Current & Future ESA Earth Observation Missions and Programmes

CGMS-46
7 June 2018

Ivan Petiteville, ESA
Earth Observation Programmes

ESA-DEVELOPED EARTH OBSERVATION MISSIONS

esa

Satellites
28 under development
13 in operation

2010

Proba-1
GOCE
SMOS
CryoSat
Proba-V
Swarm
Meteosat 10 (MSG)
MetOp-B
Sentinel-1A
Sentinel-2A
Sentinel-1B
Sentinel-2B
Sentinel-3A
Sentinel-3B
Sentinel-5p
Aeolus
Seosat
EarthCARE
Biomass
FLEX

2015

Meteosat 11 (MSG)
Sentinel-6A
Sentinel-1C
Sentinel-2C
Sentinel-1D
Sentinel-2D
Sentinel-3C
Sentinel-3D
Sentinel-6B

2020

MetOp-C
Sentinel-5A MetOp-SG-A1
MetOp-SG-B1
MTG-I
Sentinel-4A MTG-S1

2025

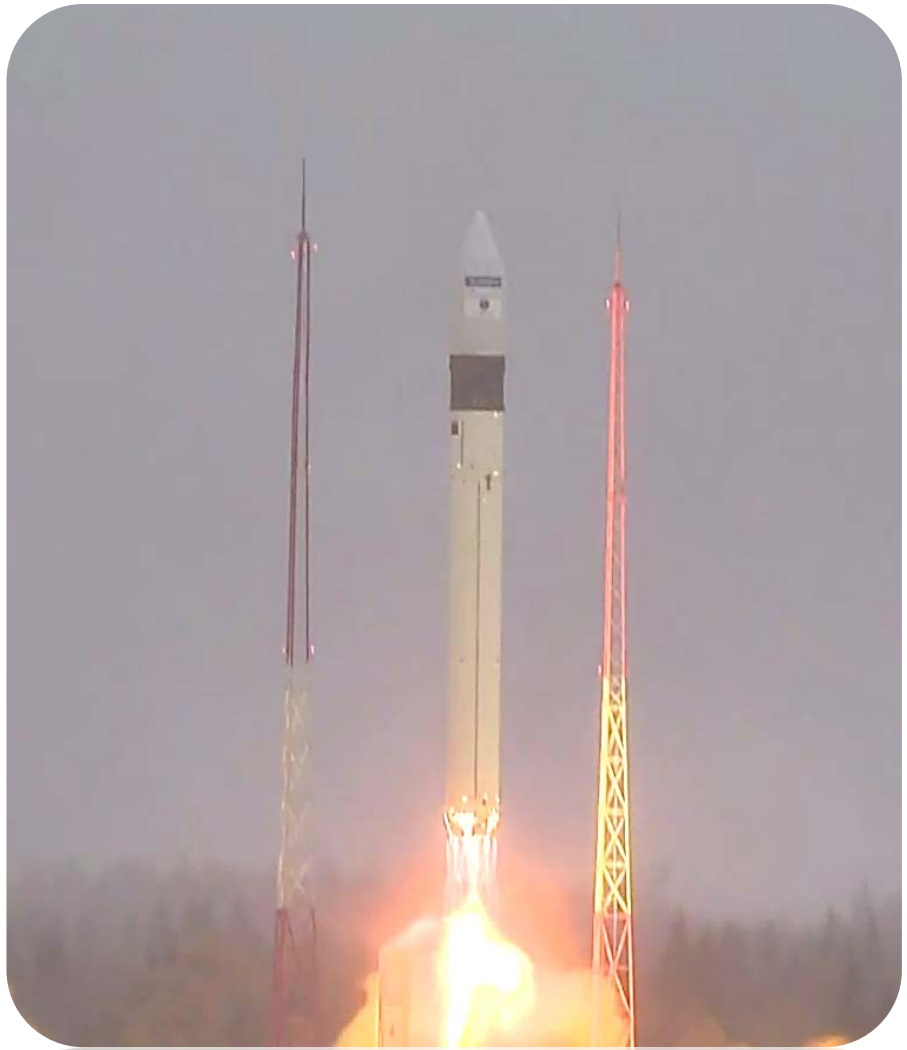
MTG-I2
Sentinel-5B MetOp-SG-A2
MTG-I3
MetOp-SG-B2

2030

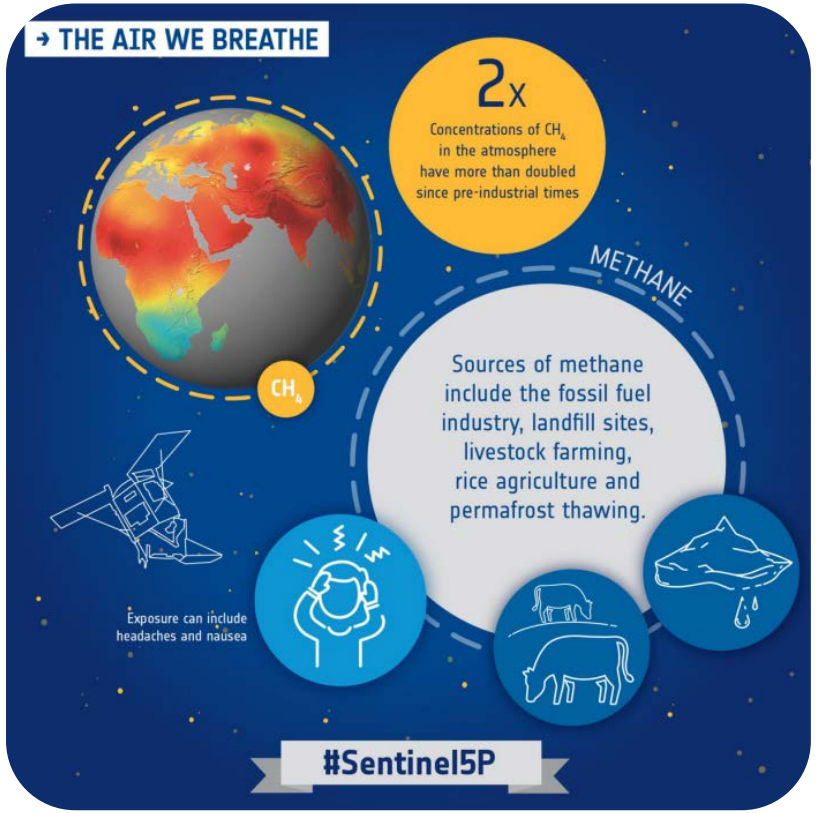
Sentinel-4B MTG-S2

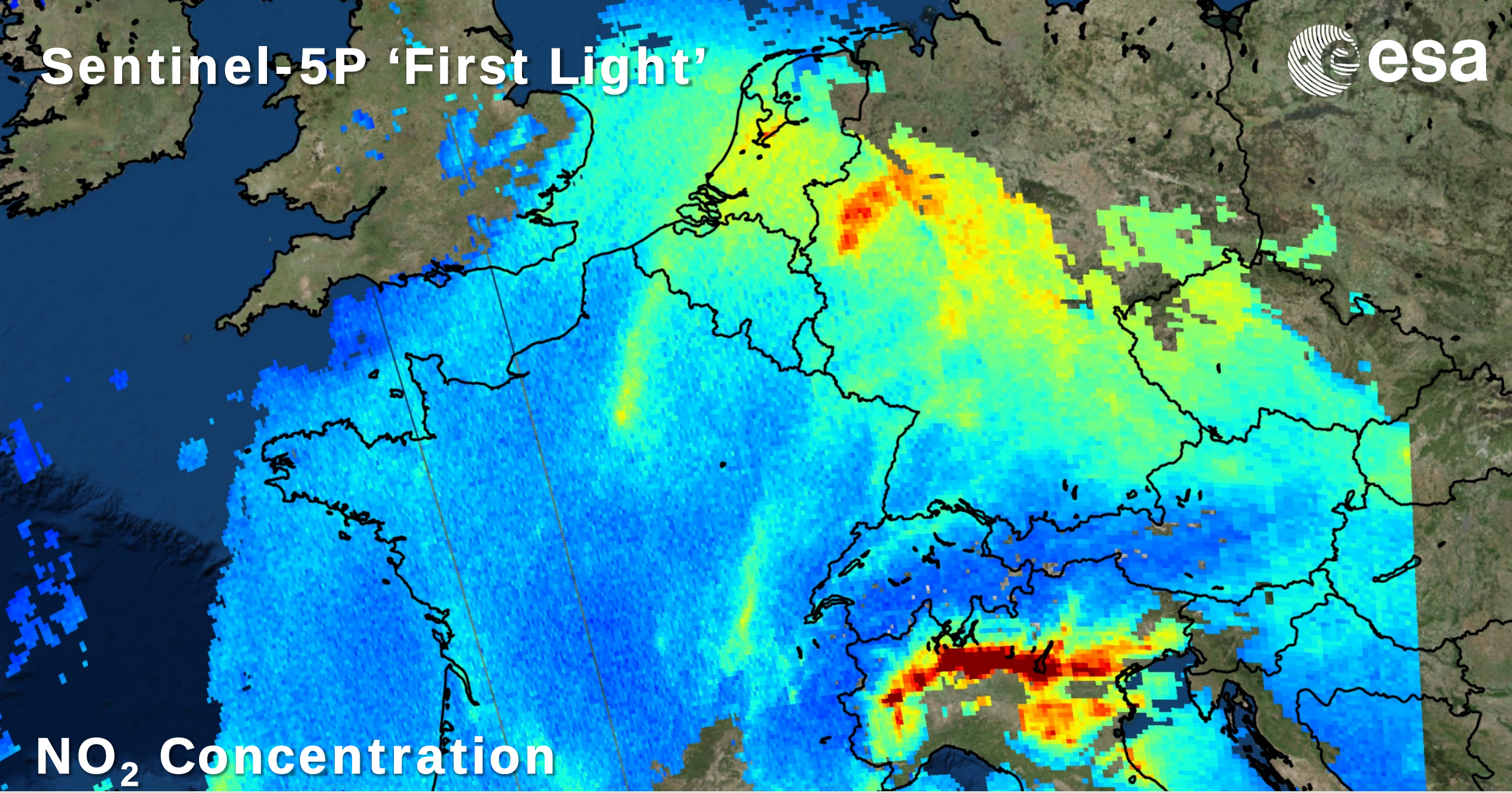
Science | **Copernicus** | **Meteorology**

Successful Launch Sentinel-5P



13 October 2017 - 11:27 CEST
Rokot Launcher, Plesetsk Cosmodrome

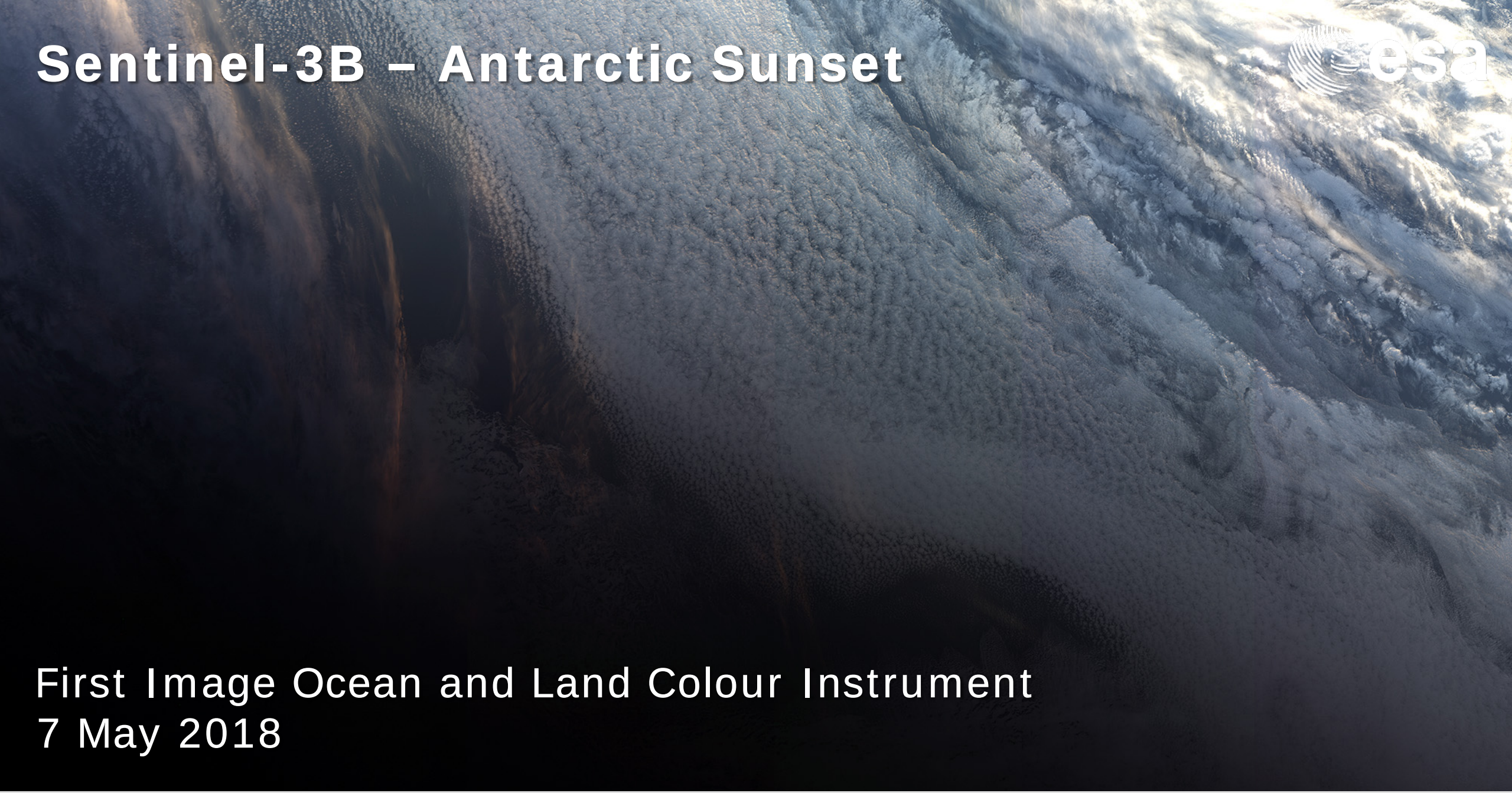



Sentinel-5P ‘First Light’
esa
NO_2 Concentration

Launch Sentinel-3B

Plesetzk
25 April 2018

Sentinel-3B – Antarctic Sunset



First Image Ocean and Land Colour Instrument
7 May 2018

Sentinel Status

S-1

Radar

A	3 Apr. 2014
B	25 Apr. 2016
C	2022/23
D	> 2022/23

S-2

High Res. Optical

A	23 Jun. 2015
B	6 Mar. 2017
C	2022/23
D	> 2022/23

S-3

Medium Res. Optical & Altimetry

A	16 Feb. 2016
B	25 Apr. 2018
C	2023
D	> 2023

S-4

Atmospheric Chemistry (GEO)

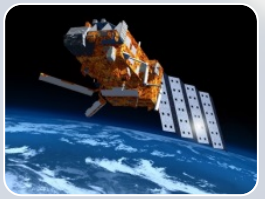
A	2022
B	2027

S-5P

Atmospheric Chemistry (LEO)

A	13 Oct. 2017

S-5



Atmospheric Chemistry (LEO)

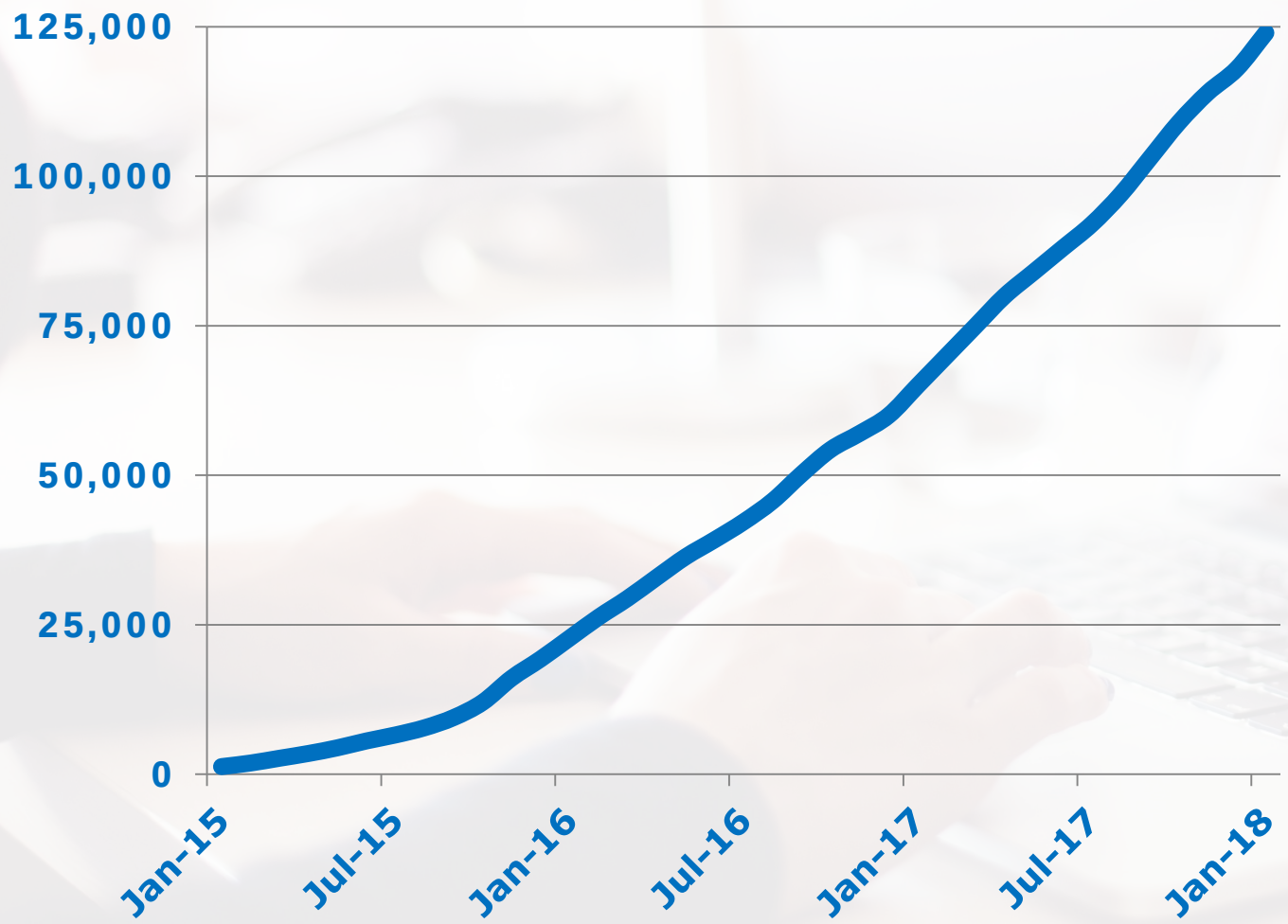
A	2021
B	2027
C	> 2027

S-6

Altimetry

A	2020
B	2025

Registered Sentinel Users



Copernicus User Uptake

The real number of users is much higher but unknown due to the free, full & open data policy.

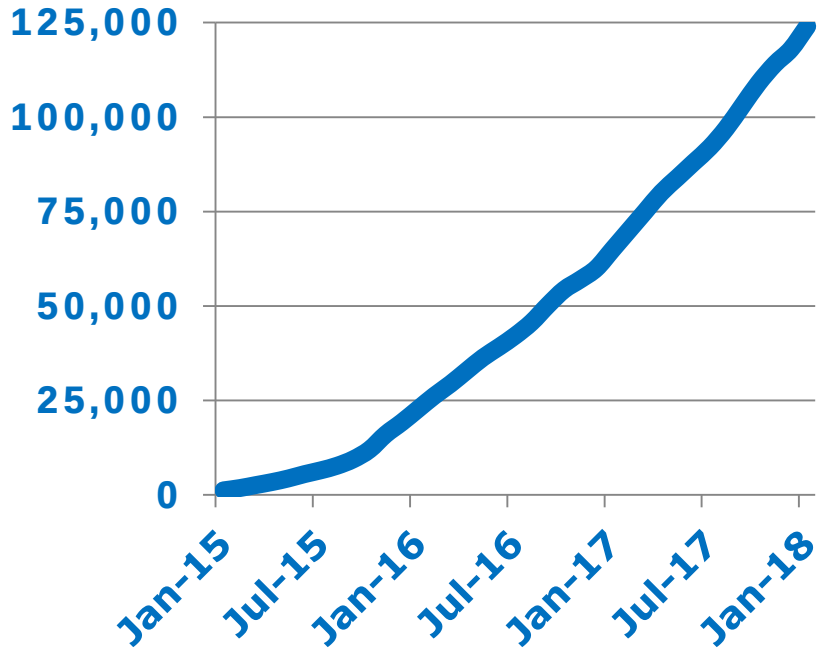
Sentinel Open Access Data Hub

Registered Users
145,506

Published Products
8,087,411

Volume of User Downloads
62.1 PB

Open Access Hub Availability
in the past month
99.4%



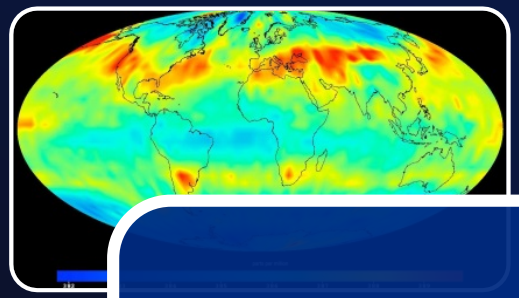
Statistics on 24 May 2018

scihub.copernicus.eu

Sentinel Expansion (7 to 12)

High Priority Candidate Missions

Applications



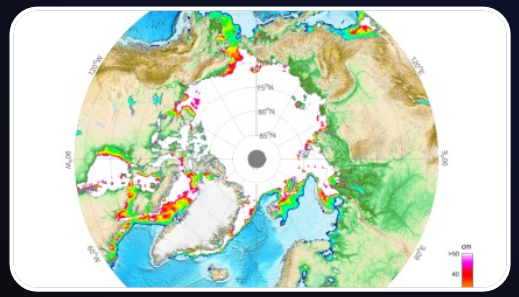
Anthropogenic CO_2

Climate Change (Causes)

Polar Ice & Snow Topography

Climate Change (Effects)

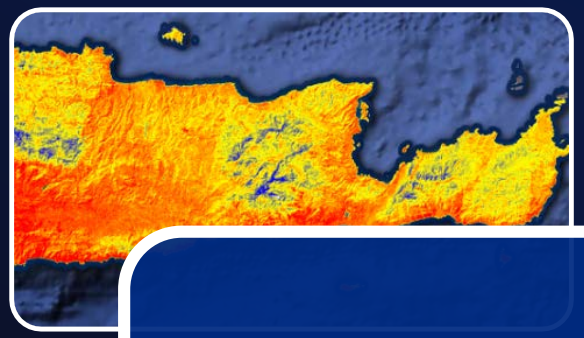
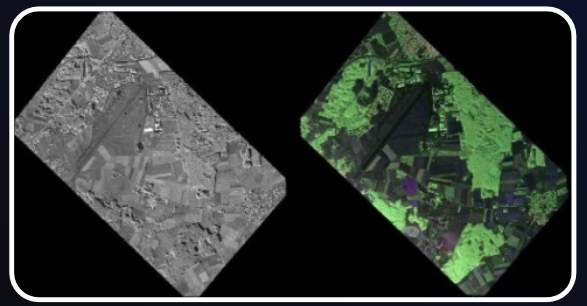
Status: Phase A/B1 system studies



Passive Microwave Imaging

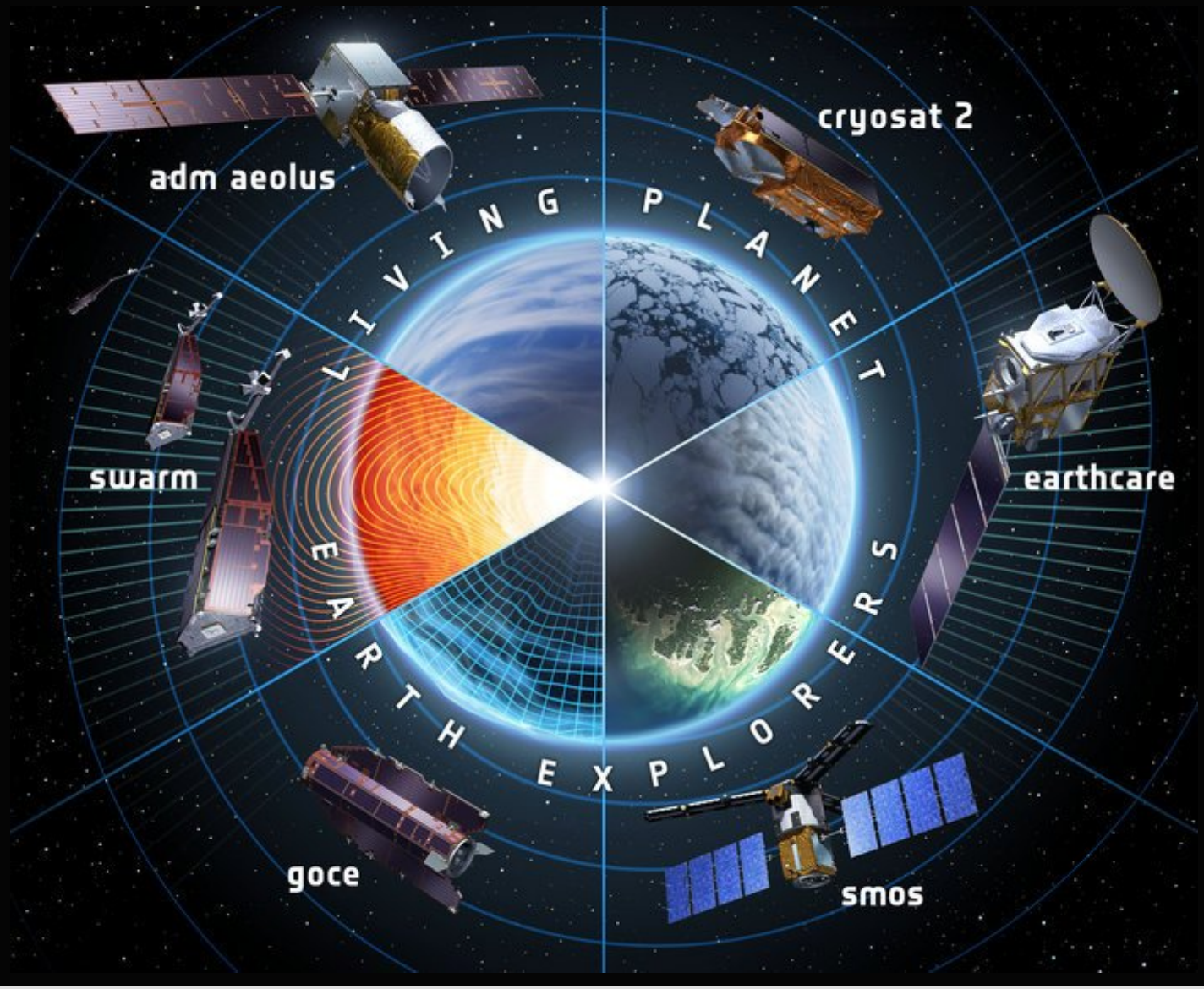
Sea Surface Temperature & Sea Ice Concentration

Sentinel Expansion (7 to 12)

High Priority Candidate Missions	Applications
 High Resolution Land Surface Temperature	Agriculture & Urban Management Services
 HyperSpectral Imaging	& Food Security, Soil & Mineral Resources
 L-band SAR	Soil, Vegetation, Food Security & Ground Motion

Status: Phase A/B1 system studies

Science: Earth Explorers



GOCE	2009 – 2013
SMOS	2009 – Present
Cryosat	2010 – Present
Swarm	2013 – Present
Aeolus	2018
EarthCARE	2021
Biomass	2022
FLEX	2022

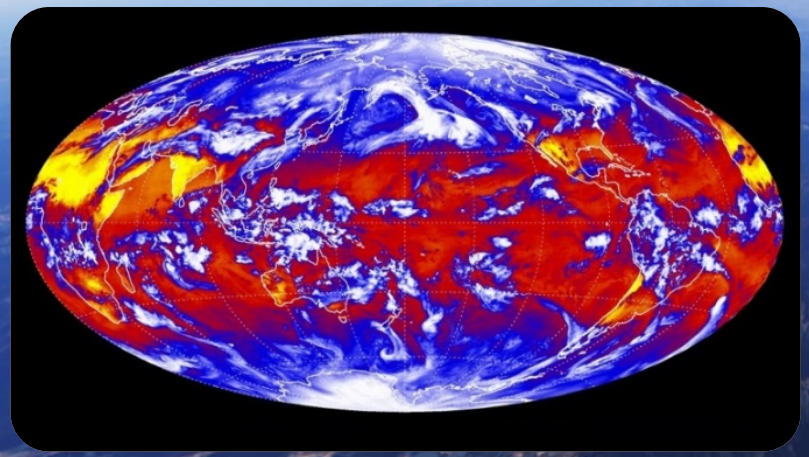

Aeolus
esa
Launch 21 Aug. 2018
Wind Mission
First ever UV LIDAR in Space
European Space Agency

Earth Explorer 9 and beyond

Earth Explorer 9: launch around 2025

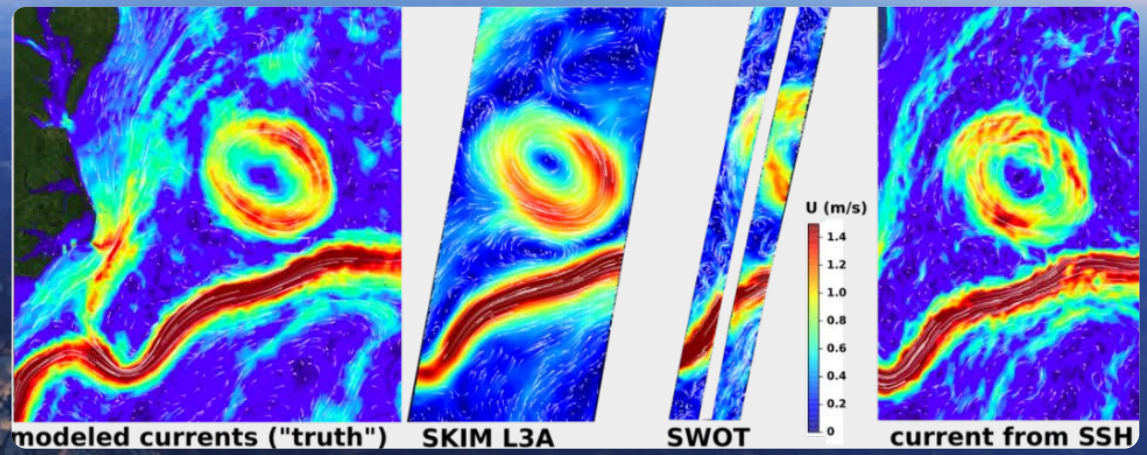
FORUM

Greenhouse Effect / Climate Change



SKIM

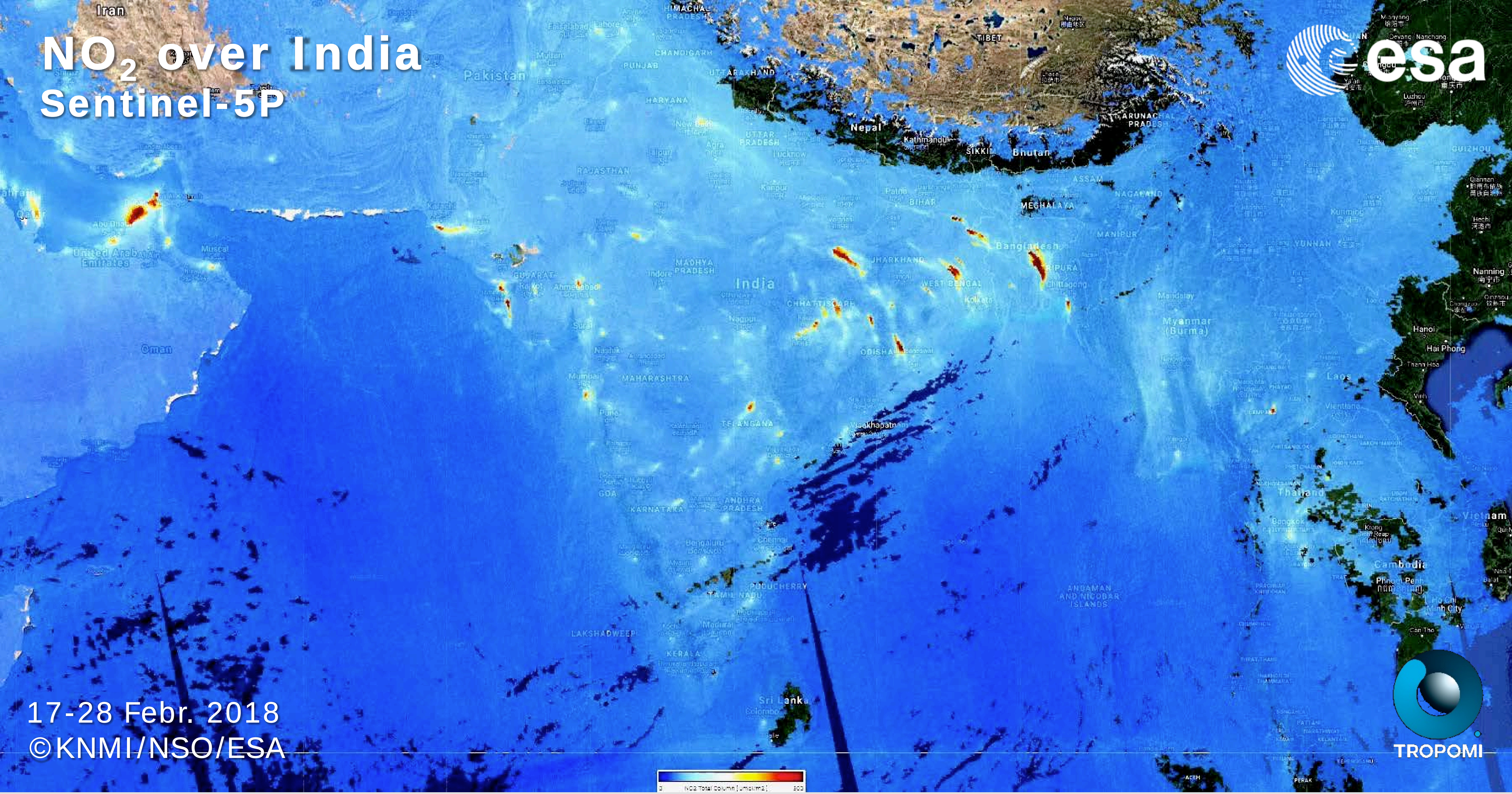
Ocean Surface Currents



Earth Explorer 10

- 21 proposals under evaluation
- 3 candidates for Phase 0 selection in September 2018

NO_2 over India
Sentinel-5P



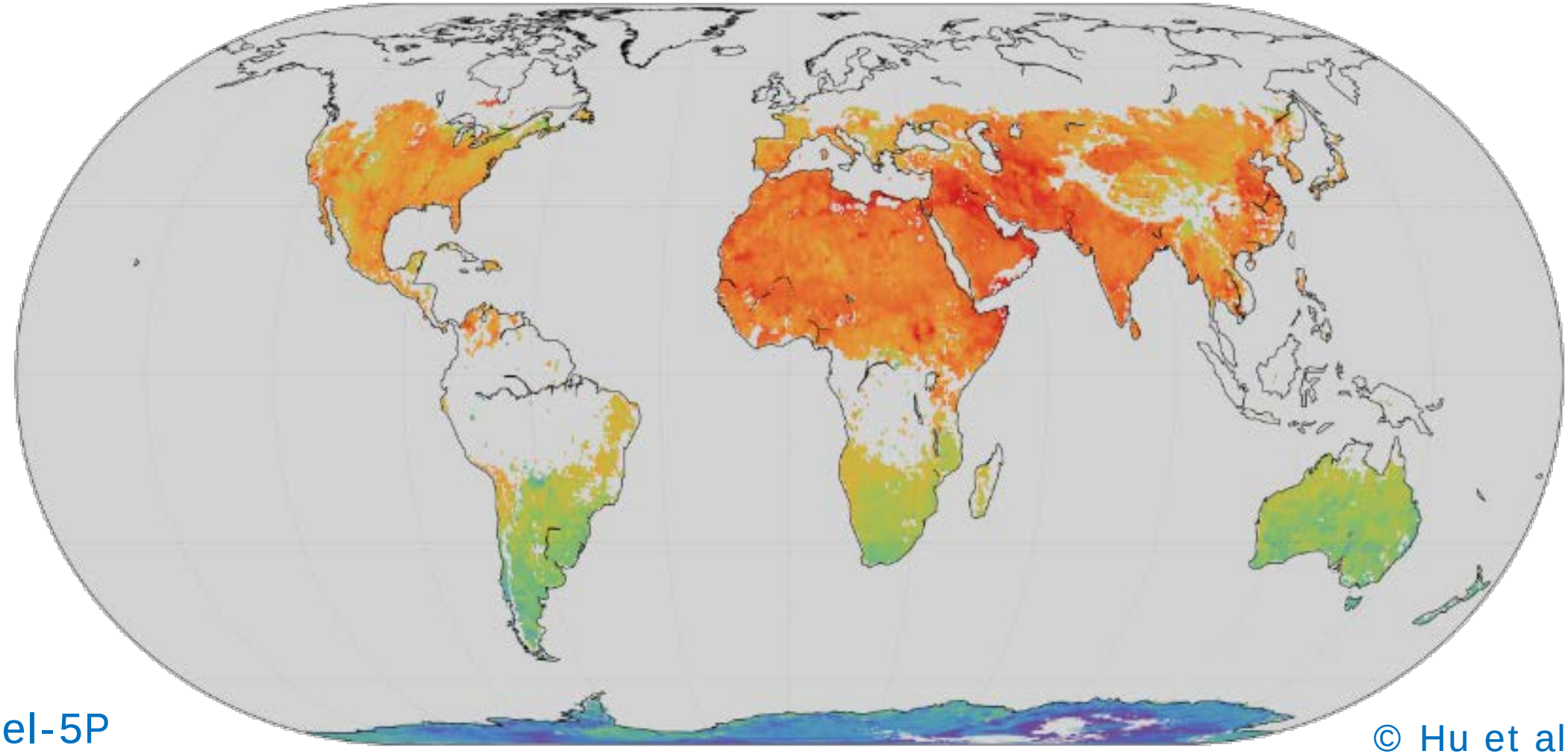
17-28 Febr. 2018

esa

TROPOMI

European Space Agency

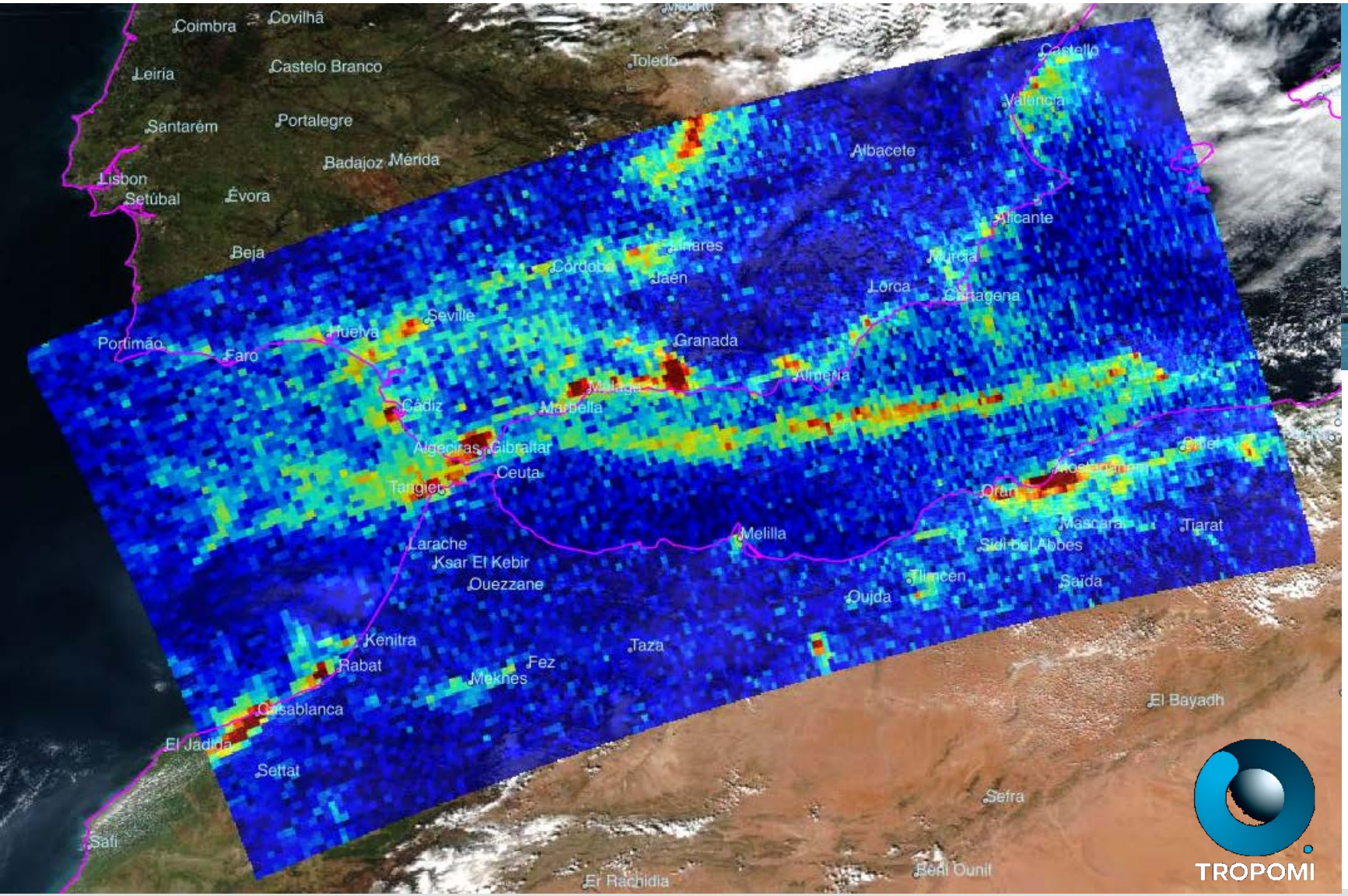
Methane – Global View



Sentinel-5P
Average 12 Nov. - 30 Dec. 2017

© Hu et al., GRL 2018

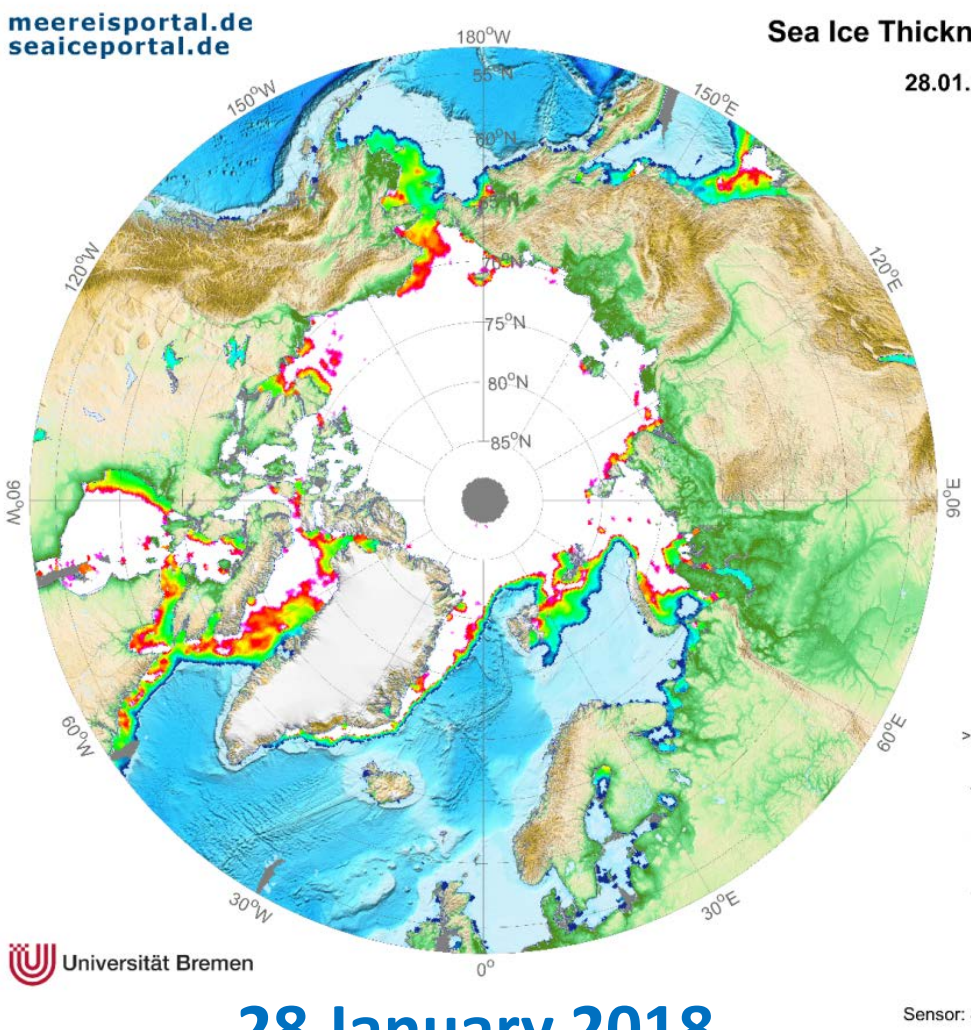
Sentinel-5P – New Data



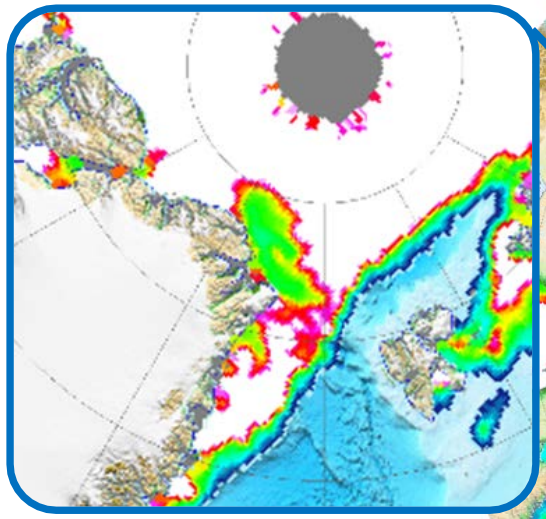
NO_2 Concentrations Strait of Gibraltar

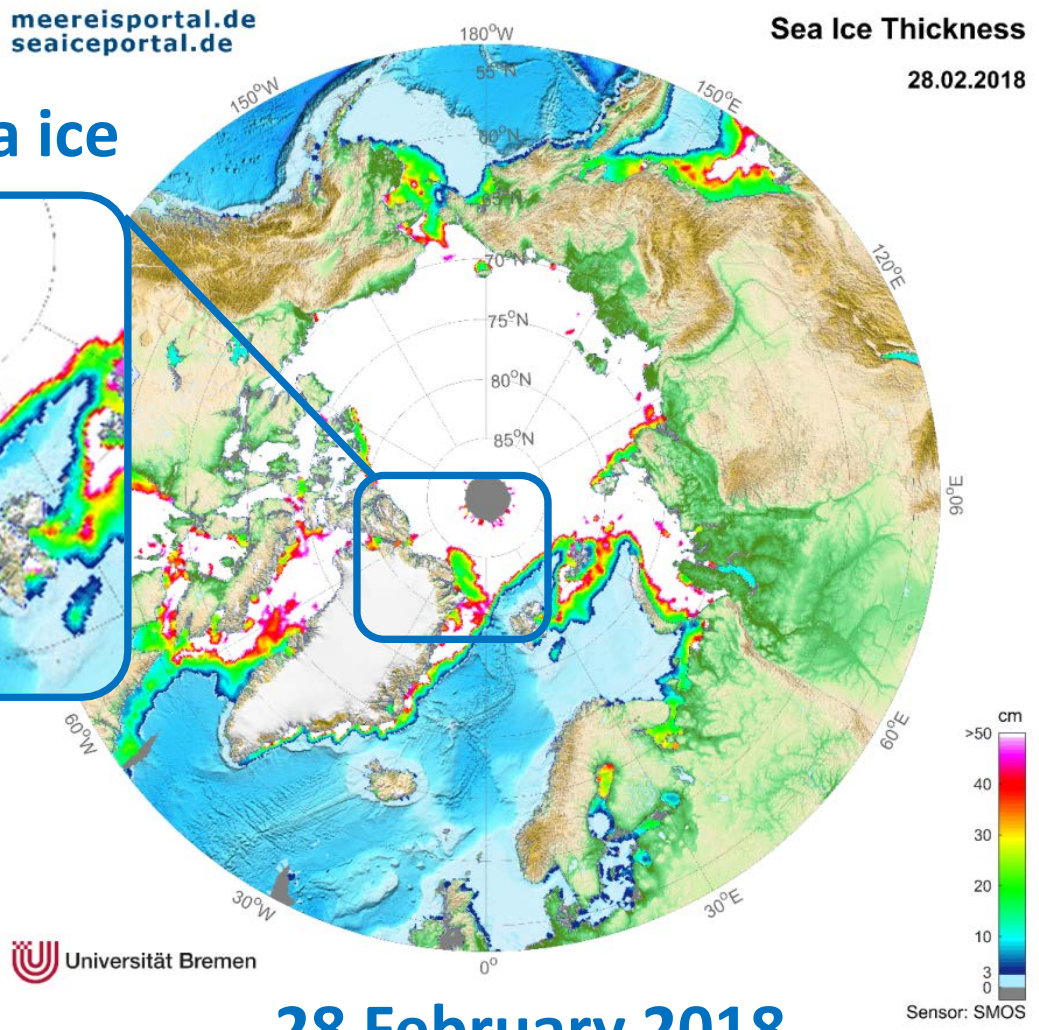
Sentinel-5P 20 February 2018

SMOS: Sea Ice Thickness



Opening of sea ice





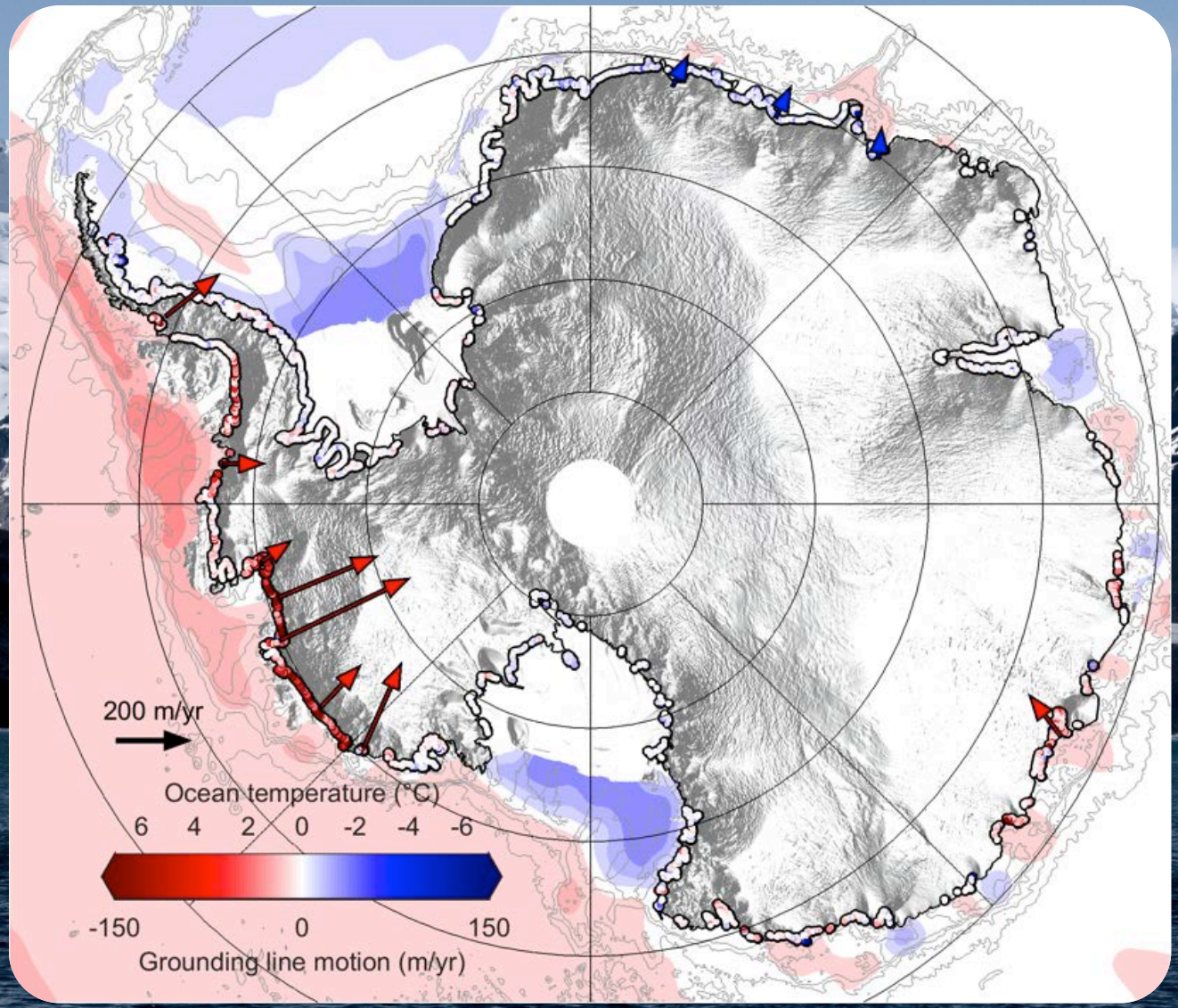
28 January 2018

28 February 2018

Glacier Decline

Cryosat – 2018

Cryosat: Land Ice Melting



Shifting Grounding Lines

Based on CryoSat data over six years (2010 – 2016)

New Meteorological Systems

MTG

- MTG-I CDR remains on schedule to start Q4/2018
- Stable FAR predictions:
  - MTG-I-1 Dec. 2020
  - MTG-S-1 Aug. 2022

MetOp-SG

- Cycle of Platform lower level / equipment CDRs is nearing completion
- Satellite A launch date in Q4 2022
- Satellite B schedule remains Dec. 2022

Climate Change Initiative Extension – CCI+

New CCI subscriptions at CM-16

83M€ for 2017-2024 period

ITTs for CMUG, new R&D on existing ECVs and Knowledge Exchange released in Q1 2018

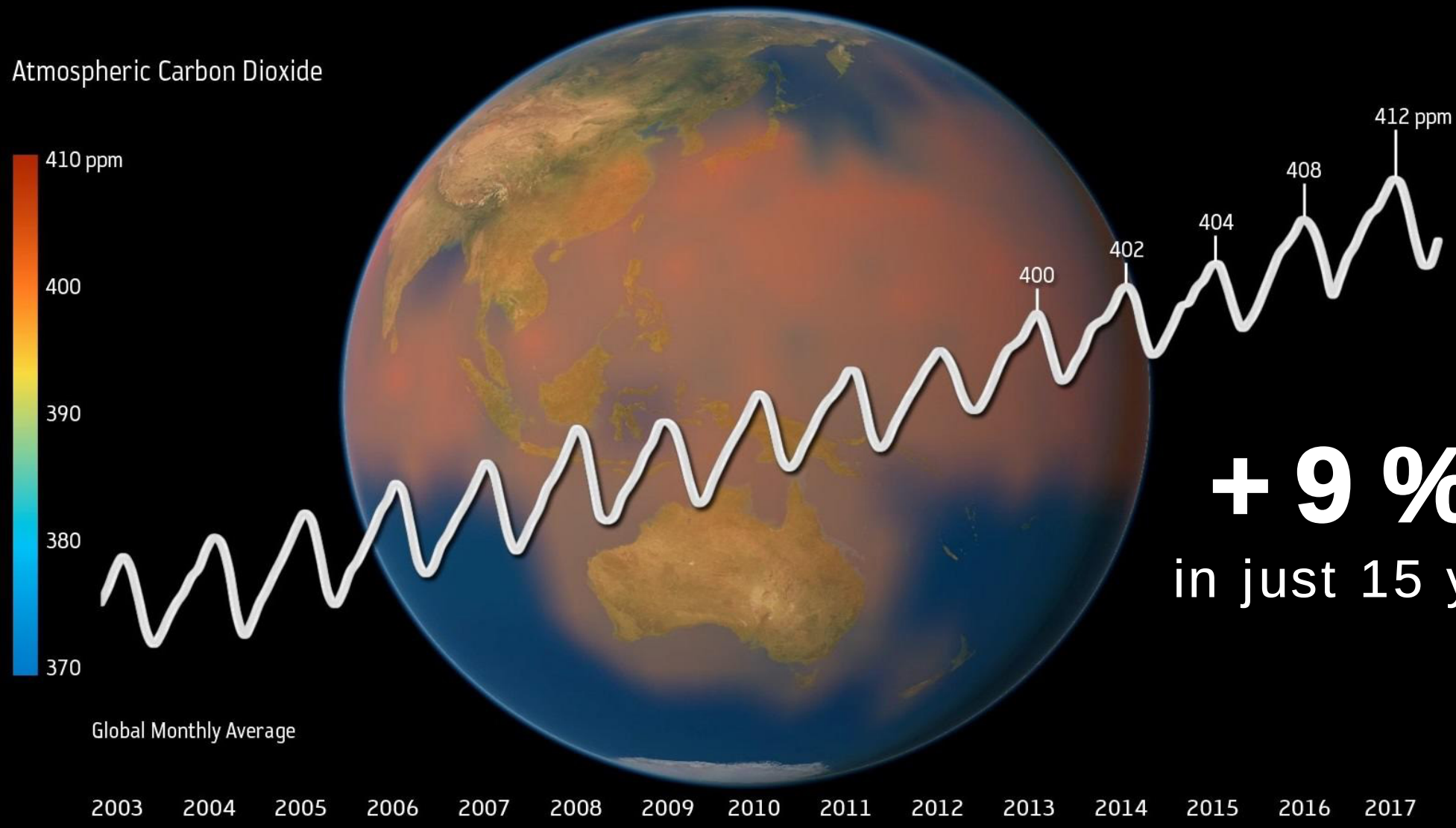
Aerosol, Cloud, CO2 & CH4, Ozone, SST, Ocean Colour, Sea Level, Sea Ice, Glaciers, Ice Sheets, Land Cover, Fire, Soil Moisture

Ground Biomass, Permafrost, Land Surface Temperature, Water Vapour

Knowledge Exchange

Cross-ECV Scientific Exploitation

Atmospheric Carbon Dioxide (ECV)



+9 % ppm

in just 15 years time

living planet symposium

MILAN
13–17 May
2019

UNDERSTANDING THE EARTH SYSTEM

SPACE 4.0 AND EARTH OBSERVATION

BENEFITS FOR A RESILIENT SOCIETY

PUBLIC AND PRIVATE SECTOR INTERACTIONS

Deadlines

Session Proposals	Abstracts	Registration	
17 June 2018	11 November 2018	April 2019	lps19.esa.int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Thank you for your attention!
www.esa.int
European Space Agency