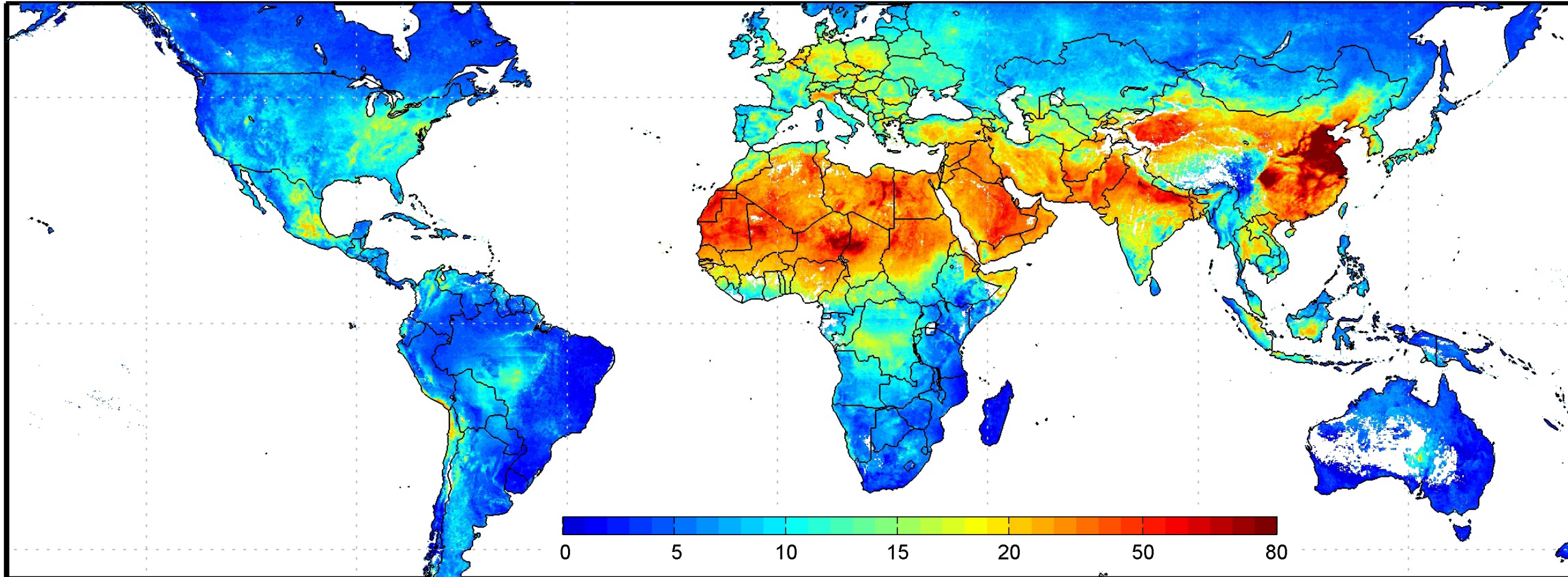# Session 2: **Global applications of satellite-derived air quality data**

Global information about ambient PM$_{2.5}$ made possible with satellite products of aerosol optical depth
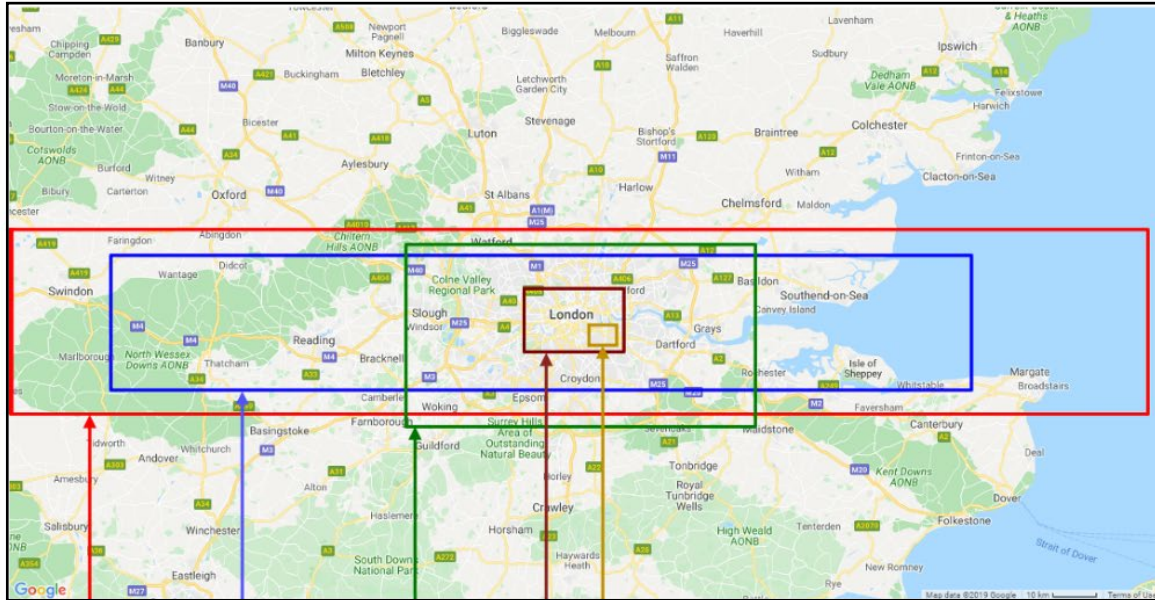

[**Image source**: Van Donkelaar et al., 2010]

April 29, 2022

Session 2: **Global applications of satellite-derived air quality data**

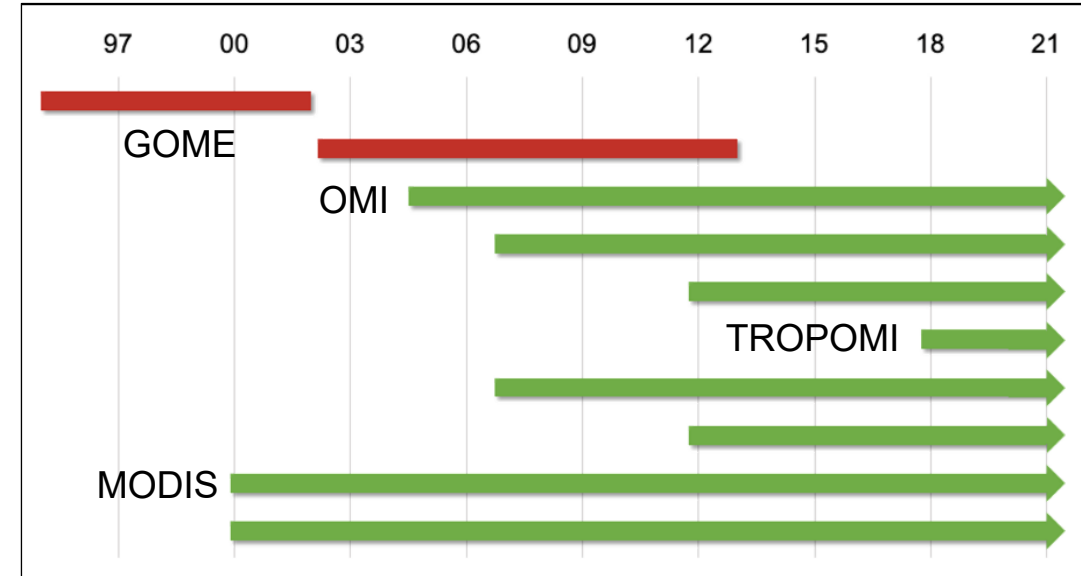Progressed from broad regional (>100 km) to urban and borough/suburb (<10 km) scales

Individual instruments provide long (10+ years) and consistent records

TROPOMI (3.5 km x 5.5 km, 2017-present)

OMI (24 km x 13 km, 2004-present)

GOME-2 (80 km x 40 km, 2007-present)

SCIAMACHY (200 km x 30 km, 2002-2012)

GOME (320 km x 40 km, 1995-2001)

Data at a range of user capabilities are increasingly **open access**

[**Images source**: K. Vohra, PhD thesis, University of Birmingham, 2021]

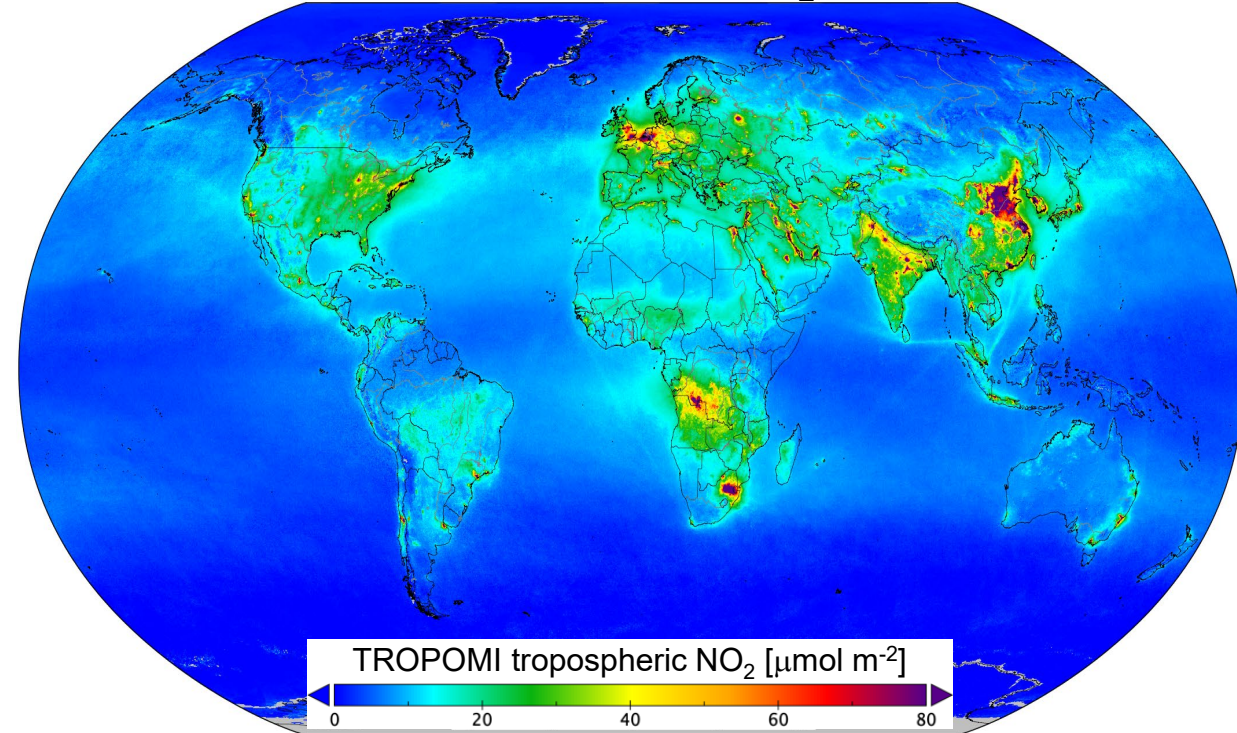# Session 2: **Global applications of satellite-derived air quality data**

Addresses monitoring gaps and data access and quality issues of surface networks

Surface networks of reference and low-cost PM$_{2.5}$ monitors
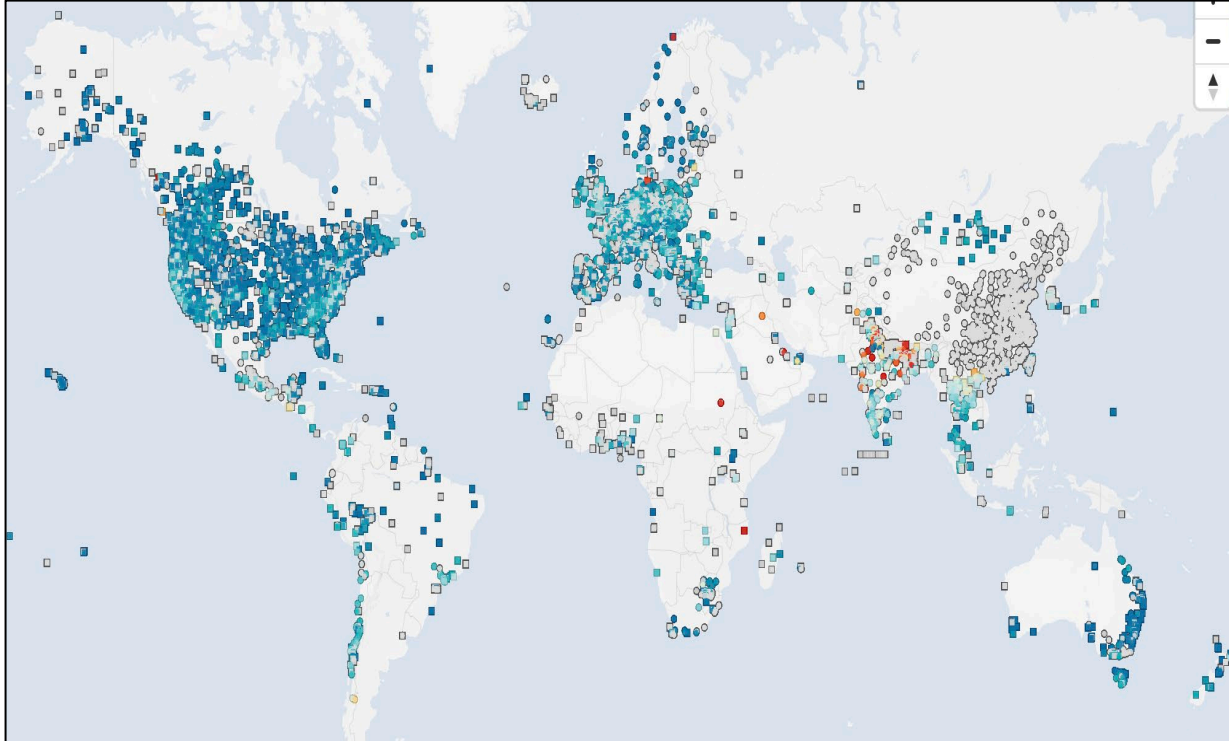
[**Image source**: OpenAQ.org, accessed 26 April 2022]

Space-based observations of NO$_2$ (Apr-Sep 2018)

TROPOMI tropospheric NO$_2$ [μmol m^{-2}]

[**Image source**: www.esa.int, accessed 28 April 2022]

Combine with surface observations, models, statistical and gridding techniques to achieve finer scales and quantify air pollutant abundances, trends and sources, and impacts on global health

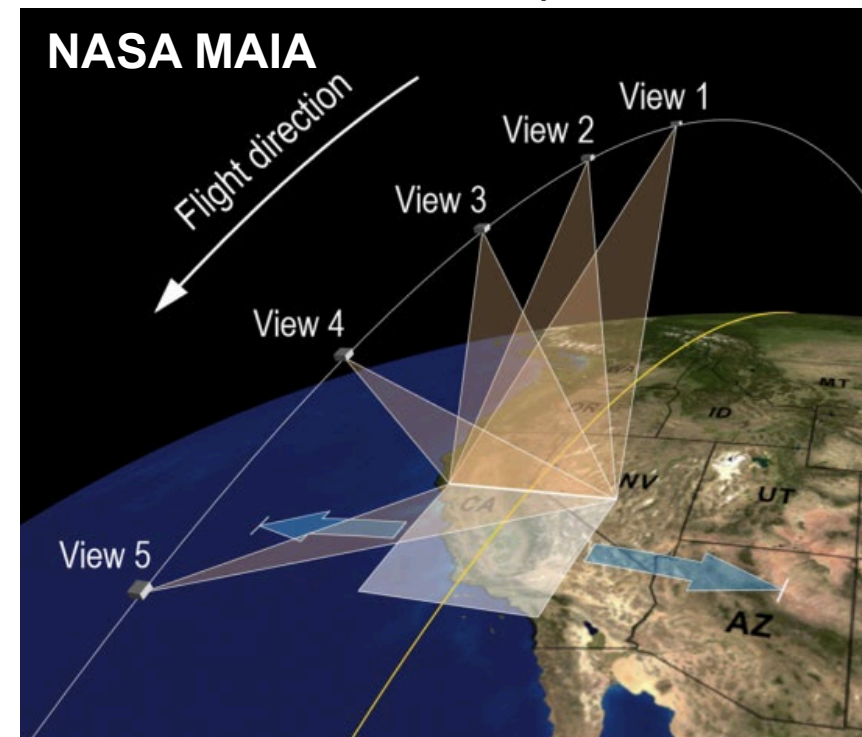# Session 2: **Global applications of satellite-derived air quality data**

The future is bright: Geostationary instruments with hourly observations during daylight hours and satellite missions designed with air quality and health communities

Future constellations of low-Earth and geostationary orbiting satellites
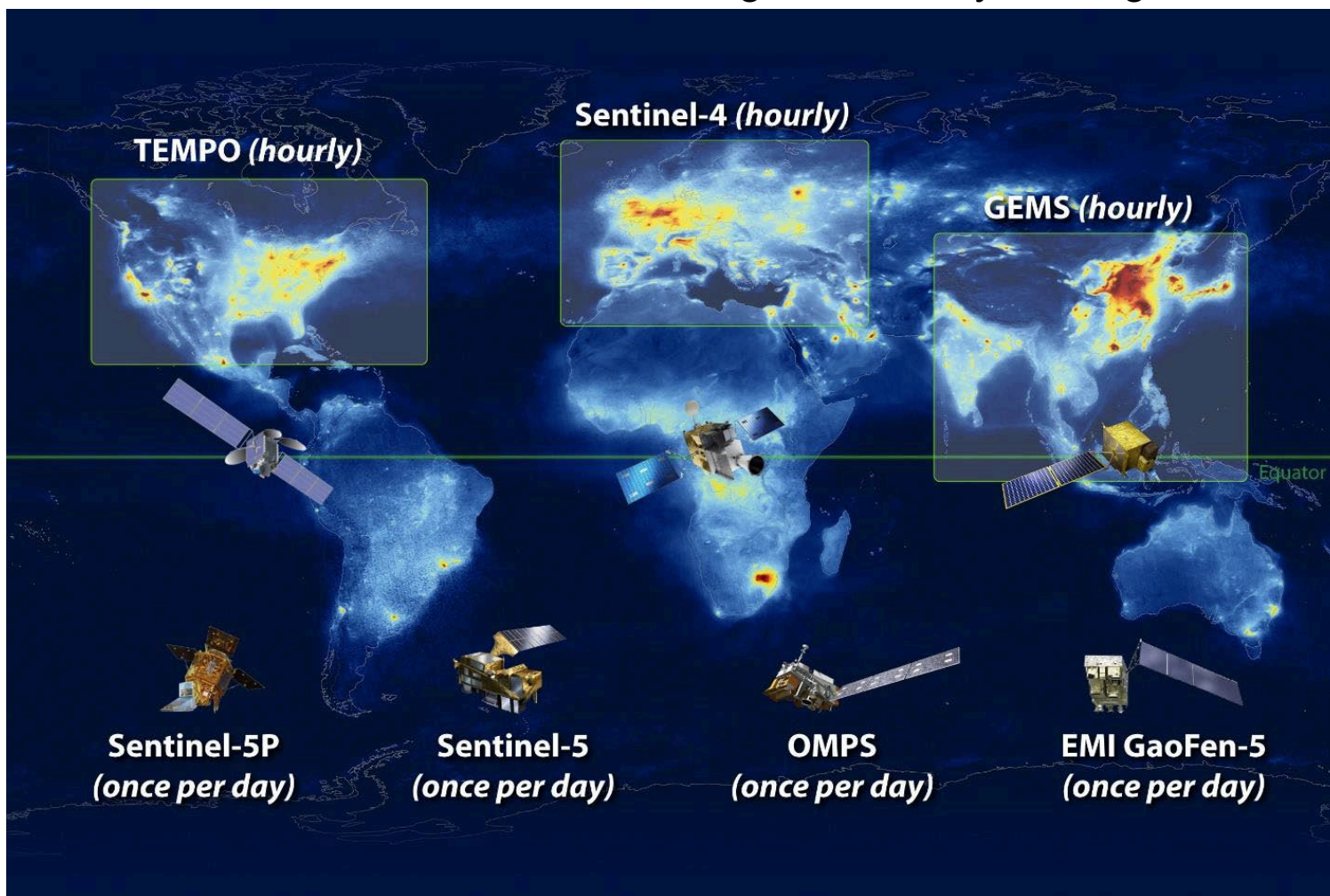
[**Image source**: ceos.org, accessed 28 April 2022]

Missions tailored to needs of air quality and health experts

[**Image source**: Liu and Diner, 2017]

Session 2: **Global applications of satellite-derived air quality data**

Examples of application to air quality and health from around the world at various stages of uptake
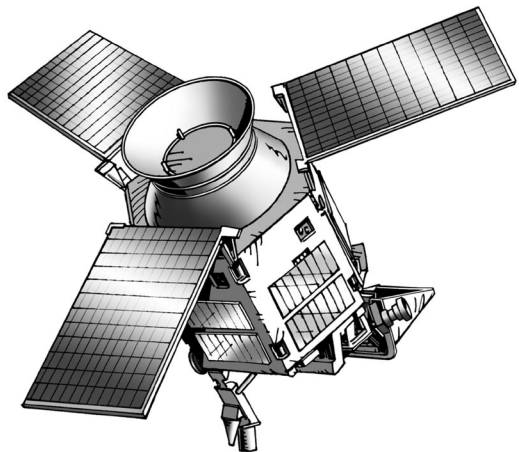
Satellite data for air quality exposure assessment and epidemiology

Yuming Guo
Monash University

Representativeness and usefulness of satellite and ground-based data for monitoring air quality

Aaron van Donkelaar
Washington U. in St. Louis

Sagnik Dey
IIT – Delhi, **India**

Laura A. Rodriguez
UIS, **Colombia**
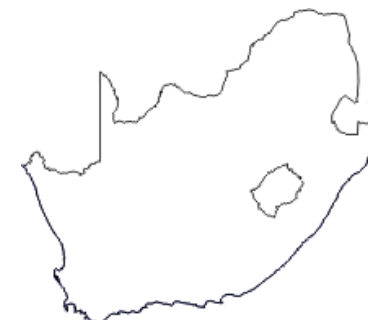
Rebecca Garland
U. Pretoria, **South Africa**