

# Space and Climate

**International Space Forum 2016**  
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# The Paris Agreement – A milestone for our planet





# The Paris Agreement

- Global average temperature increase:  $+2^{\circ}\text{C}$  (goal  $+1.5^{\circ}\text{C}$ )
- Enters into force 2020
- Reporting every 5 years, from 2023 onwards
- 194 countries + EU

## Issues addressed

- *Climate Mitigation*
- *Climate Adaptation*
- *Transparency, Global Stocktake*
- *Loss and Damage*
- *Support*

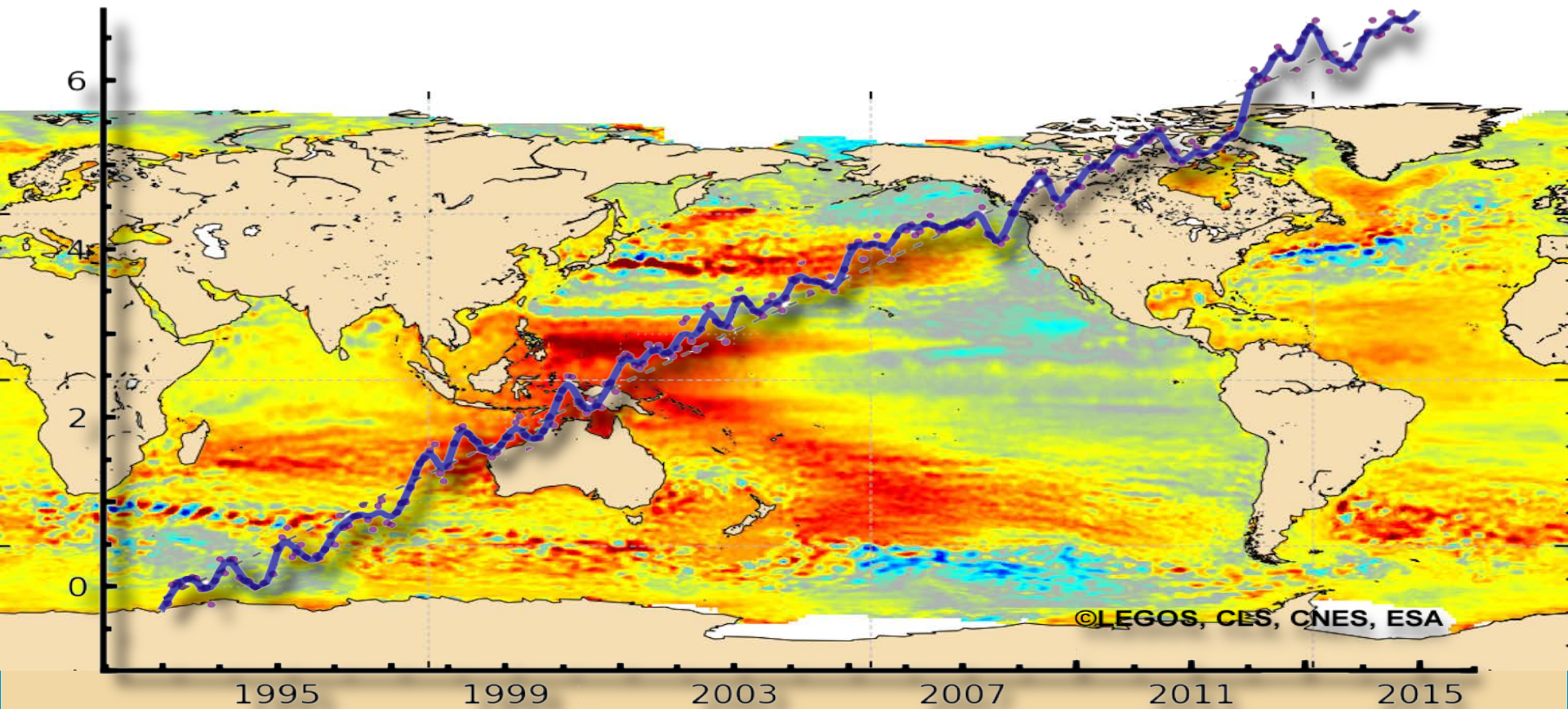


PARIS2015  
UN CLIMATE CHANGE CONFERENCE  
COP21·CMP11

**Space brings key contributions for all issues**



# Facts from Space





# Space-based EO and Climate Change

- Complete, coherent and long-term measurements of geophysical parameters needed for climate models
- Global Climate Observing System (GCOS) has identified 50 Essential Climate Variables (ECV)
- For half of these satellite EO is the primary data source







2014

1996

1978

Sentinel-1A

ERS-2

Seasat

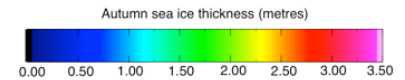
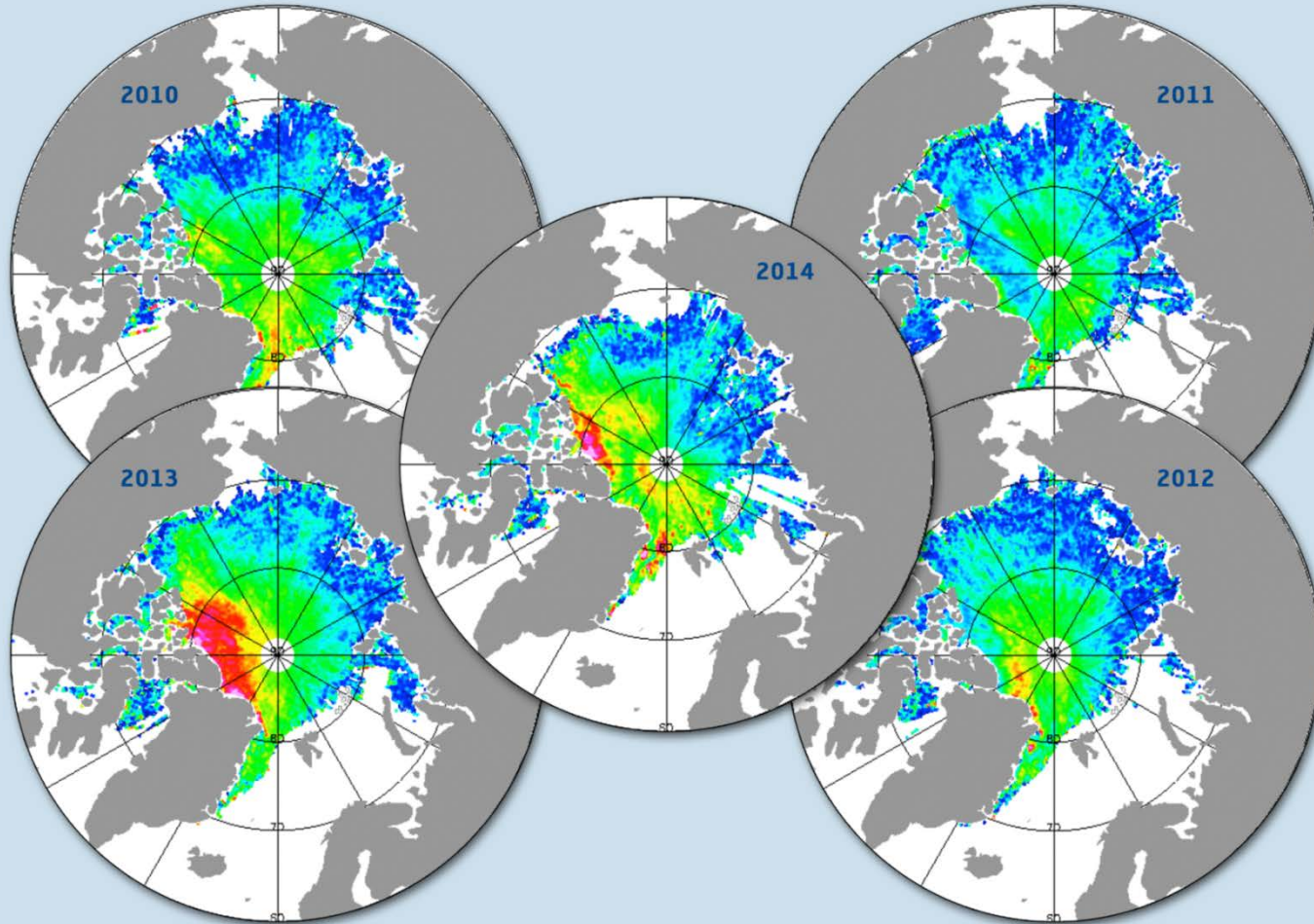
→ **36 YEARS OF GLACIER RETREAT**  
southeast Greenland



5 km



# Cryosat: Arctic Sea Ice Volume

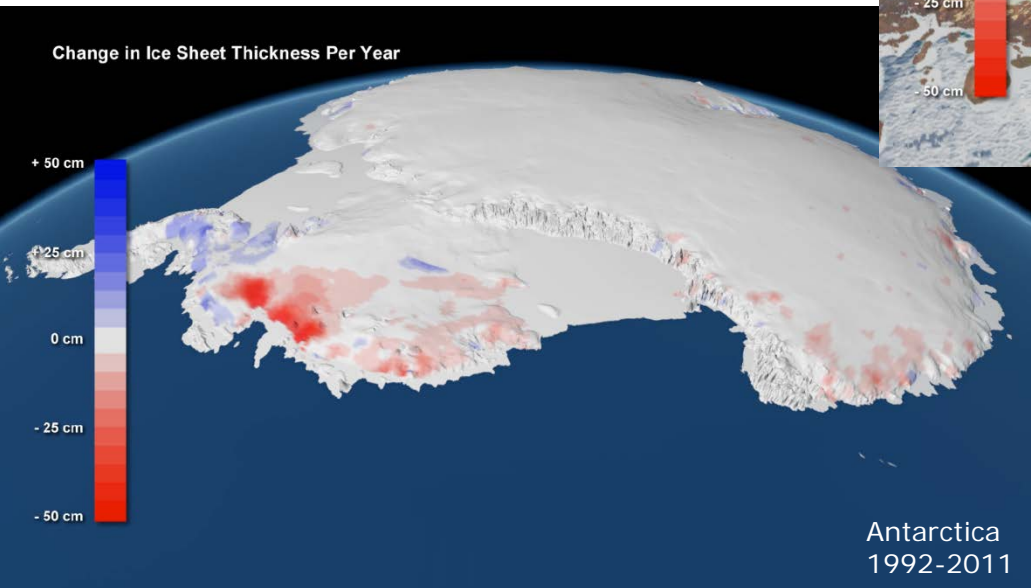
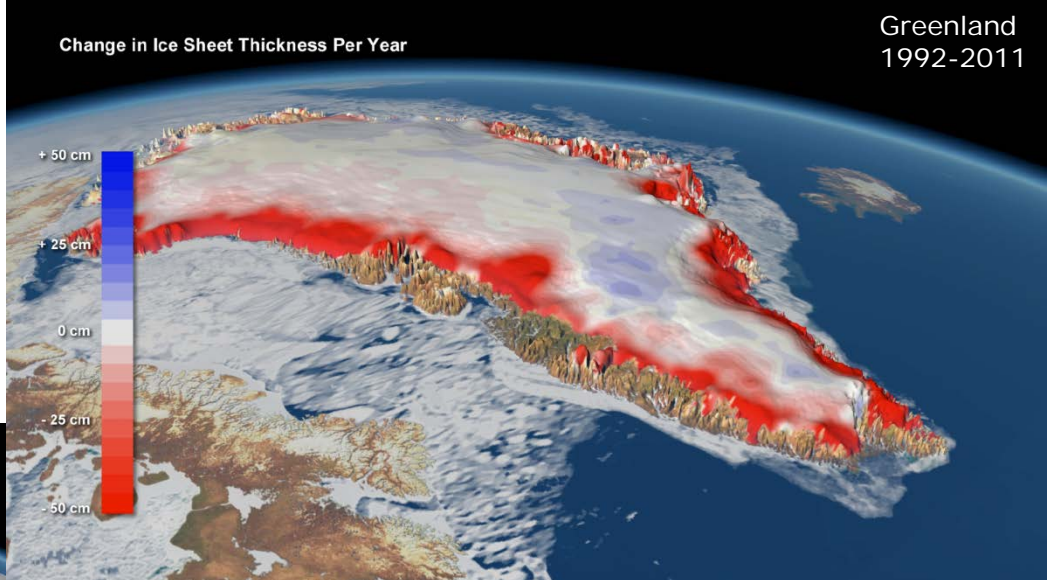


Nature  
Geoscience



# IMBIE: Ice-Sheet Mass Balance Inter-comparison Exercise

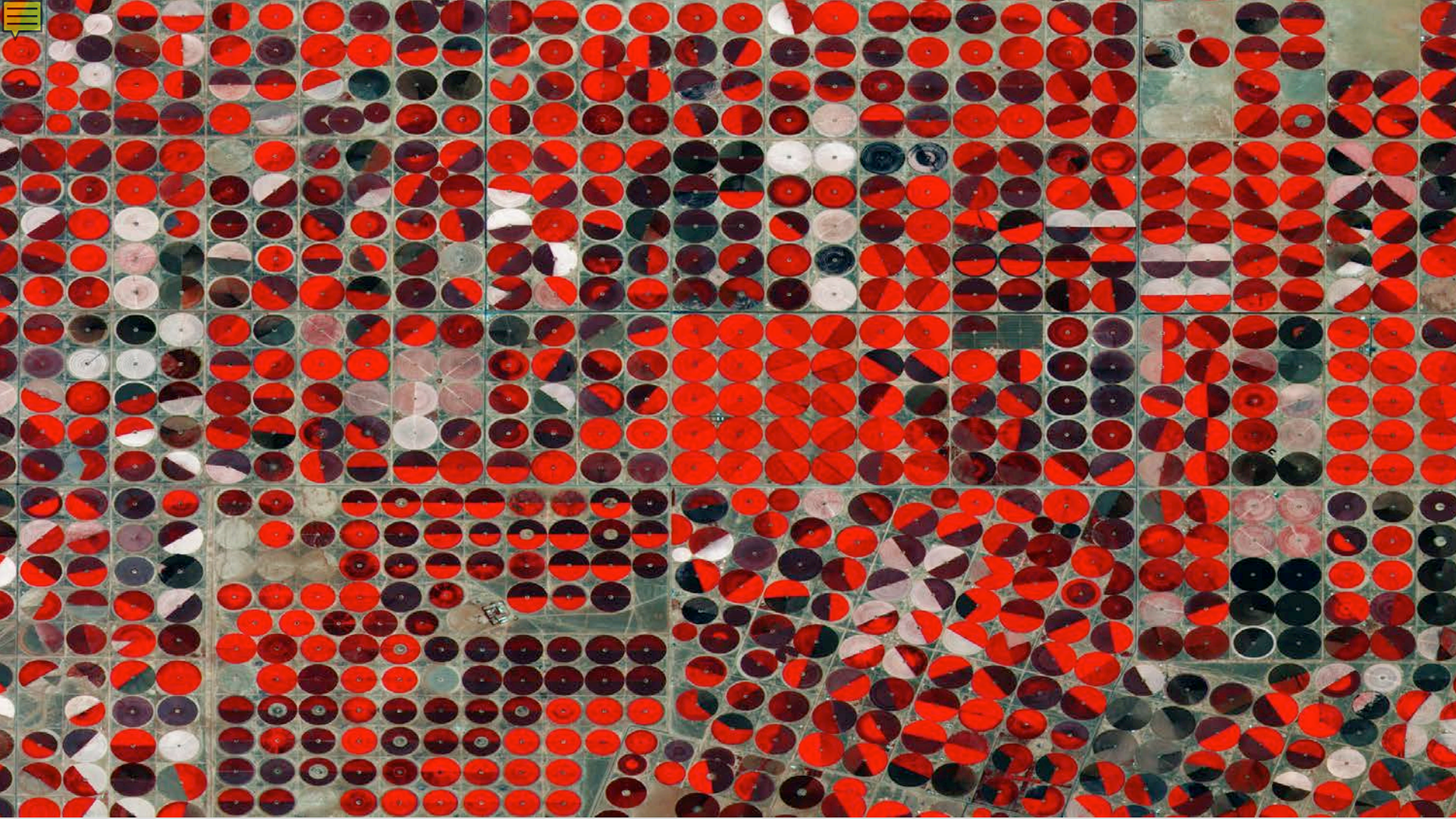
Greenland  
1992-2011



## Results:

- 11 +/- 3.8 mm sea level rise from melting ice since 1992
- Antarctic ice loss 3 times higher than in the 90s





2008/03/24 00:00 UTC

Biogenic + anthropogenic XCO<sub>2</sub> [ppm]

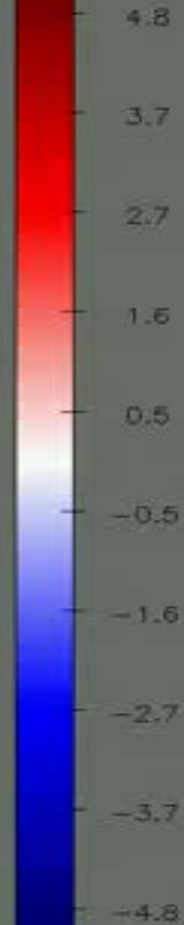


**Next big challenge: CO<sub>2</sub>**  
(Simulation, Sentinel-7, 2025+)



**Monitoring and Consequences**

→ global data exchange for worldwide acceptance!



# ESA's Climate Change Initiative (CCI)

