

Smoke Gets in your Skies



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Pint of Science

22 May 2019

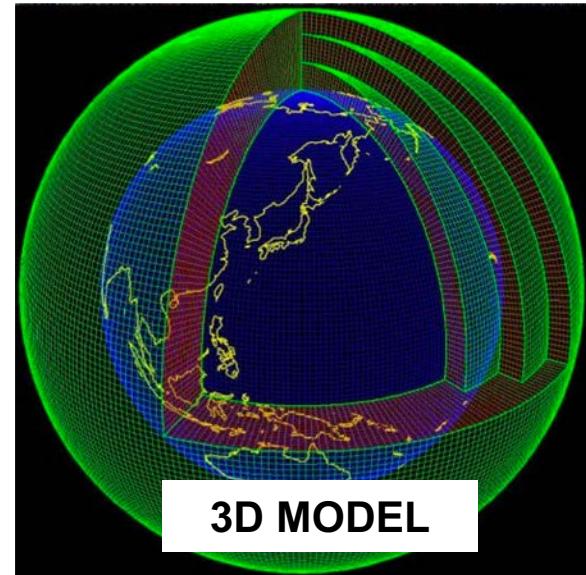
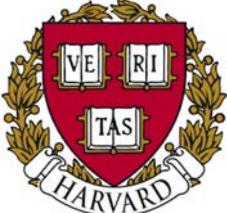
Research Group



Research Tools



Collaborators



Satellite Images



© 2018 Google

Clarendon Park



Google Earth

Spectrometers in the Lab



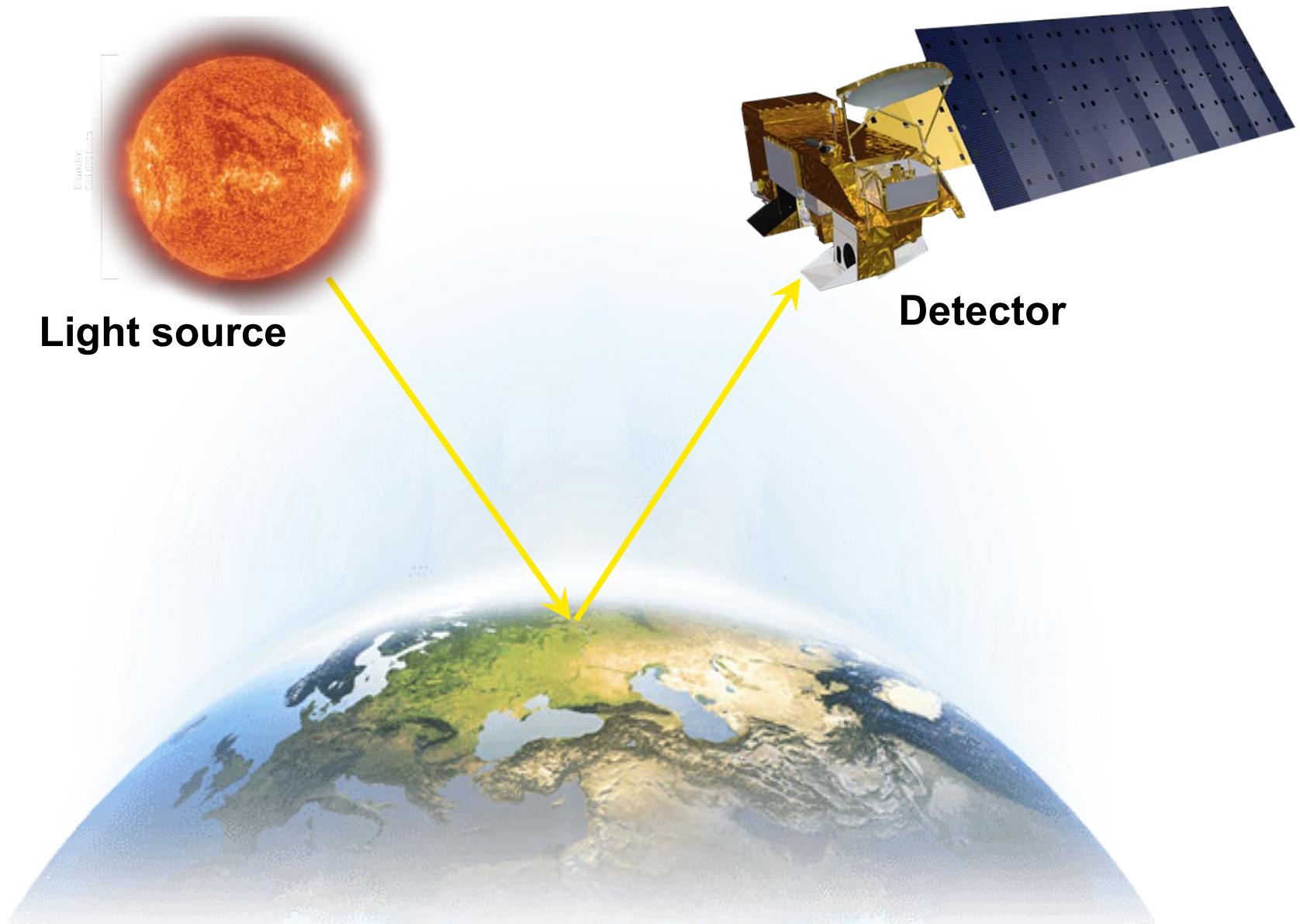
Spectrometers in Space



Spectrometers in Space



Spectrometers in Space



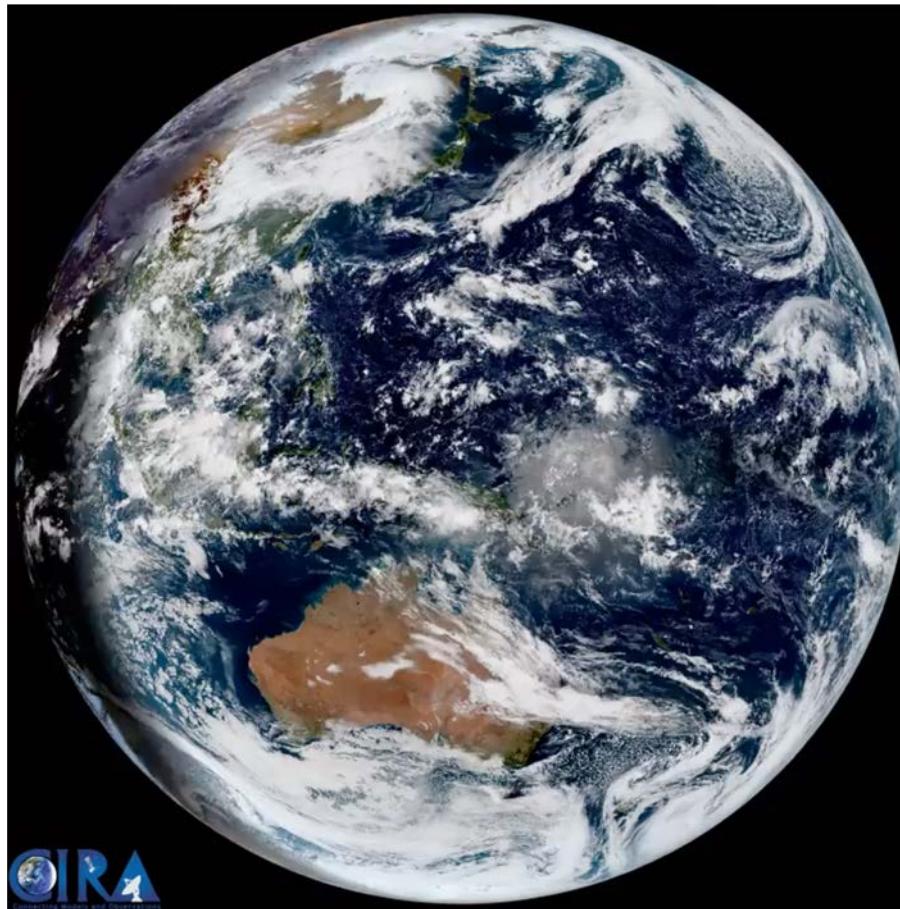
Spectrometers in Space

Low-Earth Orbiting Satellites

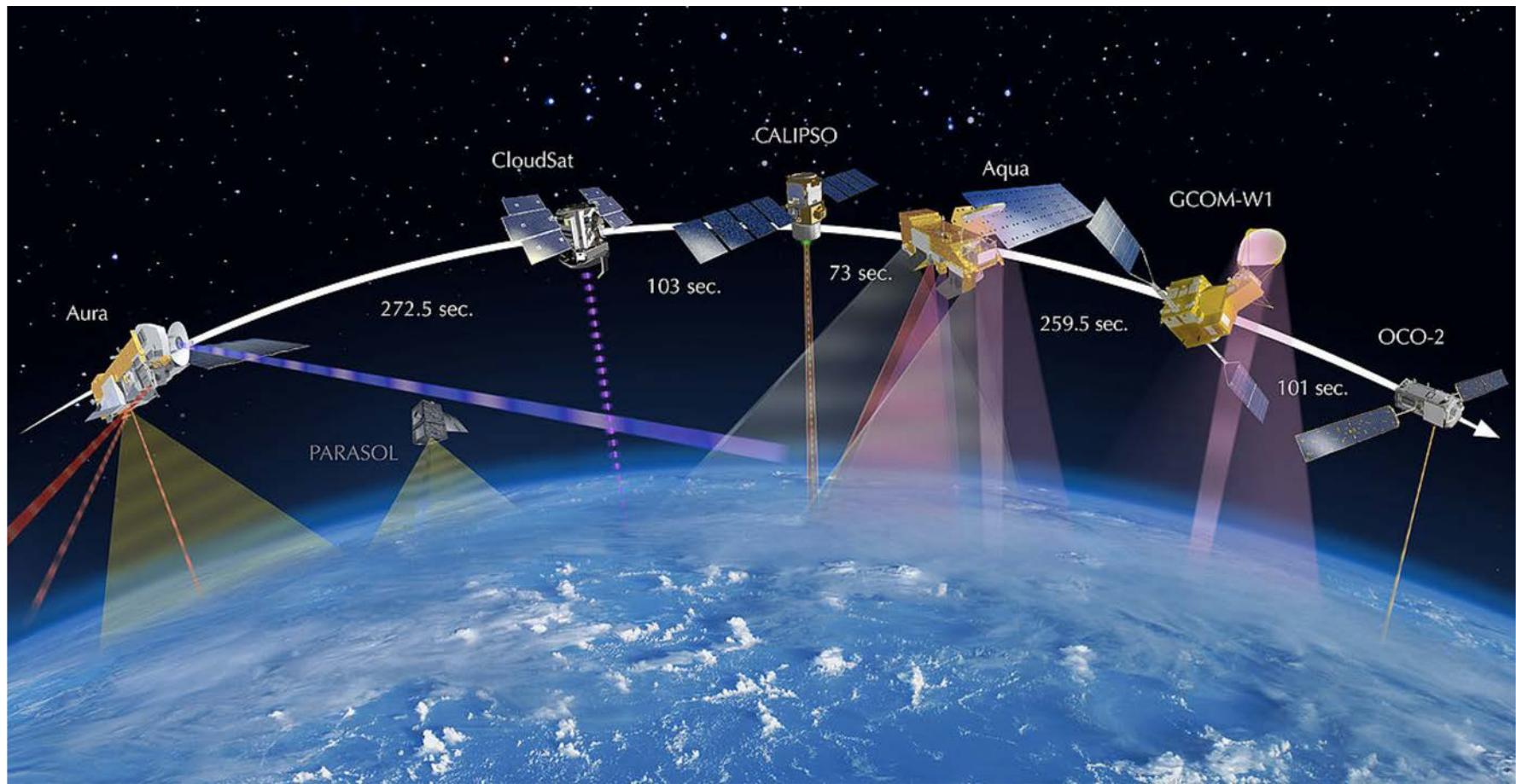


Spectrometers in Space

Geostationary Satellites



NASA Afternoon-Train (A-Train)



ESA Earth Observation Platforms

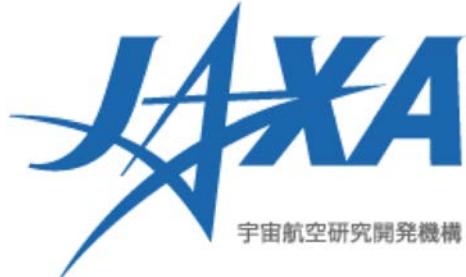
→ THE ESA EARTH OBSERVATION PROGRAMME



The Rest of the World

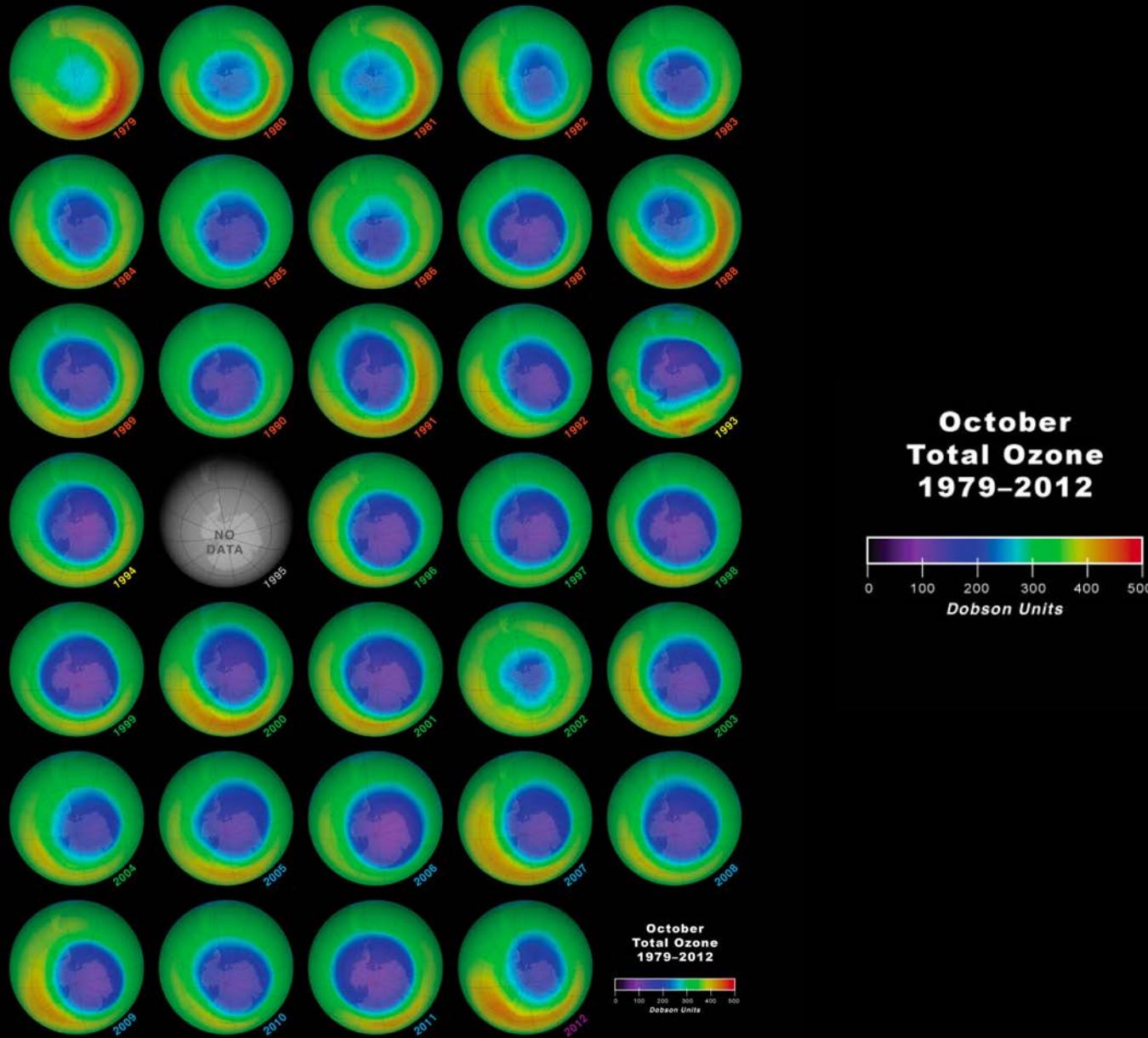


空へ挑み、宇宙を拓く

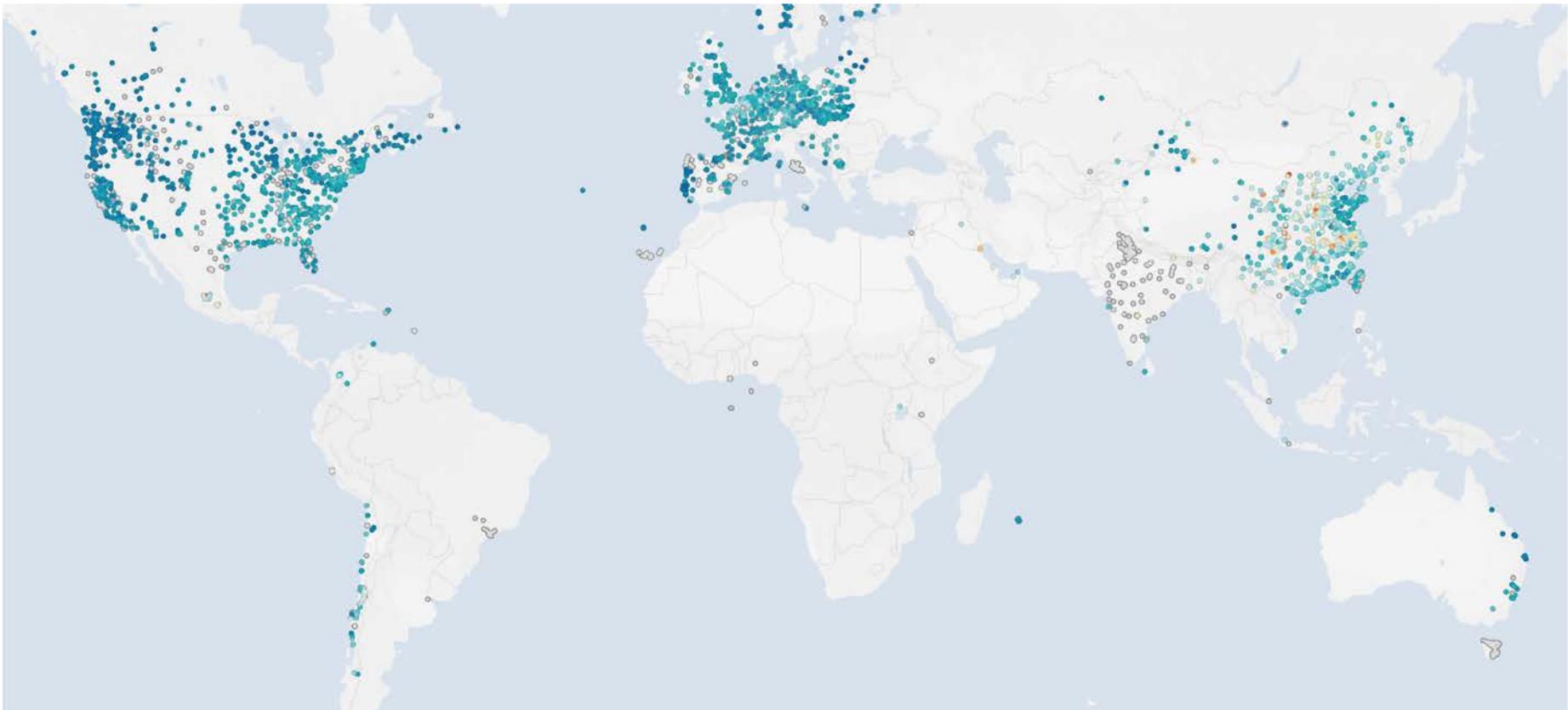


**Space-based observations have
contributed to understanding the
Earth system**

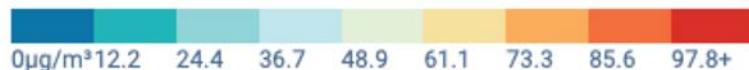
The hole in the ozone layer



Air Pollution



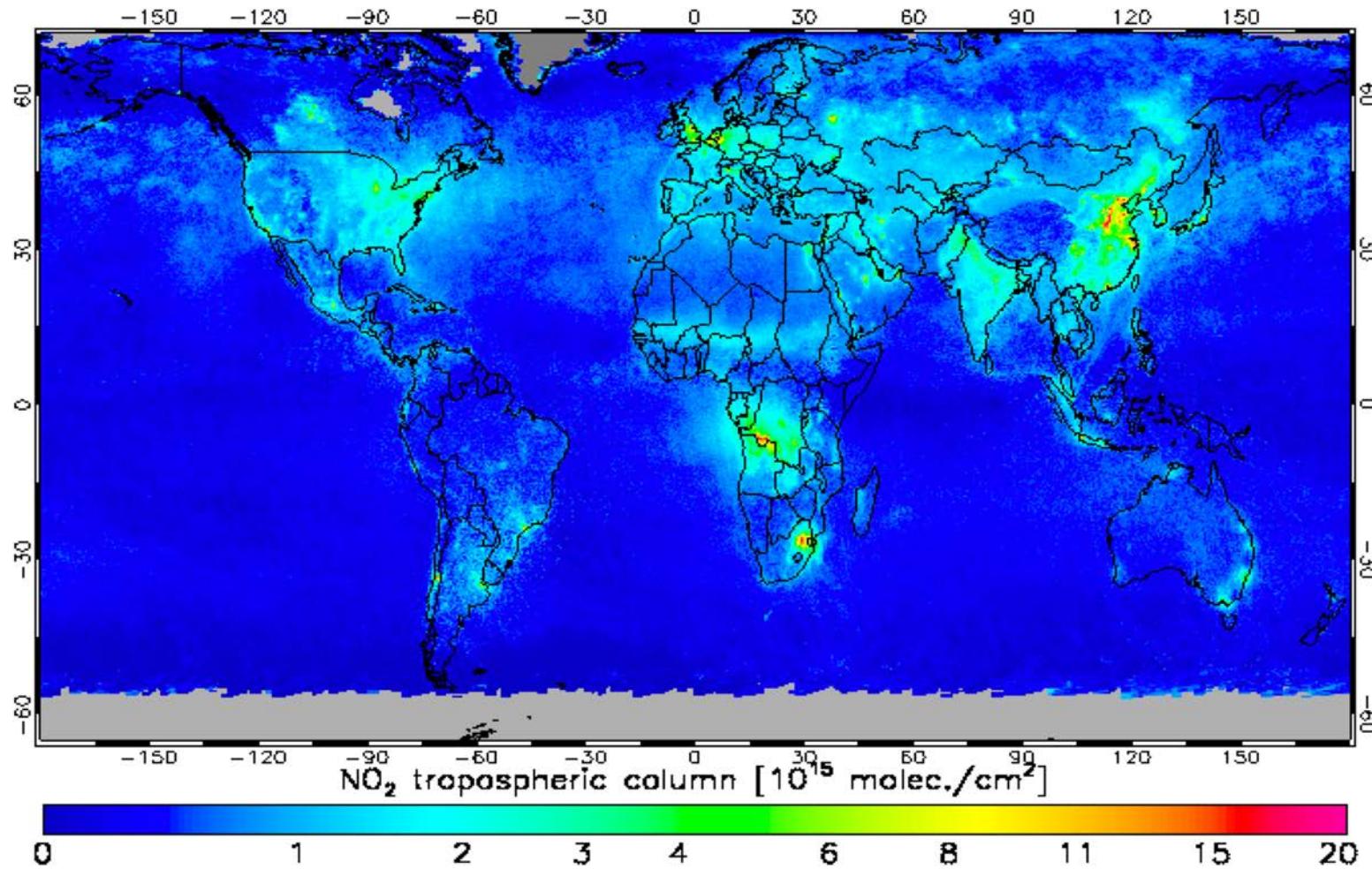
Showing the most recent values for **PM2.5** ▾



[Data Disclaimer](#) and [More Information](#)

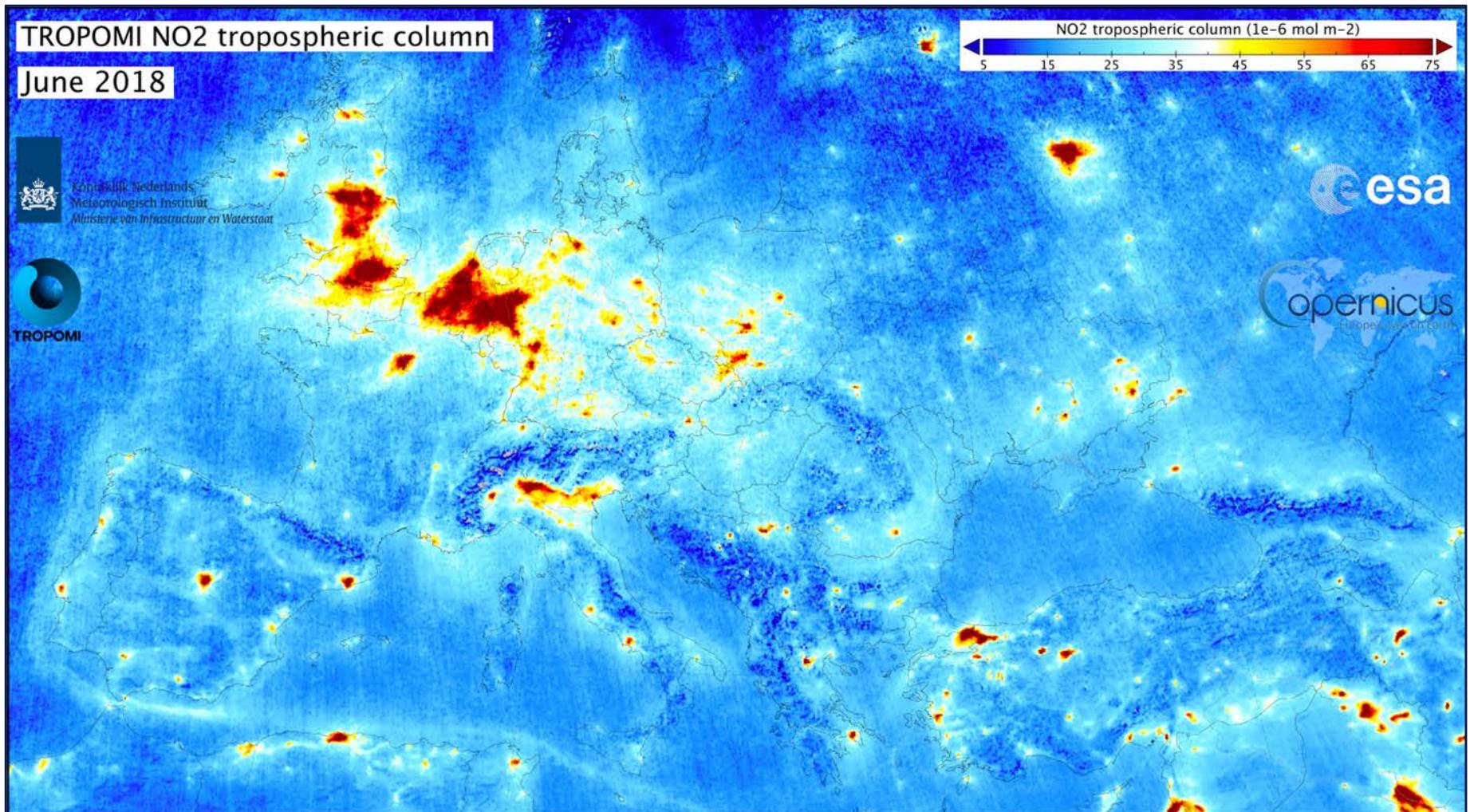
[OpenAQ, Accessed 17 May 2019]

Air Pollution



Nitrogen dioxide (NO₂) in June 2008
(KNMI/NASA OMI sensor)

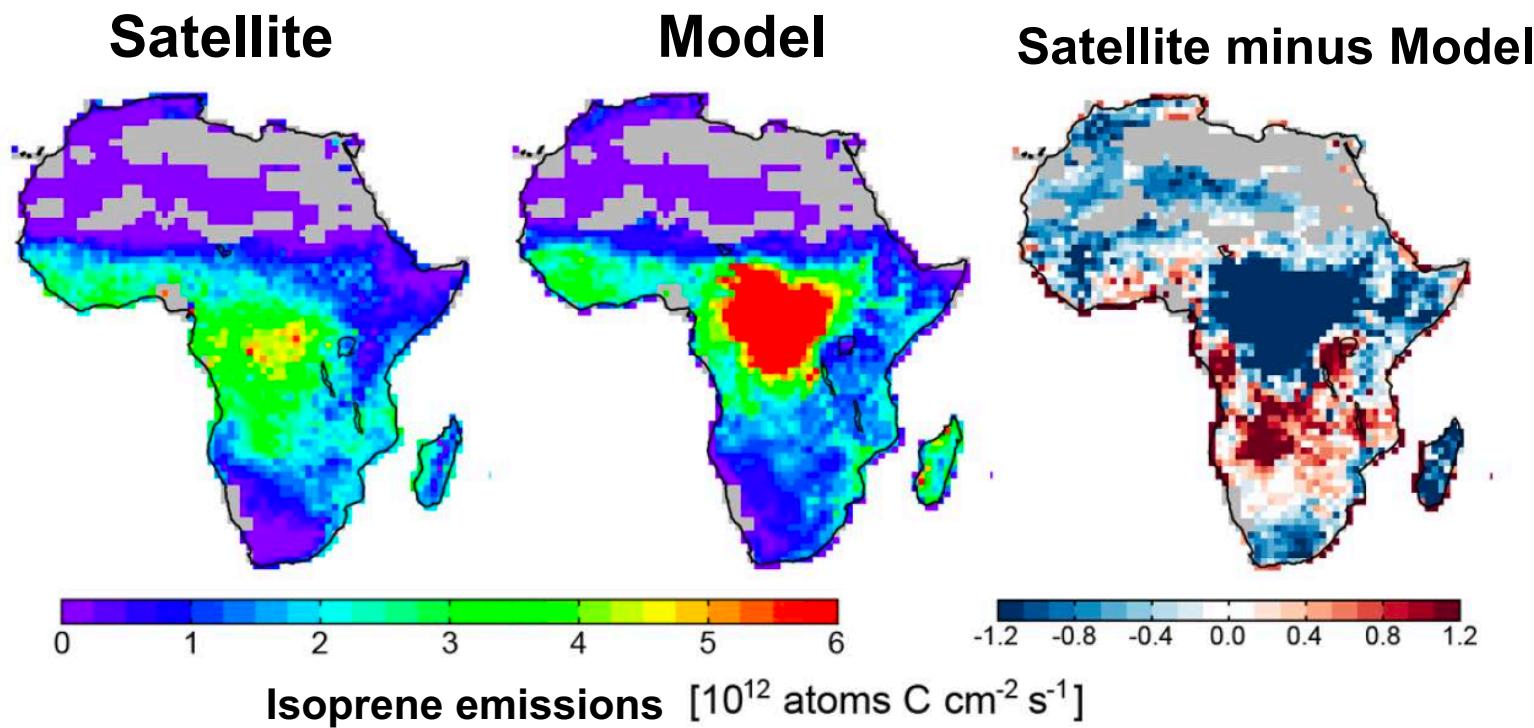
Air Pollution over Europe



**Nitrogen dioxide (NO₂) in June 2018
(ESA TROPOMI sensor)**

Air Quality in Africa

Map pollution sources from satellites and compare to state-of-art models

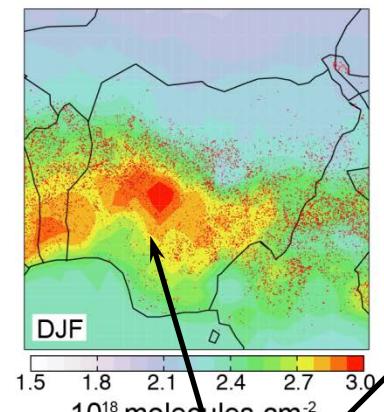


Air Quality in Africa

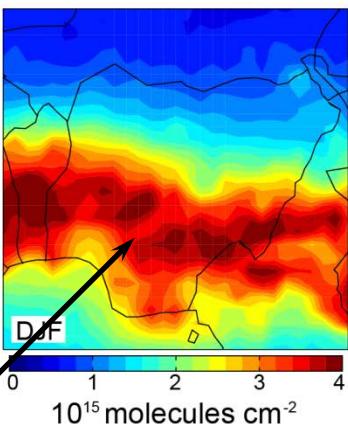
Identify sources that contribute to severe ozone pollution in Nigeria

Seasonal open fires

CO + fires

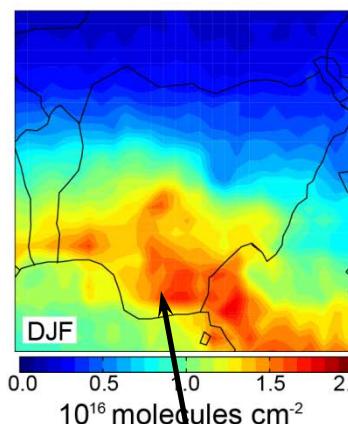


NO_2

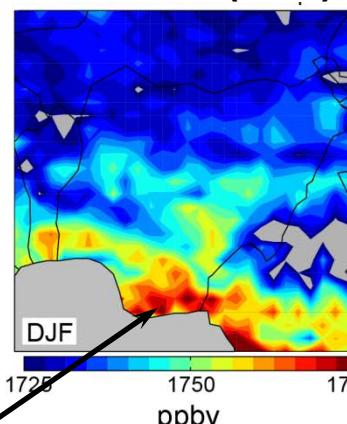


Anthropogenic Volatile Organic Compounds

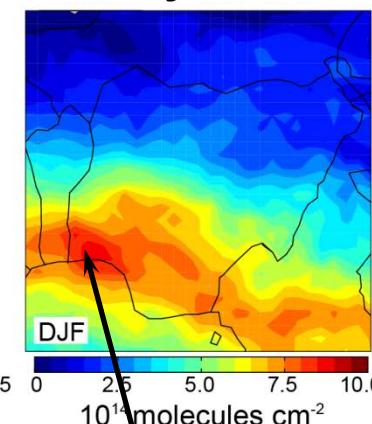
HCHO



Methane (CH_4)



Glyoxal



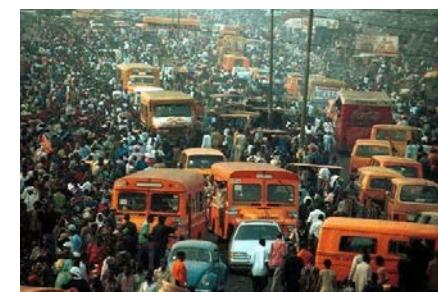
Open fires



Oil and Gas Industry



Traffic congestion



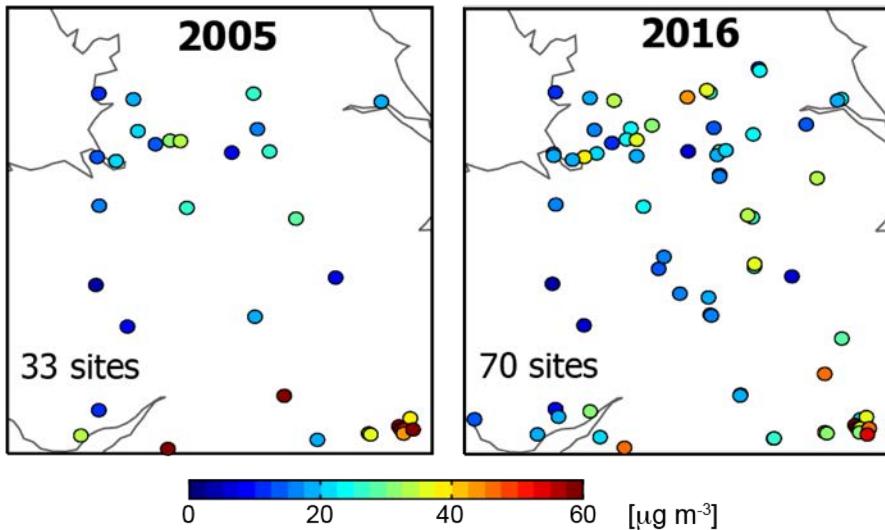
Ad-hoc oil refining

Gas Flares

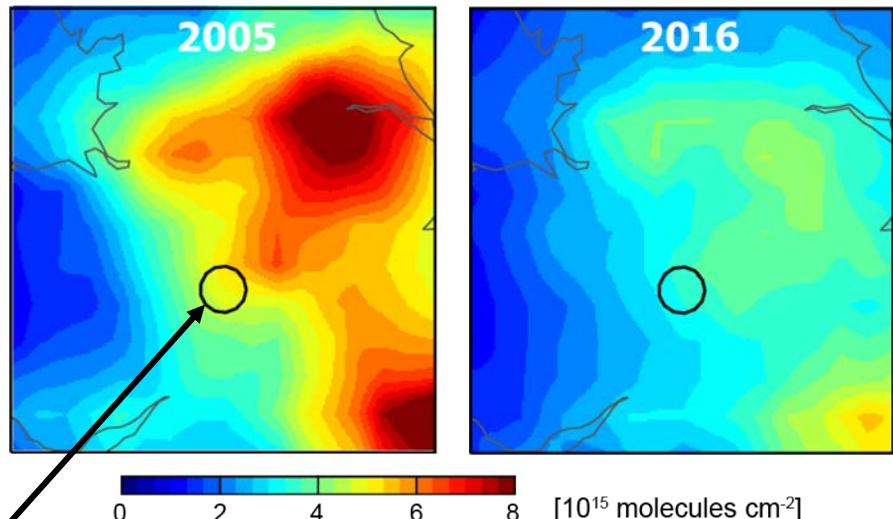
Tools to Monitor Air Quality

NO₂ is hazardous to health

DEFRA (surface) NO₂



Aura OMI (EO) NO₂



Birmingham: 3% per year decline in NO₂

Politicizing Earth Observations

News

Trump administration proposes 'privatising' International Space Station



Nasa is currently considering whether life of the International Space Station can be extended to 2028 CREDIT: NASA

By Rob Crilly, NEW YORK
11 FEBRUARY 2018 • 7:02PM

IN DEPTH | CLIMATE CHANGE

NASA cancels carbon monitoring research program

Paul Voosen

* See all authors and affiliations

Science 11 May 2018;
Vol. 360, Issue 6389, pp. 586-587
DOI: 10.1126/science.360.6389.586

Article

Figures & Data

Info & Metrics

eLetters

PDF

Europe's space agency braces for Brexit fallout

January 17, 2018 by Mariette Le Roux



The European Space Agency's Earth's changing land

Eyes in the sky: Cutting NASA Earth observations would be a costly mistake

December 1, 2016 1.56am GMT



NASA Earth Science Division operating missions, including systems managed by NOAA and USGS. NASA Earth Observing System

Europe Takes the Lead

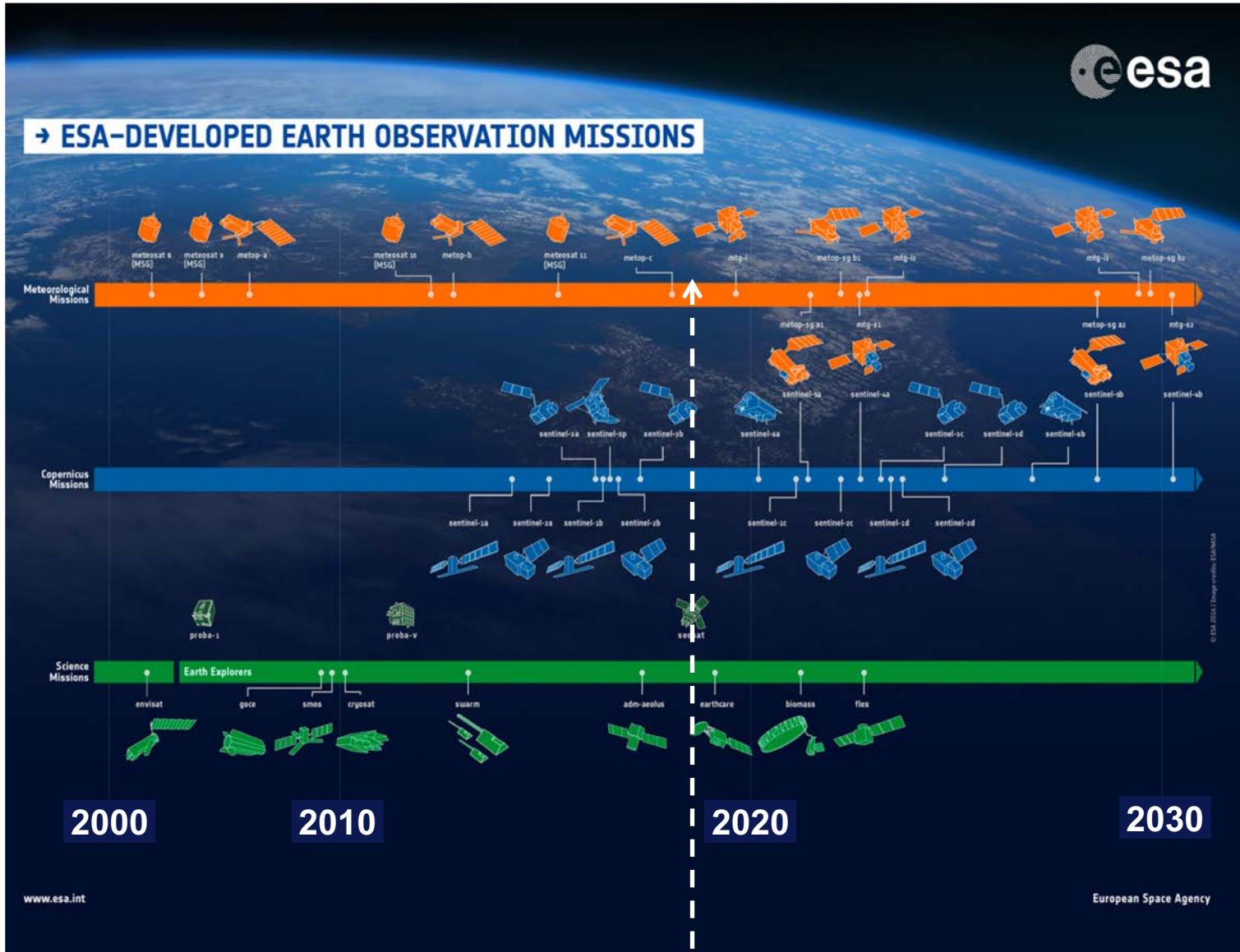
Op-ed | The golden age of European Earth observation

by Robbie Schingler and Agnieszka Łukaszczuk — November 6, 2017



An image of Paris taken by a SkySat satellite, operated by Planet, in August 2017. Credit: Planet

Europe Takes the Lead



2019