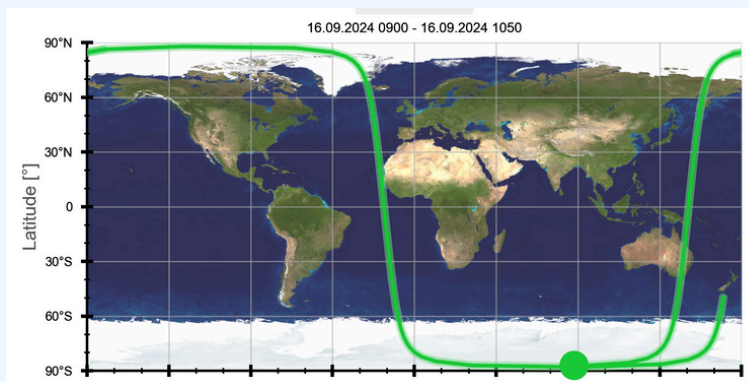




Fact Sheet

- Launch: 8th April 2010, Baikonour, Kazakhstan
- Role: Earth Observation
- Mass: 720 kg
- Orbit (PEO)
 - Altitude: 717 km
 - Inclination: 92°
 - Period: 100 min
 - Eccentricity: 0.0002326



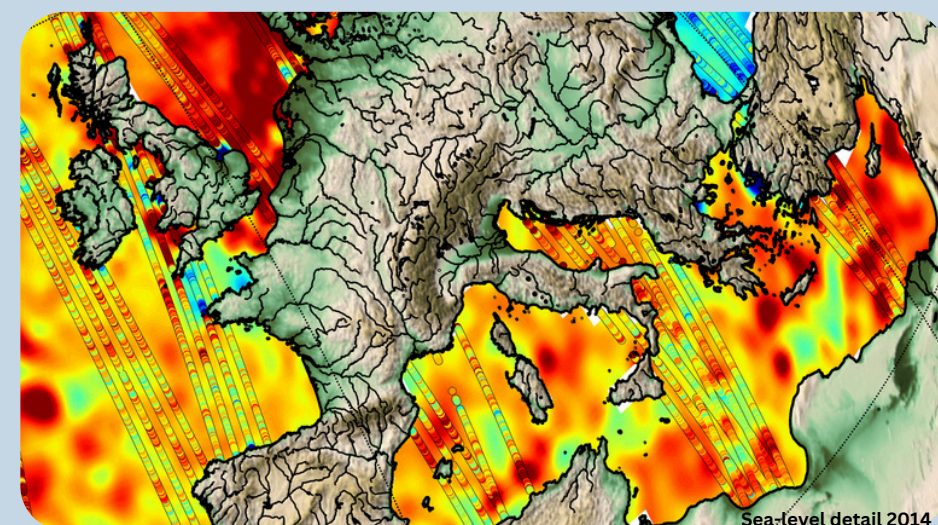
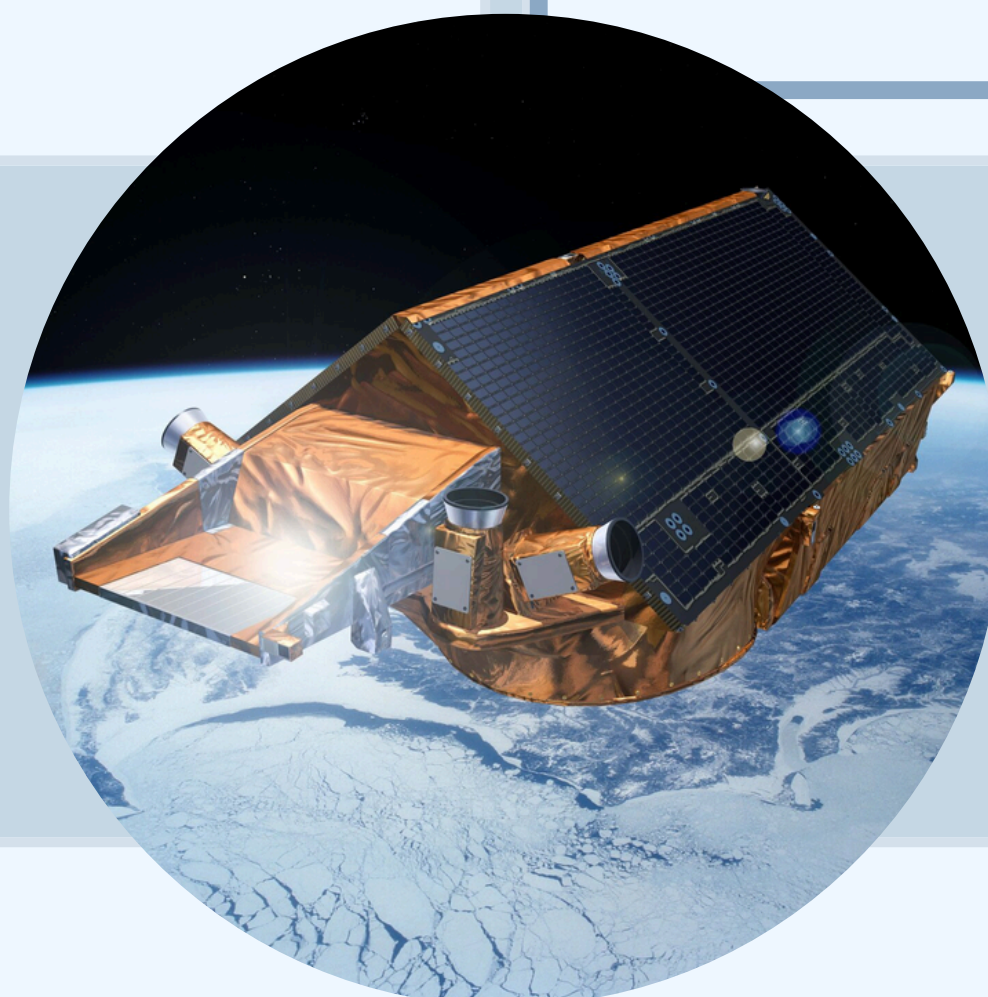
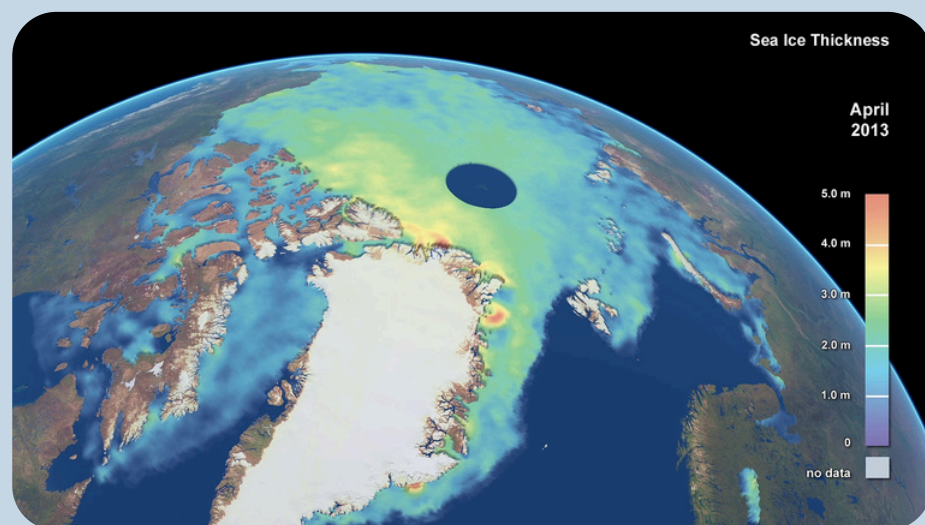
CryoSat-II is an ESA operated satellite launched in 2010 to replace Cryosat-I which was lost due to a launch failure in 2005. Cryosat-II's mission was planned for 3 years and has since been extended following nominal operations. Cryosat-II is still operational to this day and has recently started working on a joined program with ICESat-2 (NASA)

Application

The CryoSat II's goal is to monitor the precise changes in the thickness of the polar ice sheets and floating sea ice that overlie Greenland and Antarctica, deepening our understating of the relationship between ice and global climate change.

“ In order to understand fully how climate change is affecting these remote but sensitive regions, there remains an urgent need to determine exactly how the thickness of the ice, both on land and floating in the sea, is changing. By addressing this challenge, the data delivered by the CryoSat mission will complete the picture and lead to a better understanding of the role ice plays in the Earth system.

” - ESA [1]



Sensor

The sensor aboard the Cryosat II is a **SAR Interferometric Radar Altimeter (SIRAL)**. It is an active sensor that sends radar pulses to the earth surface and detects the return echo with two receiving antennas. By knowing the position and attitude of the satellite, the return time will give information about the surface altitude. SIRAL operates at a single frequency Ku-band (microwave range between 12 - 18 GHz) and is able to observe different surfaces with three different modes. This sensor has a spatial resolution of 250m along its track.

Low Resolution Mode (LRM):

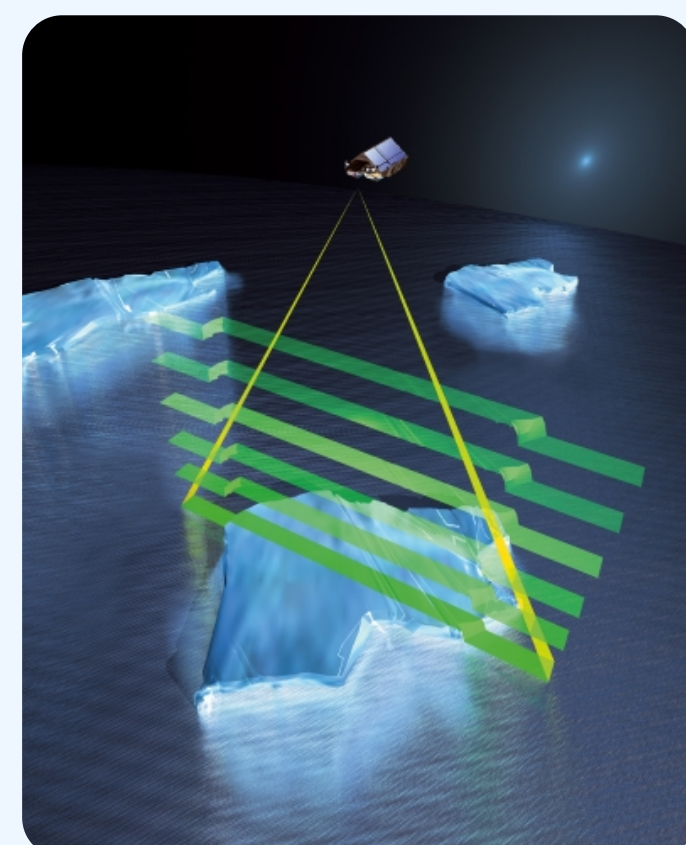
- Operates over the ice sheet interiors, oceans and land not covered by the other modes
- Similar to conventional pulse width-limited altimeters
- Low pulse repetition frequency (PRF)

Synthetic Aperture Radar (SAR) mode:

- Operates over sea ice areas, ocean basins and coastal zones
- Used for high-resolution measurements of floating sea ice
- Enables the indirect measurement of sea ice thickness
- PRF is about 10 times higher than at LRM

SAR Interferometric (SARIn or SIN) mode:

- Operates over ice sheet margins, small ice caps, mountain glaciers, some geostrophic ocean currents and major hydrological basins
- Used to study steep and mountainous terrains
- Synthetic aperture processing and use of a second antenna as an interferometer



[1] https://esamultimedia.esa.int/multimedia/publications/BR199_LR.pdf

[2] <https://earth.esa.int/eogateway/missions/cryosat/cryo2ice>

[3] <https://earth.esa.int/eogateway/instruments/siral/description>

[4] https://en.wikipedia.org/wiki/Electromagnetic_spectrum

[5] [https://www.esa.int/ESA_Multimedia/Missions/CryoSat-2/\(result_type\)/images](https://www.esa.int/ESA_Multimedia/Missions/CryoSat-2/(result_type)/images)