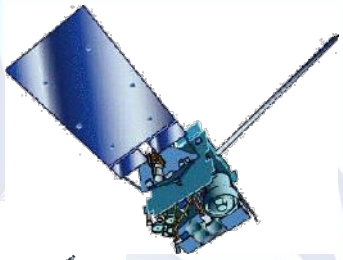


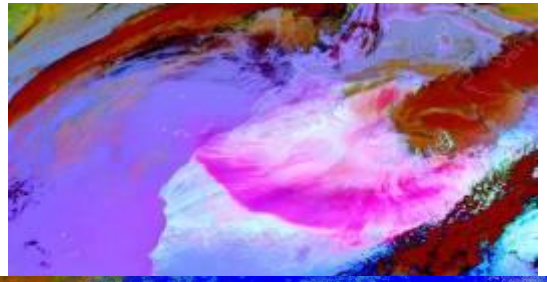
GPS Radio Occultation

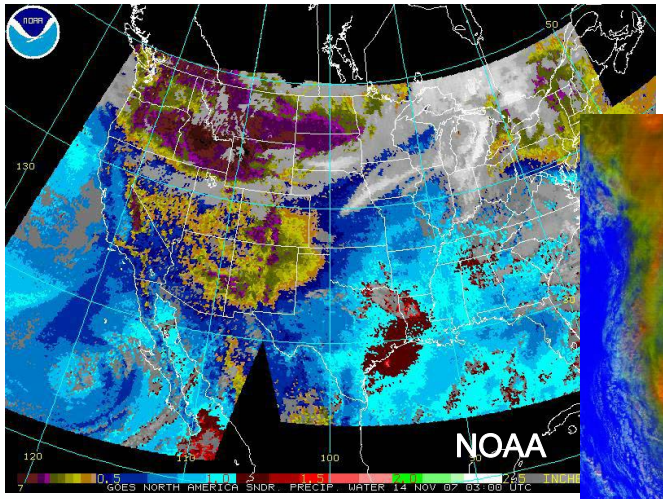


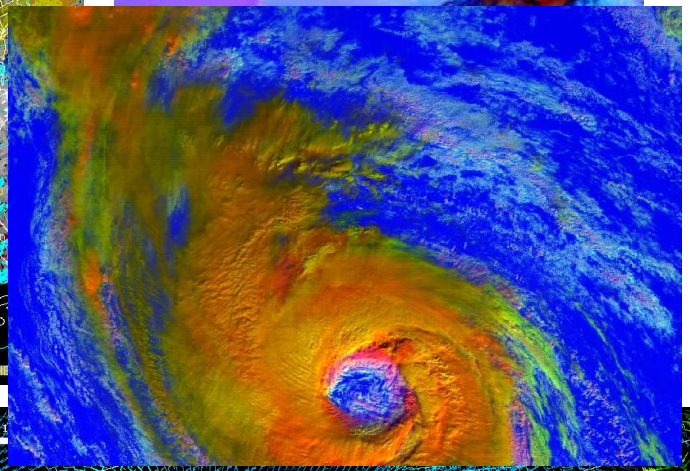
Courtesy of ECMWF

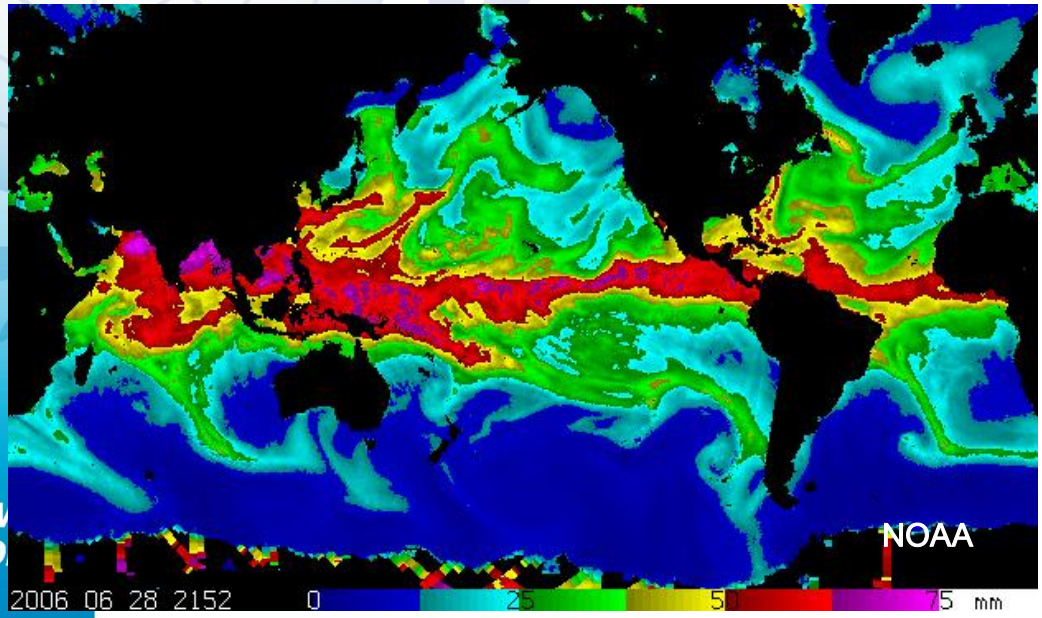
Data ⇨ Products

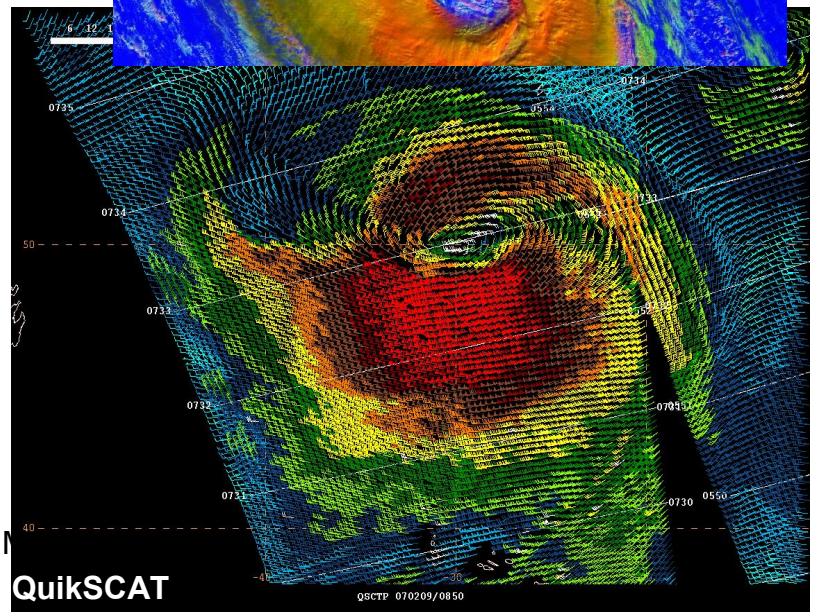




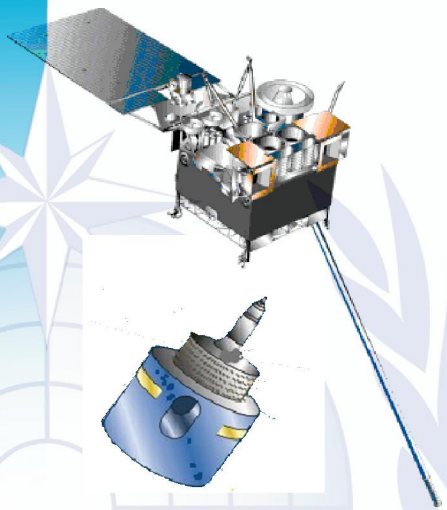


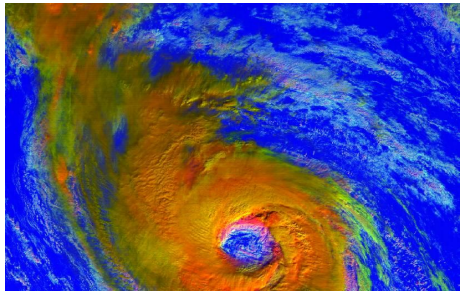


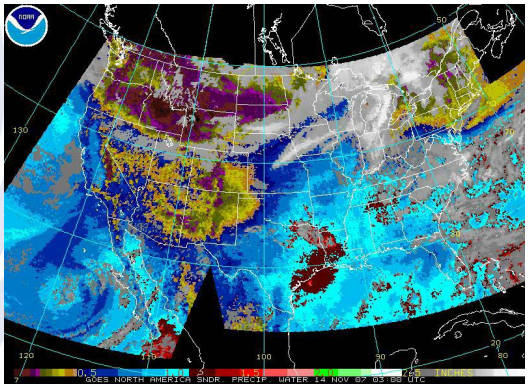


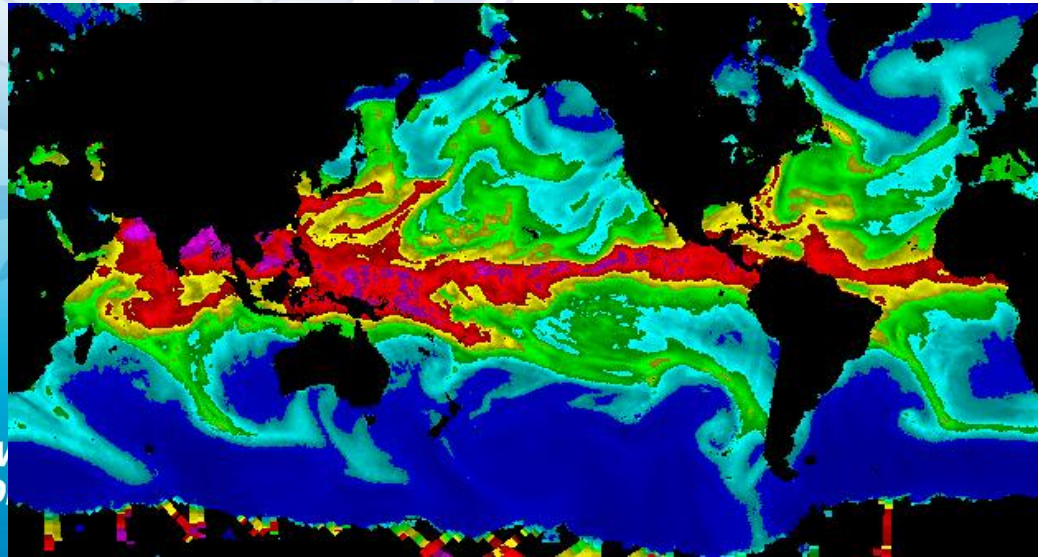


Data ⇨ Products ⇨ Applications









Met

Required continuity…

- Operational continuity with near-real time global coverage data
- Comprehensive and sustained monitoring of Essential Climate Variables

International cooperation

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International cooperation & satellite meteorology

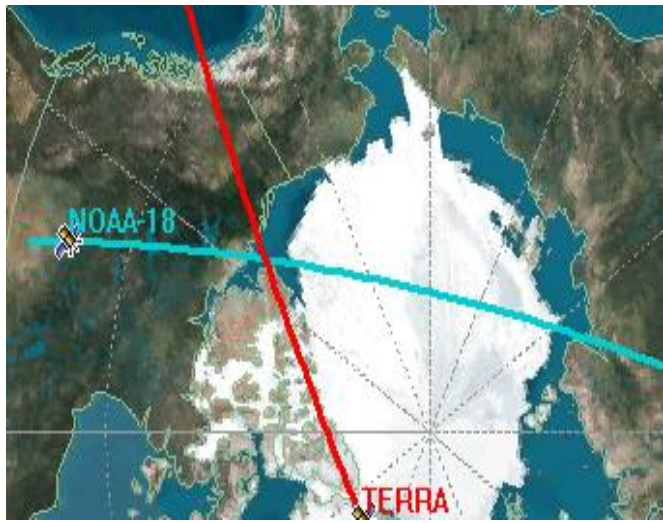
- 1961: **Launch of Tiros-2 with FPR on board**
  UN Resol.1721 on cooperation in satellite meteorology
- 1963: WMO establishes World Weather Watch and the GOS
  Launch of Tiros-8 with APT
- 66-73: **Launch of scanning camera aboard geostationary ATS-1**
  Global Atmospheric Research programme (GARP)
  Coordination of Geostationary satellites: CGMS
- 1978: First Global GARP Experiment (FGGE) **involves 5 GEO**
  First contingency relocation of a satellite (Indian ocean)
- 79-09: India (79), China (89), Korea (05) joined CGMS
  Satellite back-up operations in 84, 91, 92, 98, 03
- 1998: USA & Europe sign Initial Joint Polar Syst
- 2006: Response to GCOS by CGMS
  & CEOS (virtual constellations)

First APT reception from Tiros-8
in Lannion, France, 24 Dec 1963

Coordination Group for Meteorological Satellites (CGMS)

- 37 years
- 12 satellite operators
- Geostationary constellation of 10-15 satellites
- 3 polar-orbiting constellations of 2-3 satellites
- Other missions (altimetry, GPS RO) in transition from R&D to operations

- Contingency plan
- Technical standards
- Intercalibration
- Products
- Training



Challenges

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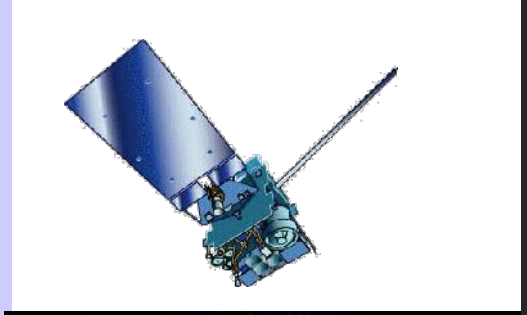
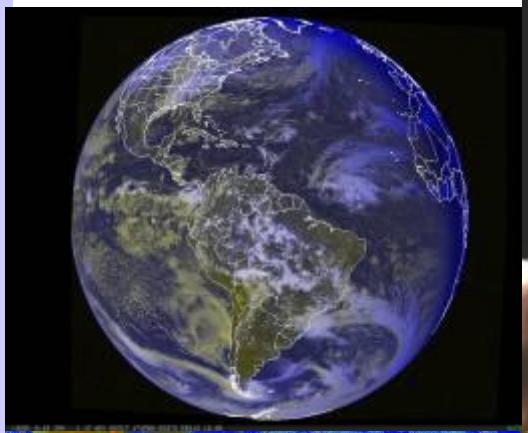
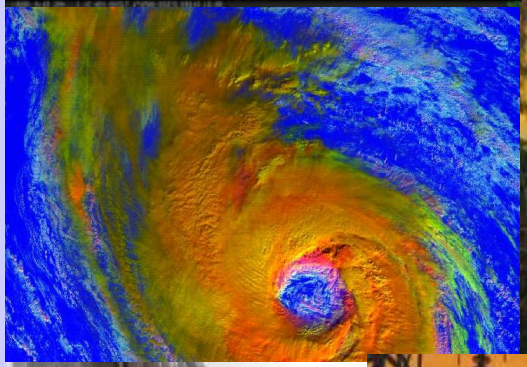
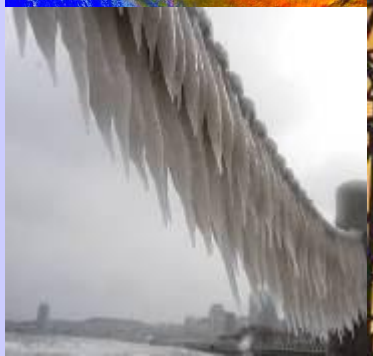
Challenges

- Continuity and improvement of operational constellations
- Sustained observation of ALL Essential Climate Variables observable from space
- Transition Research to Operations for priority, mature observaions
- Generation of QC products
- Integration :
  network optimization,
  composite products,
  system interoperability






Thank you !