

## SATELLITE OF THE DAY

# SMOS – A Star in the Sky

ESA's Soil Moisture Ocean Salinity Earth Explorer mission



Image: ESA

Optik, Strahlung, Fernerkundung

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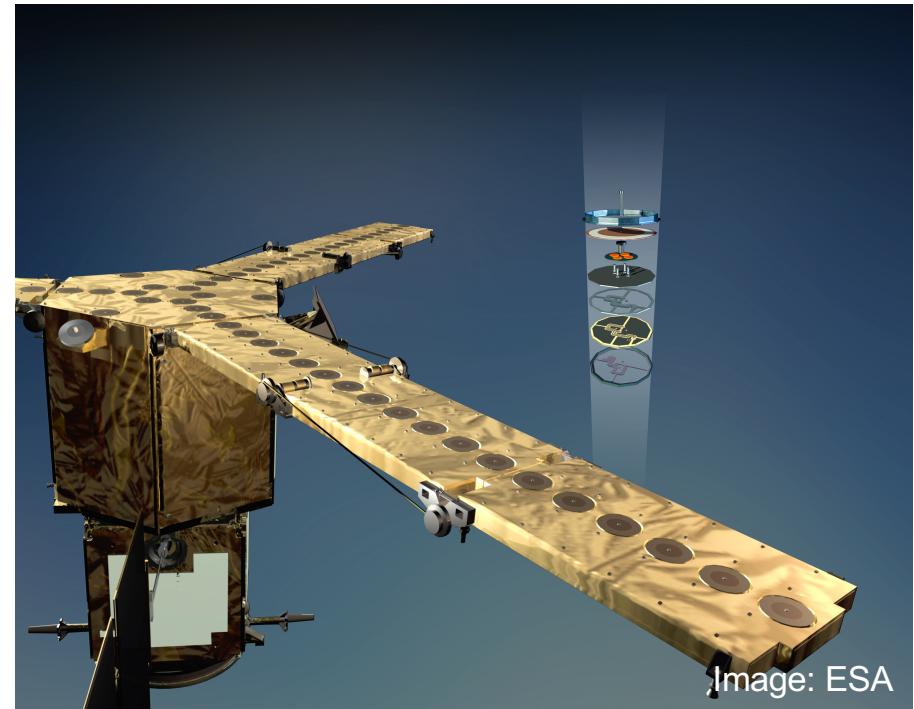
*Brought to you by Elina Plesca*

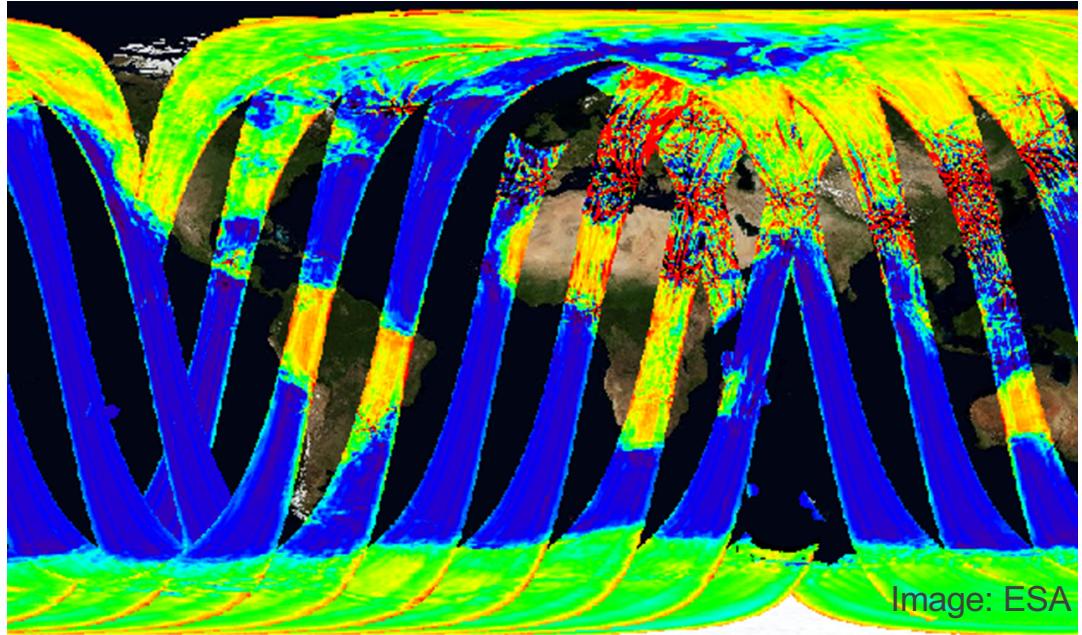
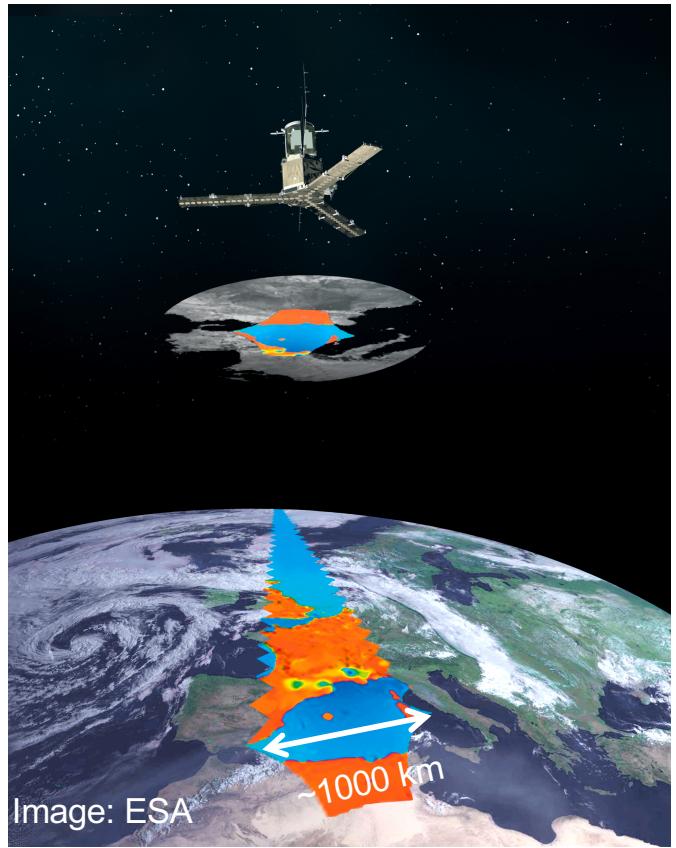
# SMOS AND MIRAS – FIRST-EVER POLAR-ORBITING 2D INTERFEROMETER MEASURING IN L-BAND

- ▶ Launched on 2 November 2009, in operation at least until 2017
- ▶ Sun-synchronous orbit at 758 km altitude

**Instrument:** MIRAS (Microwave Imaging Radiometer using Aperture Synthesis) – passive microwave 2D-interferometer

- ▶ L-band (21 cm – 1.4 GHz)
- ▶ The antenna aperture is synthetized by 69 small antennae
- ▶ Measurement every 1.2 sec
- ▶ Spatial resolution: 35 km at sub-satellite point
- ▶ Angular range: 0-55 deg
- ▶ Field of view: hexagon-like shape, about 1000 km in diameter
- ▶ Temporal resolution: global coverage every 3 days





First image from SMOS (17 Nov 2009) – non-calibrated  $T_B$

SMOS aims to improve our knowledge about the Earth's water cycle by measuring:

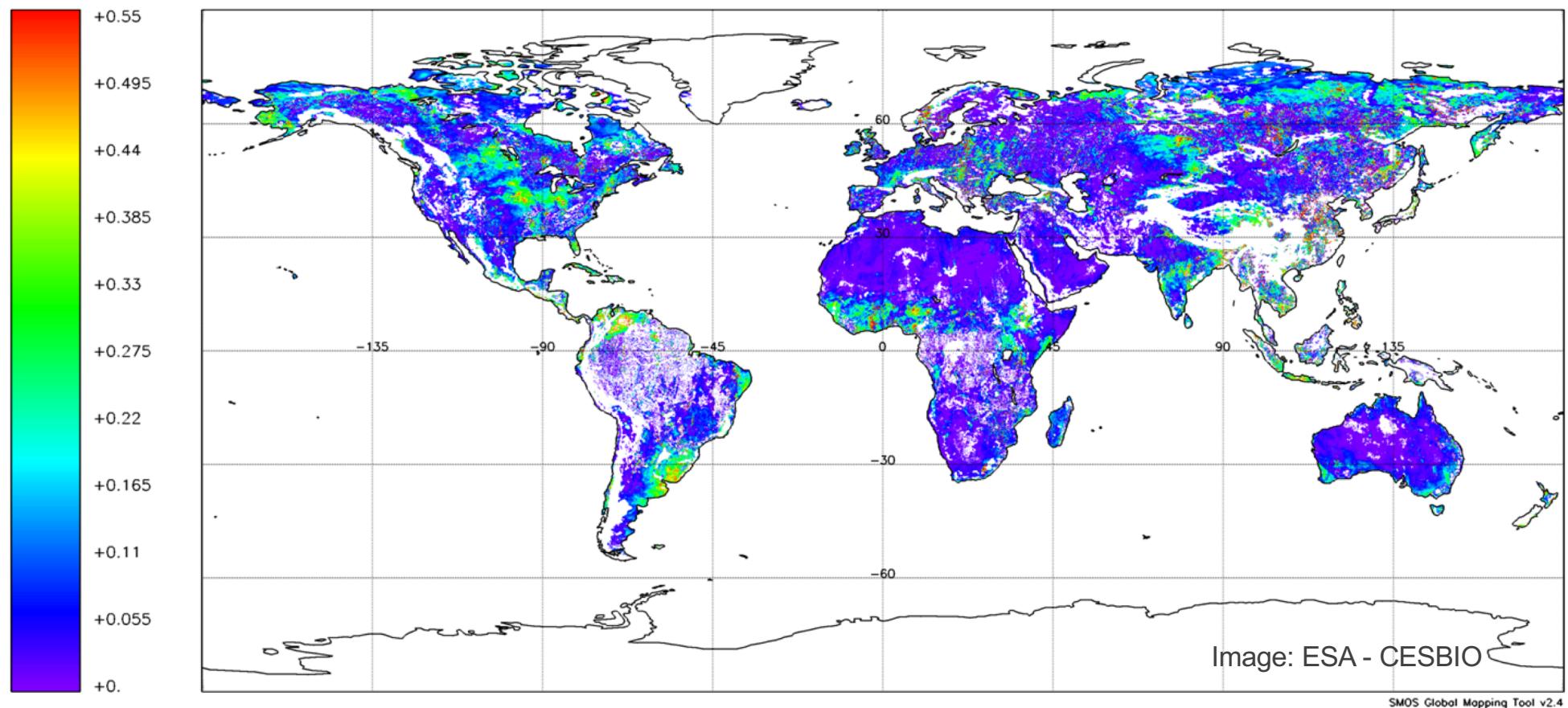
- ▶ Soil moisture
- ▶ Ocean salinity
- ▶ BONUS: ice thickness, hurricane tracking (wind speed over ocean or SST)



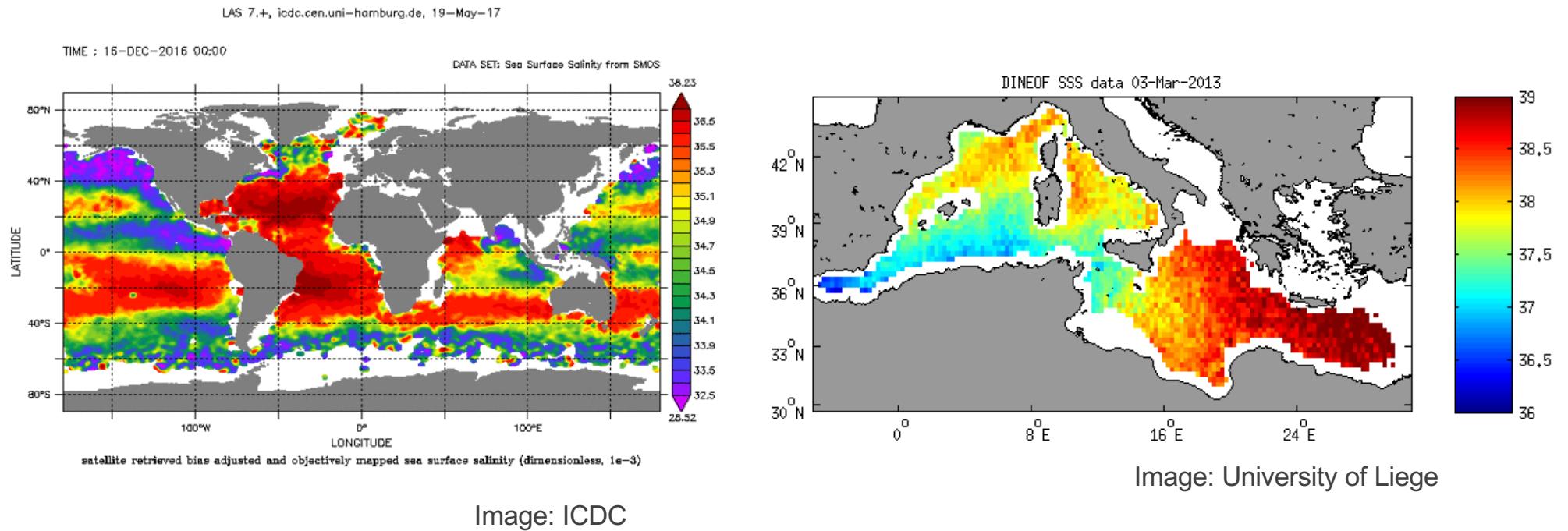
MIR\_SMUDP2 – Soil\_Moisture ( $\text{m}^3\text{m}^{-3}$ ) – 20100620T001100 – 20100623T004816

Cylindrical projection – 87 product(s) – Generated on 20100624T193111

Orbits: All – Fill value: -999.0



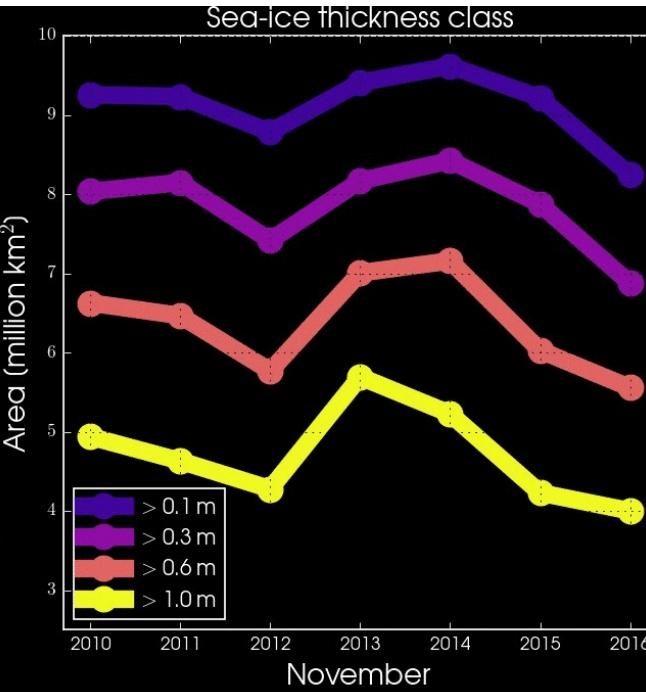
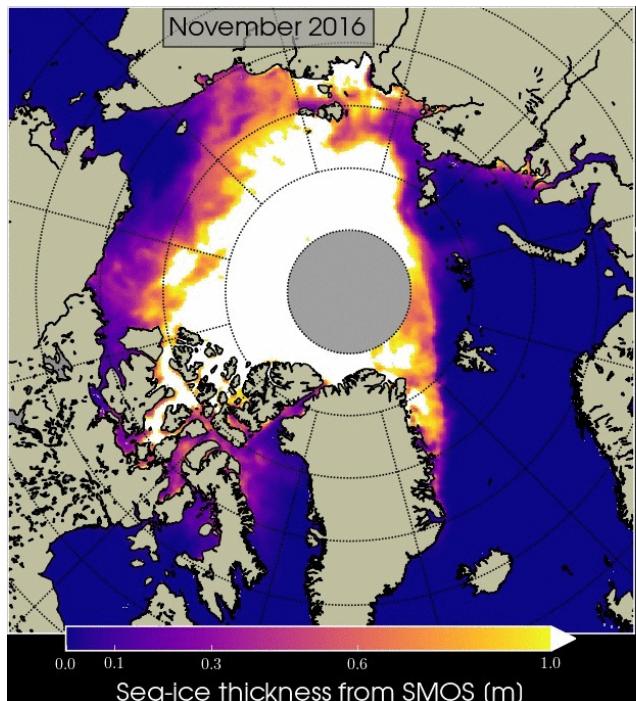
Soil moisture retrievals for 20-23 June 2010



Global salinity map from SMOS  
(16 December 2016)

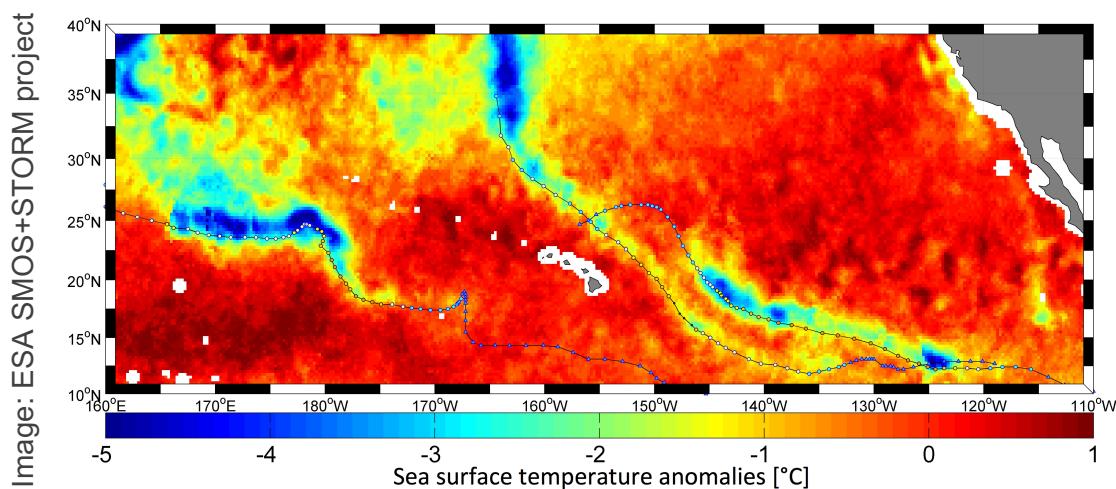
Daily salinity map created using DINEOF\*  
(3 March 2013)

\* DINEOF – Data Interpolating Empirical Orthogonal Functions



Changes in sea-ice thickness during November between 2010 and 2016  
(SMOS complementing the ESA CryoSat mission)

Image: University of Hamburg



Kilo, Ignacio and Jimena hurricanes cooling the ocean surface  
(August 2015)