



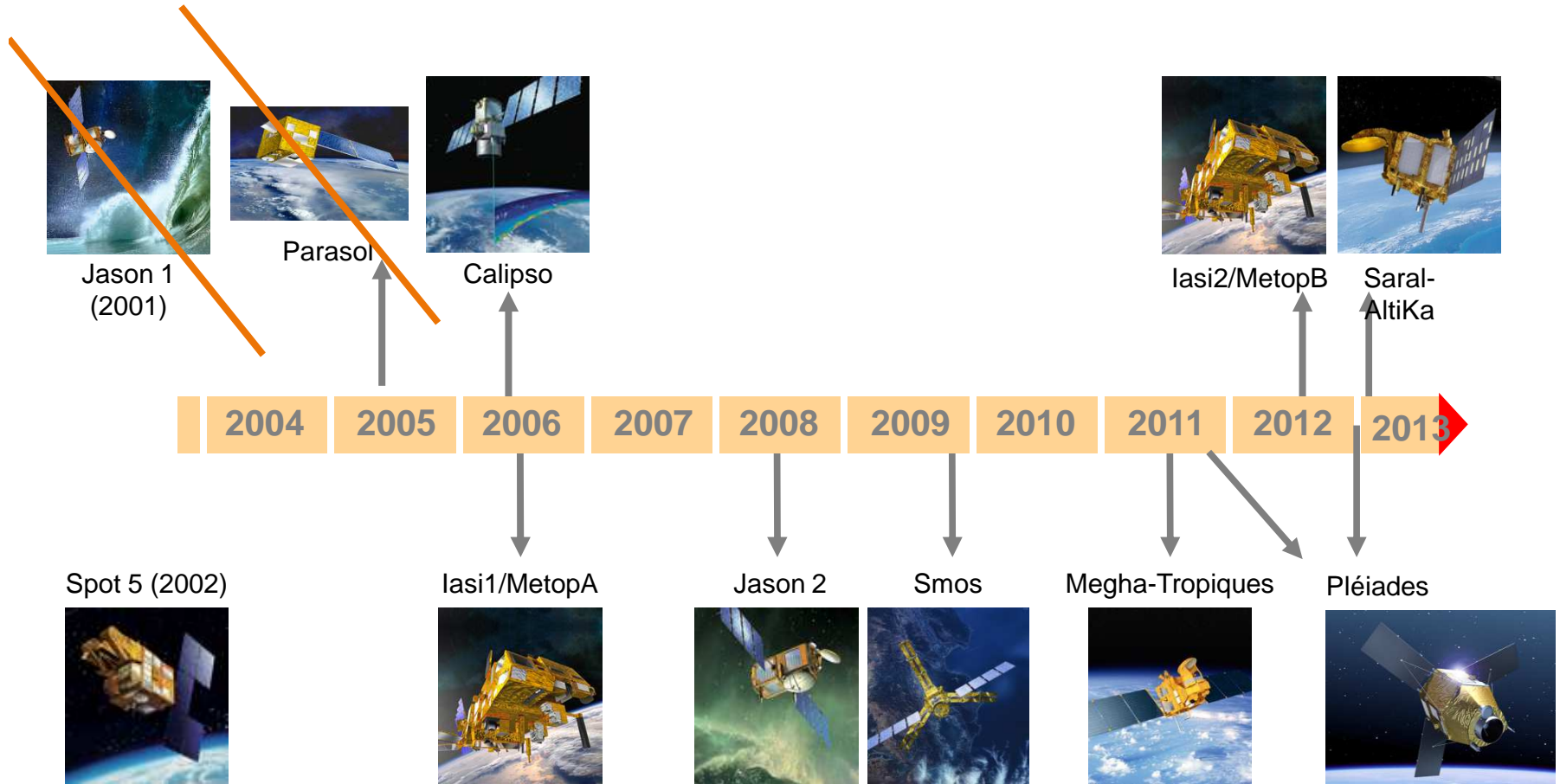
CENTRE NATIONAL D'ÉTUDES SPATIALES

# **CNES Current and future satellite programmes including brief highlights on Climatology and Meteorology**

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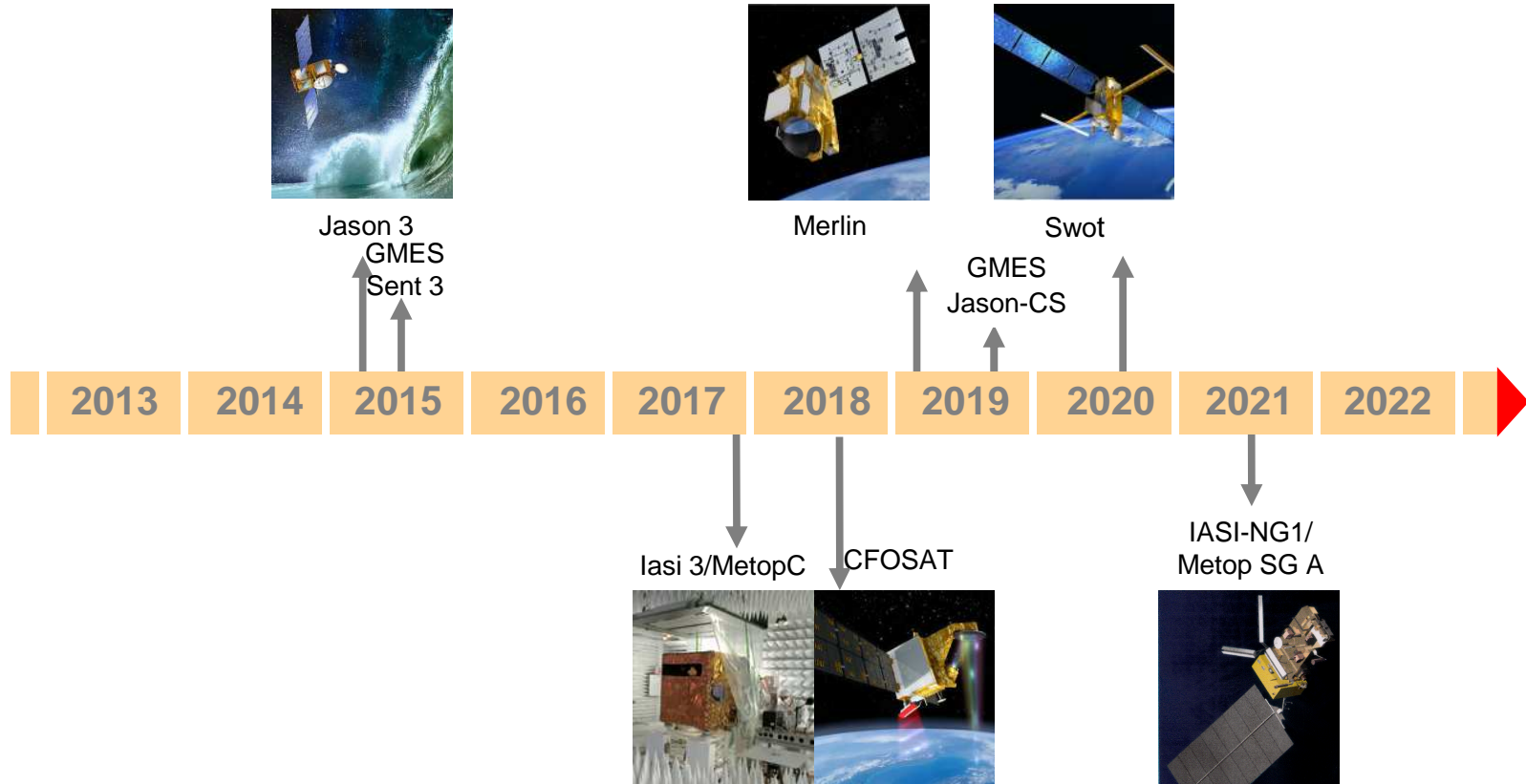
# Observation

## CURRENT PROGRAMMES



# Observation

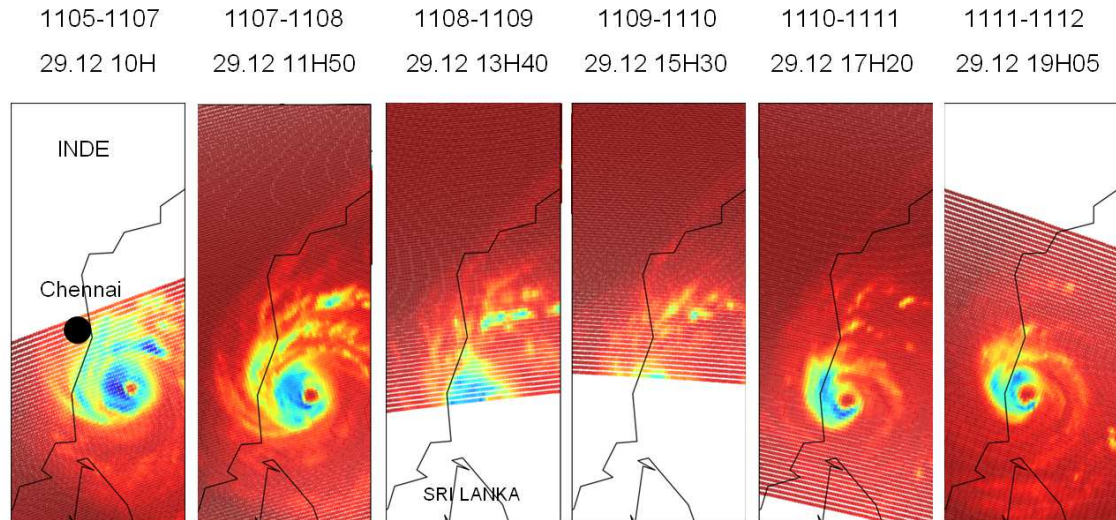
## FUTURE PROGRAMMES



## atmosphere

**1. Megha-Tropiques (CNES-ISRO), launched in October 2011, studies the water and energy cycles in the tropical atmosphere with MW instruments (Saphir, Madras) and a Broadband VIS/IR radiometer (Scarab). Madras was unfortunately lost end of January 2013. Madras data is still being evaluated and not yet provided to the whole scientific community.**

**The tropical cyclone Thane as seen by Saphir on 29 December 2011.**



## atmosphere (continued)

2. **Calipso** (NASA-CNES A-Train) launched in April 2006, studies the properties of clouds and aerosols with a lidar (CALIOP, NASA) and an IR imager (IIR, CNES) on a platform provided by CNES. Extension of the mission decided until end of 2015, further extension under consideration.

3. **Parasol** (A-Train) launched in December 2004, studies the properties of clouds and aerosols with POLDER, a multi-viewing and multi-polarisation imager. End of the mission in December 2013.

## atmosphere (continued)

4. **IASI and IASI-NG** (CNES-Eumetsat) infrared sounders on Metop then Metop-SG (2021-2040). IASI-NG will succeed to IASI with improved performances. The phase B has just begun. The phases C-D are linked to the final decision for EPS-SG at Eumetsat (end 2014?)

5. **Merlin** (CNES-DLR) is intended for the measurement of atmospheric methane (CH<sub>4</sub>) with a lidar, provided by DLR. CNES will contribute by its new small platform Myriade-E. Phase B has just begun. Planned launch date: 2019.

6. **Microcarb** (CNES) is intended for measuring CO<sub>2</sub> column concentrations with a near-infrared dispersive grating spectrometer. Phase A is completed. Discussions with ESA EO directorate are ongoing in order to find possible synergies with the Carbonsat project.

## Climate-related space missions : ocean

1. **Jason-2/3** (Eumetsat, NOAA, CNES, NASA) intended to provide high-precision data for the monitoring of sea-level. Planned launch date for Jason-3: April 2015.

2. **Saral** (CNES-ISRO), launched on 25 February 2013, embark the Ka-band radar altimeter AltiKa (sea level).

CNES is also involved in Sentinel-3 and Jason-CS (for sea level)

3. **CFOSAT** (CNSA-CNES), intended to provide sea wave spectrum (SWIM radar instrument from CNES), and sea surface wind (CNSA). Planned launch : 2017 TBC.

## Climate-related space missions : land

1. **VEGETATION** (CNES, BFSPO, ASI, SNSB, JRC) intended to provide land cover with a multi-purpose VIS/IR imagery on SPOT 4/5. SPOT 5 launched on May 2002 .
2. **SMOS** (ESA, CNES, CDTI) provides soil moisture and ocean salinity. Launched on November 2009.
3. **SWOT** (NASA, CNES) will provide the collection and distribution of high-precision data for the monitoring of water level (sea, lakes, rivers). Planned launch : 2020.



### **CNES Climate Change Working Group, current activities :**

- **first inventory of existing ECV series derived from CNES missions, and first answer to the CEOS-CGMS inventory. CNES essentially holds FCDR data, but some ECV data are produced in CNES-CNRS thematic data centers**
- **climate reprocessing activities especially at the end of missions. An example is for POLDER data (3 instruments) with a full reprocessing planned in 2014 (POLDER 1/2/3)**
- **GSICS activities : intercalibration with IASI ; extended data base including measurements of MODIS, MERIS, SeaWiFS, Vegetation, Parasol, SPOT/HR, Landsat, SEVIRI ; cross calibrations performed regularly. Complete recalibration of Parasol and Végétation data covering their overall lifetime in orbit and insuring consistency with MODIS and MERIS.**

## Climate-related data centers (Thematic data centers)

CNES is a partner of several French Thematic data centers which process, archive and distribute Earth observation satellite data. These centers are involved in processing/reprocessing activities for climate data records.

1. **ICARE** center is dedicated to aerosols-cloud-water vapor-precipitation data. Main space missions involved: Parosol, Calipso (mirror site of NASA/ASDC), Modis, MSG, TRMM, Megha-Tropiques. <http://www.icare.univ-lille1.fr/>

2. **ETHER** center is devoted to the chemical composition of the atmosphere. Main space missions involved: Odin/SMR, IASI (in connexion with Eumetsat), GOSAT. <http://ether.ipsl.jussieu.fr/>

We are going to merge these two centers.

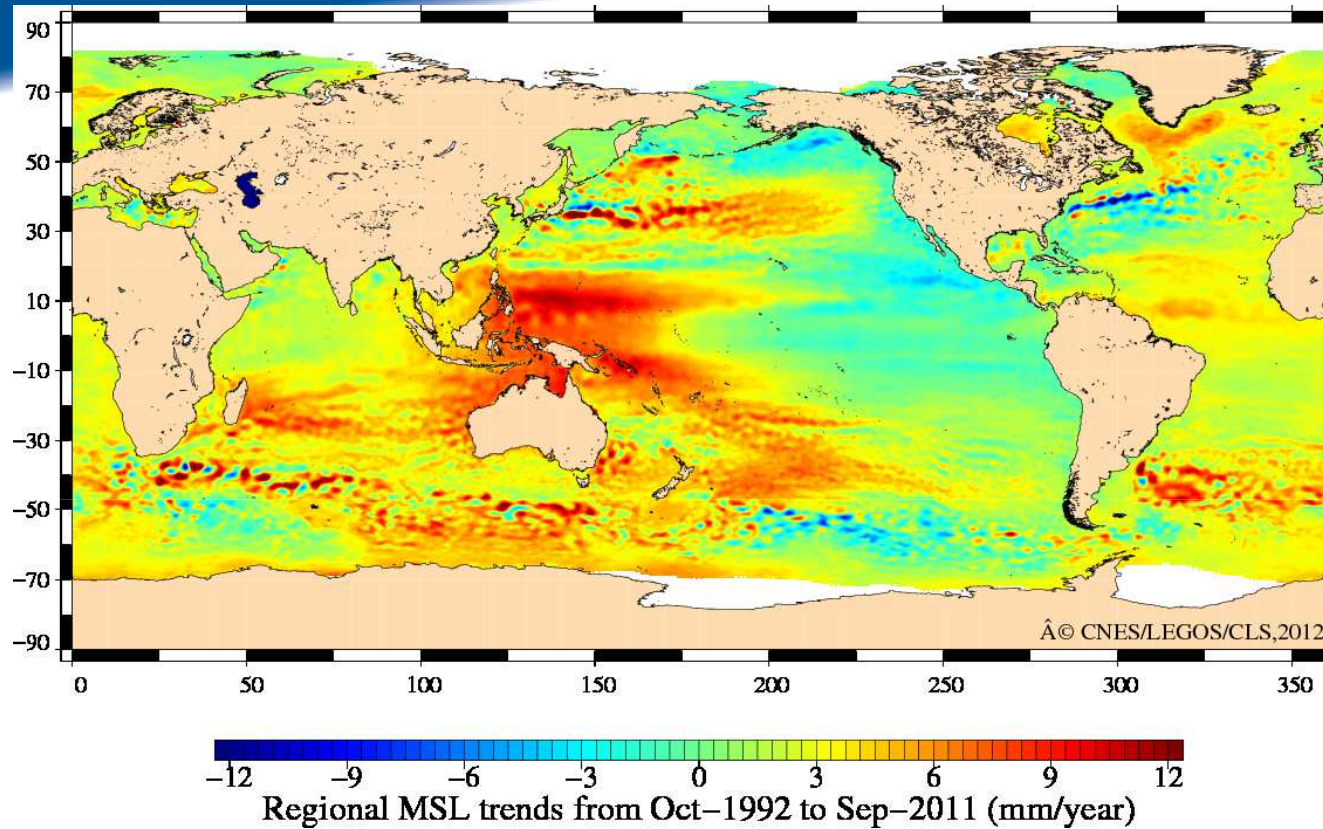
3. **AVISO** center (partnership with CLS, also NASA, NOAA, Eumetsat) is devoted to oceanography, mainly ocean surface altimetry. Main space missions involved: ERS-1, ERS-2, Topex-Poseidon, Envisat, Jason-1, Jason-2.

<http://www.aviso.oceanobs.com/>

4. **THEIA** center (partnership with other French institutions) is devoted to land data, at global and regional scales. Main space missions involved: Spot/Vegetation, Envisat/Meris, Modis, MSG. <https://www.ptsc.fr/>

## Involvement in European Climate activities

- **CNES and the French scientific community are involved in the programme CCI of ESA.**
  - CNES has one participant (METEO-FRANCE) in the CMUG group, which insures the link between CCI and the modelling community.
  - CNES supports French scientists involved in several consortia of CCI: sea-level, aerosol, cloud, greenhouse gases, fires, land cover, ocean colour, ozone, SST, CMUG.
- French scientists supported by CNES are taking part in **Eumetsat climate activities**. For example, algorithms and expertise of LATMOS on IASI level 2 products (O<sub>3</sub>, CO<sub>2</sub>..) is part of Ozone and Atmospheric chemistry SAF.
- Via the Thematic data centers, CNES is involved in the consortia which will lead to **GMES Core Services**: MACC (atmosphere), MyOcean (ocean) and Geoland (land). These Core Services will have a role in the building of some ECV climate products.



**Thank you for your attention**