

EO for Urban Development

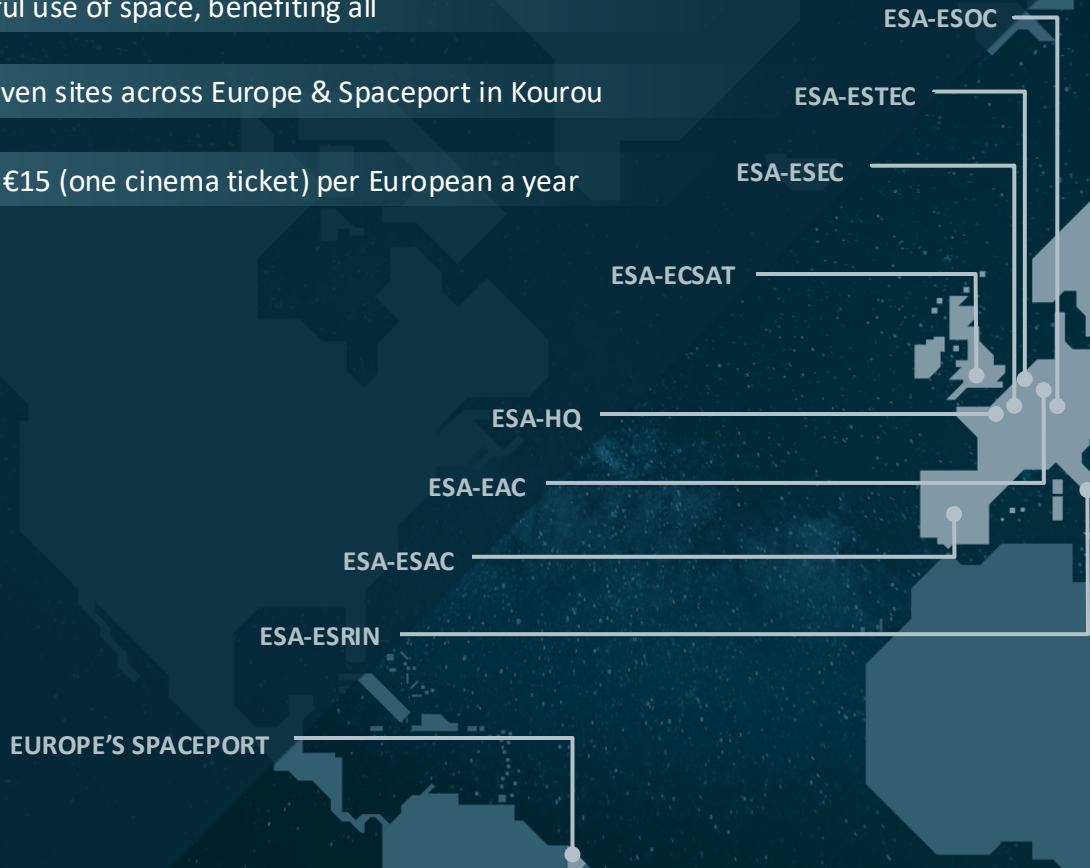
Alex Chunet (Earth Observation Applications Engineer at ESA)

WHO 23 Member States, 2500+ staff members and total workforce of 6000+

WHY For the peaceful use of space, benefiting all

WHERE HQ in Paris, seven sites across Europe & Spaceport in Kourou

BUDGET €8.26 billion = €15 (one cinema ticket) per European a year



Earth Observation at ESA

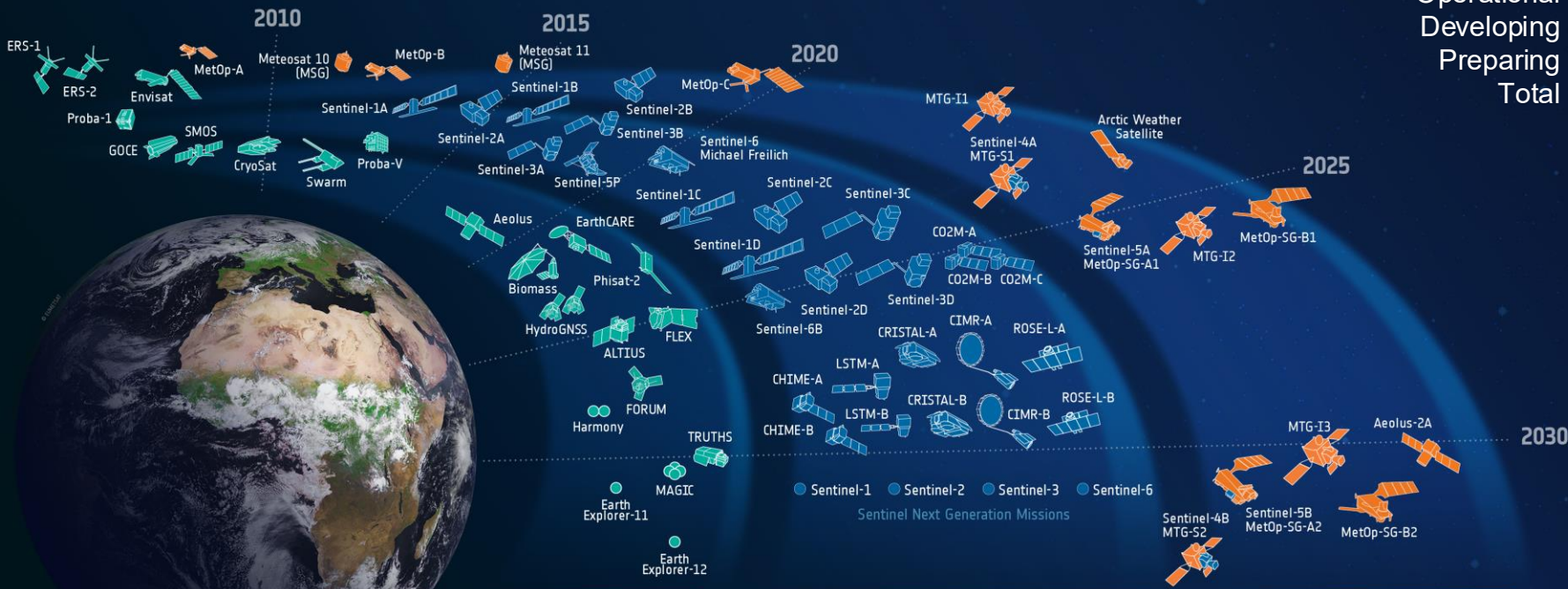


ESA's Earth Observation Missions

World-class Earth Observation systems developed with European and global partners to address scientific and societal challenges

Satellites

Heritage **08**
 Operational **16**
 Developing **40**
 Preparing **22**
 Total **86**



Science



Copernicus



Meteorology



Meteosat MTG-I1
18-19 March 2023



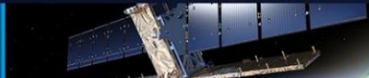
Earth Explorers: Putting Together the Puzzle Earth Since 2009



Copernicus Sentinels: Operational monitoring



PROGRAMME OF THE
EUROPEAN UNION



sentinel-1

→ RADAR VISION



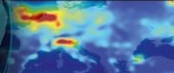
sentinel-2

→ COLOUR VISION



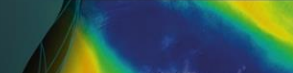
sentinel-3

→ A BIGGER PICTURE



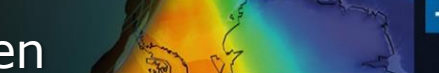
sentinel-4

→ EUROPEAN AIR MONITORING



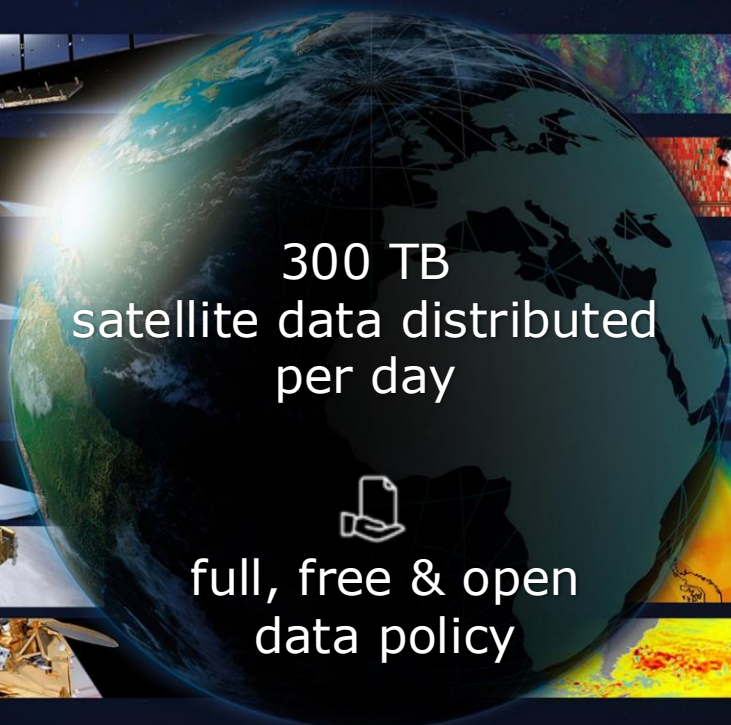
sentinel-5p | sentinel-5

→ GLOBAL AIR MONITORING



sentinel-6

→ SURFING THE SEAS



300 TB
satellite data distributed
per day



full, free & open
data policy



→ THE EUROPEAN SPACE AGENCY

All global landmass is observed every 5 days ...

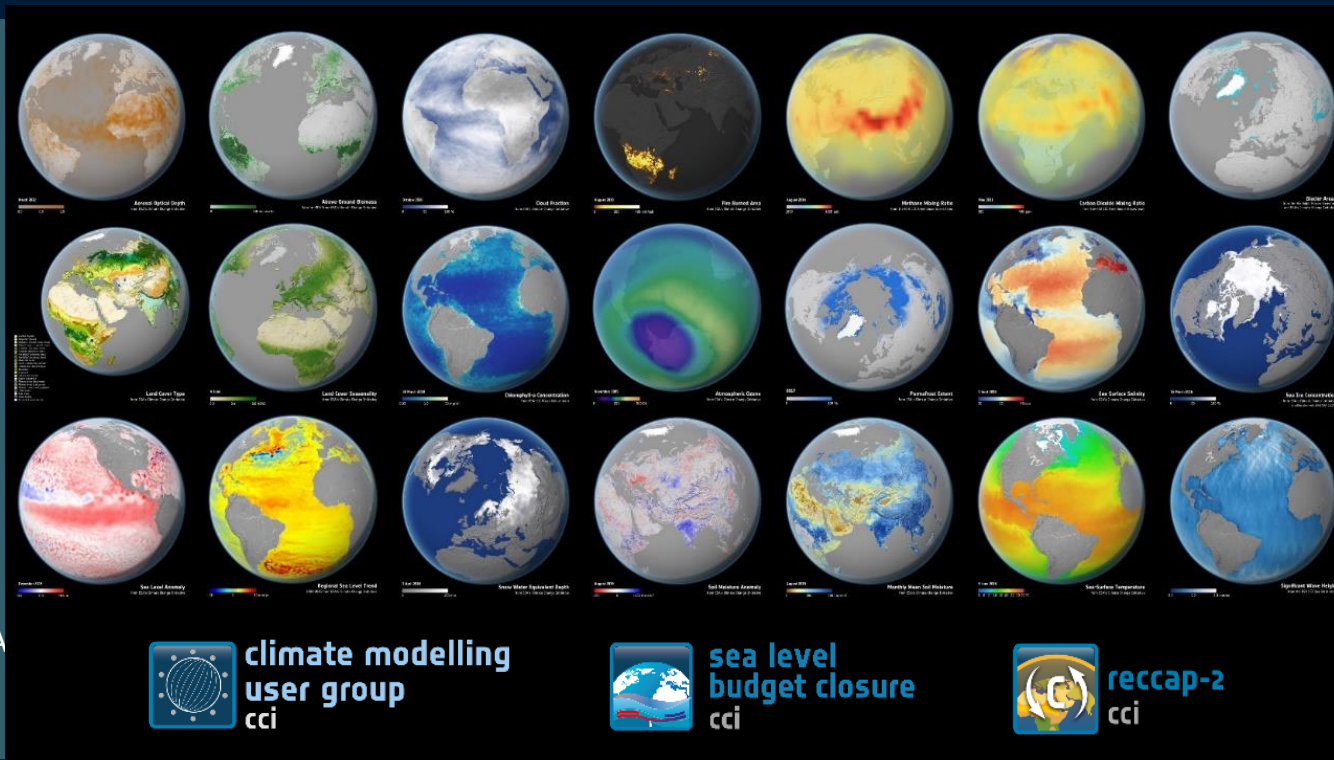


... at 10m resolution



ESA Climate Change Initiative: 21 Essential Climate Variables (ECV) Being Monitored

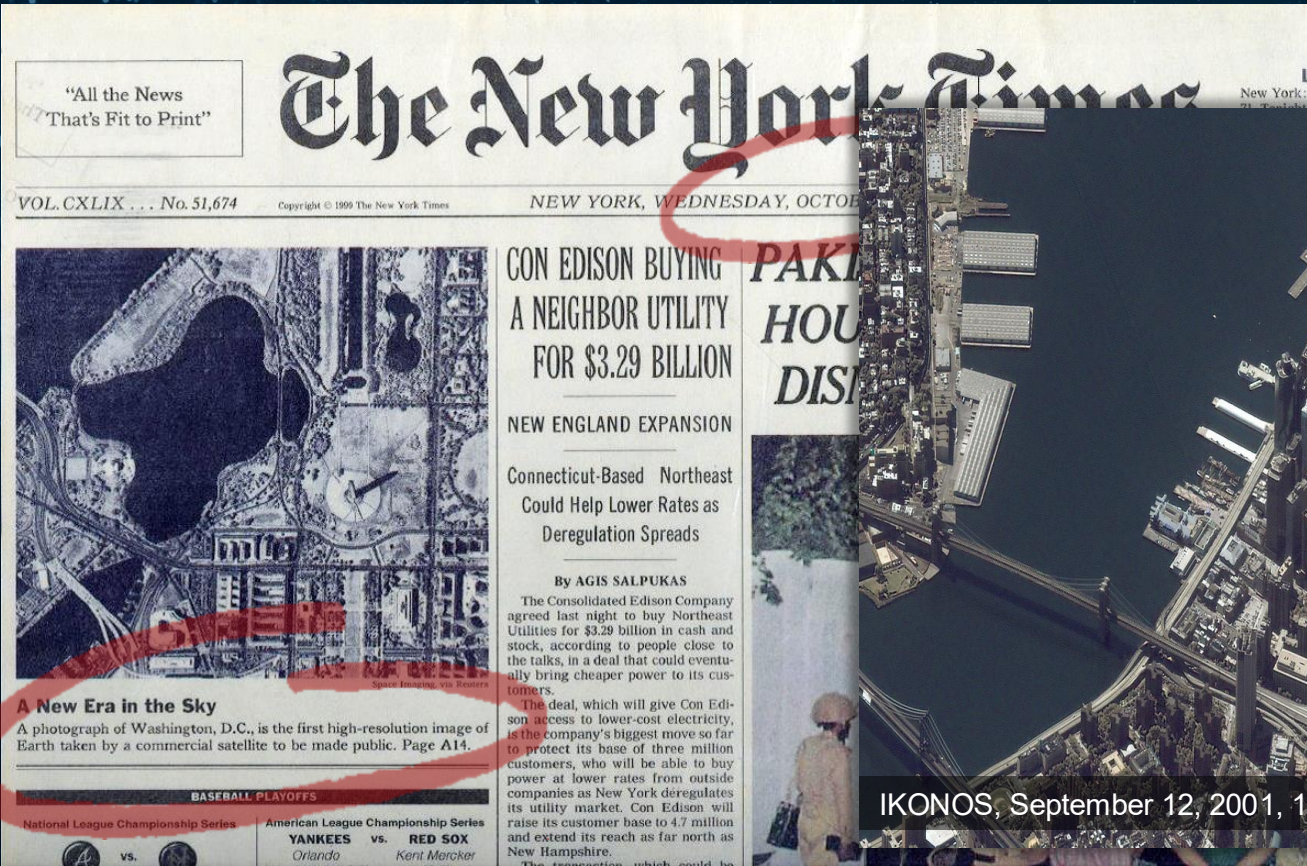
- CCI is a response to UNFCCC's need for **systematic global climate observation**
- ECV datasets provide **long-term empirical evidence** to predict & understand key parts of the climate
- 54 defined ECVs, 36 monitored from space, **21 under development** by ESA



Earth Observation and Urban Development



Urban Applications: The Resolution Revolution



IKONOS, September 12, 2001, 11:43 EDT

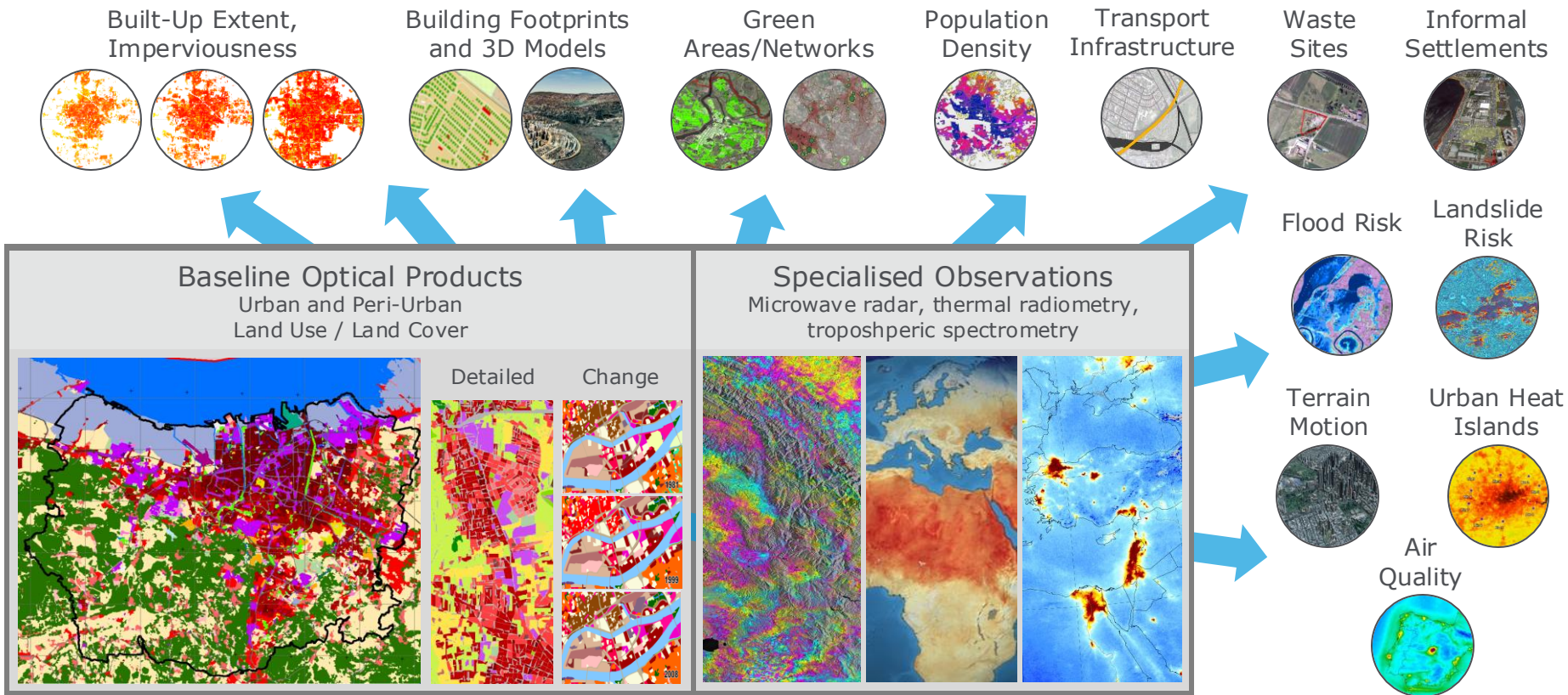
Urban Applications: The Resolution Revolution



Pléiades Neo, 5 November 2022



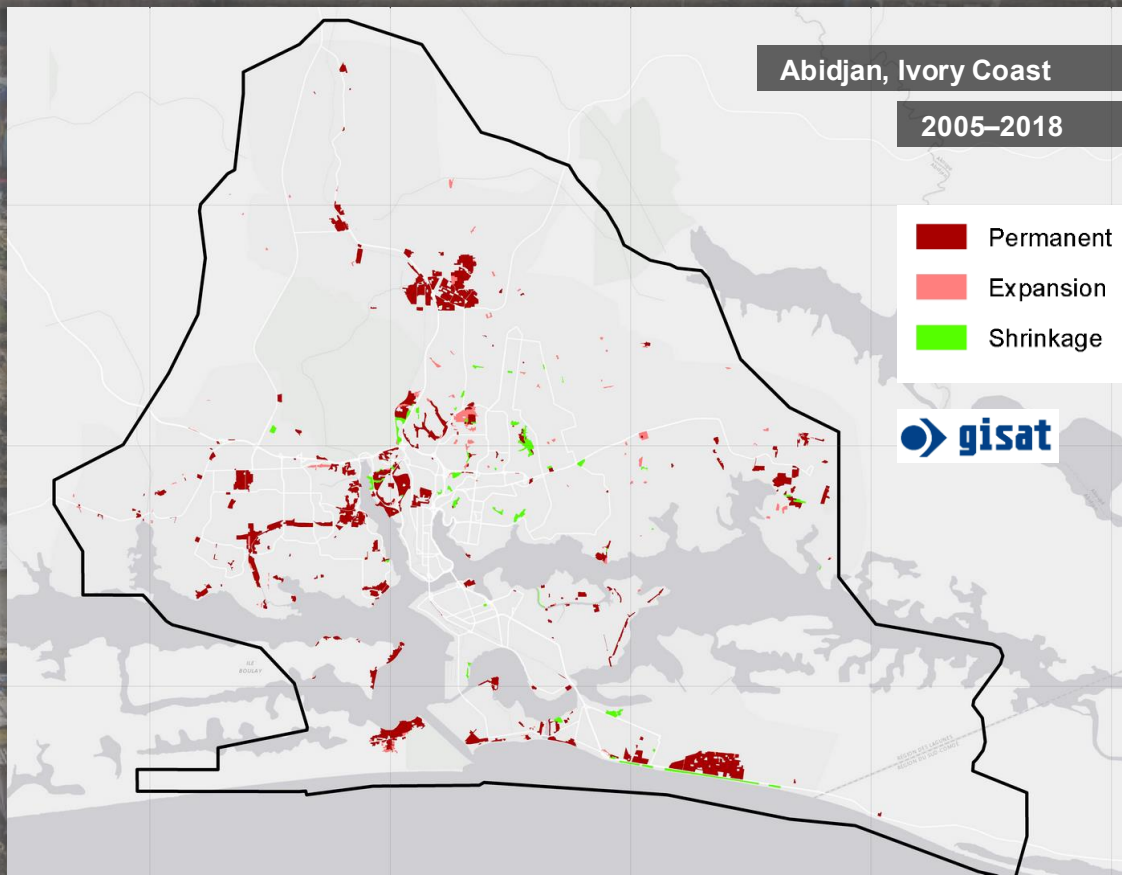
EO for Urban Development: Information Types



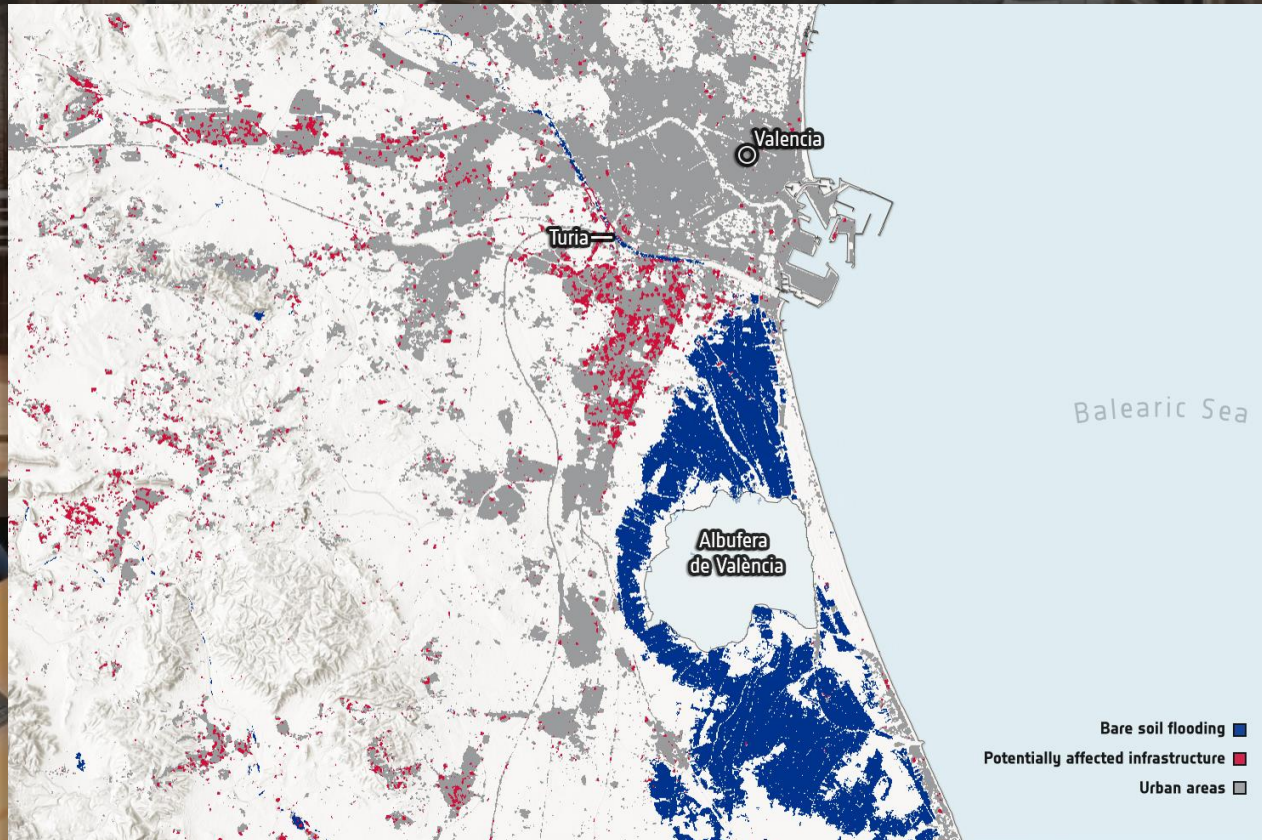
Monitoring and Understanding Urban Growth Dynamics



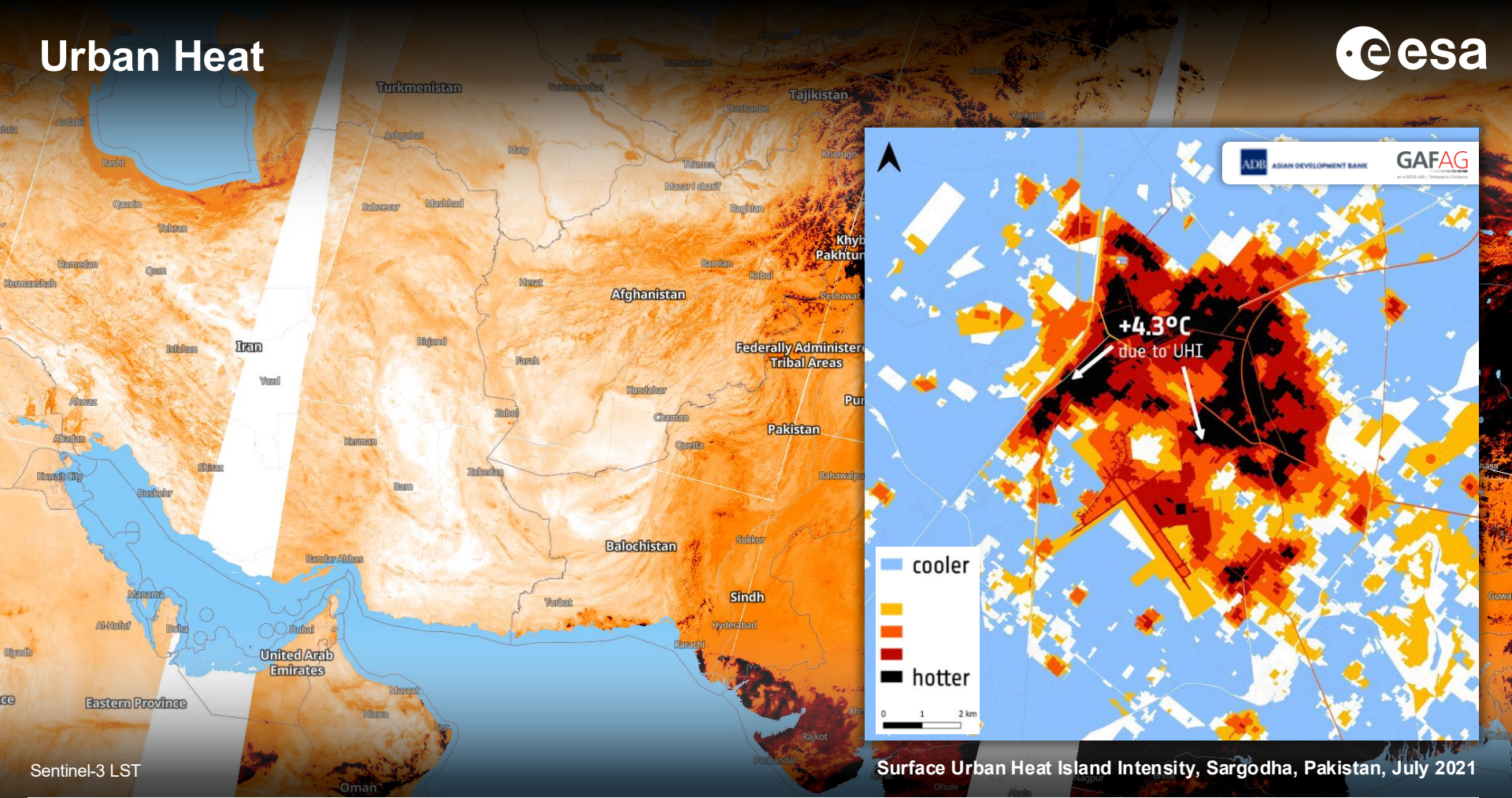
Land Use Change Monitoring Example: Informal Settlements



Urban Floods



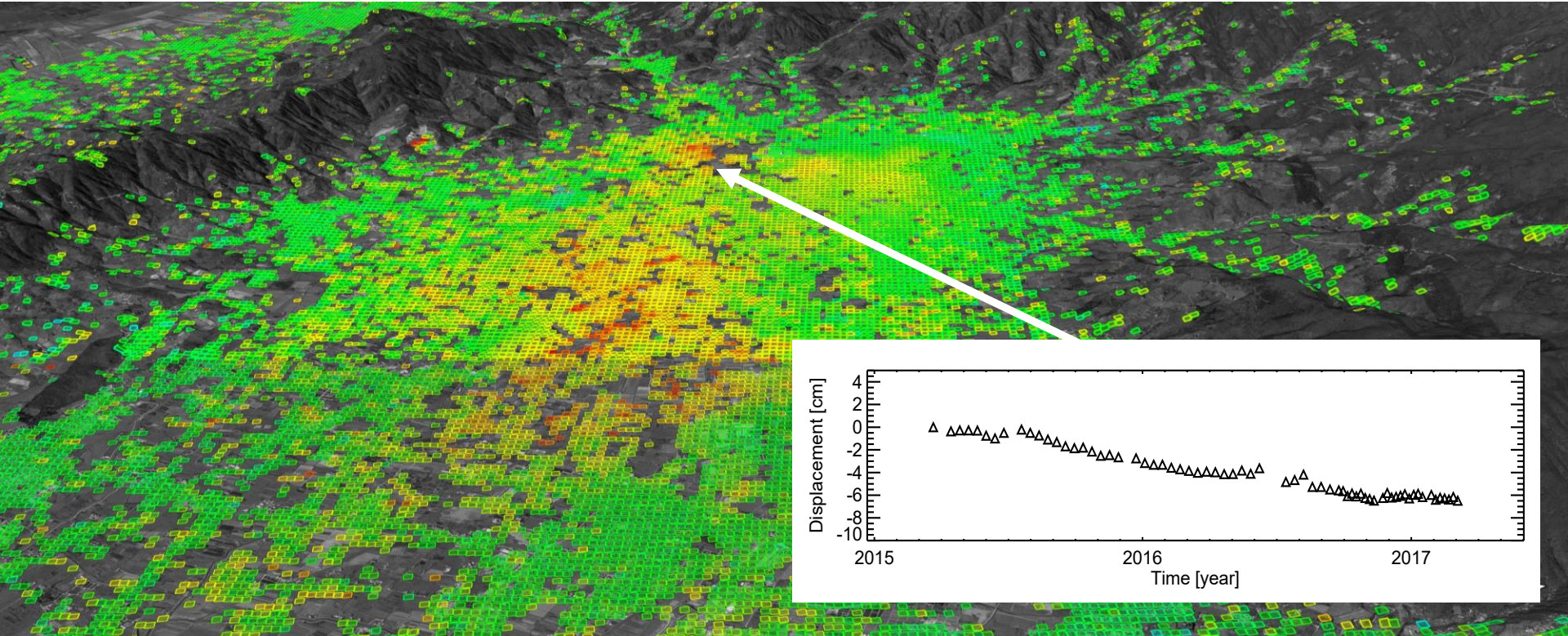
Urban Heat



Surface Urban Heat Island Intensity, Sargodha, Pakistan, July 2021

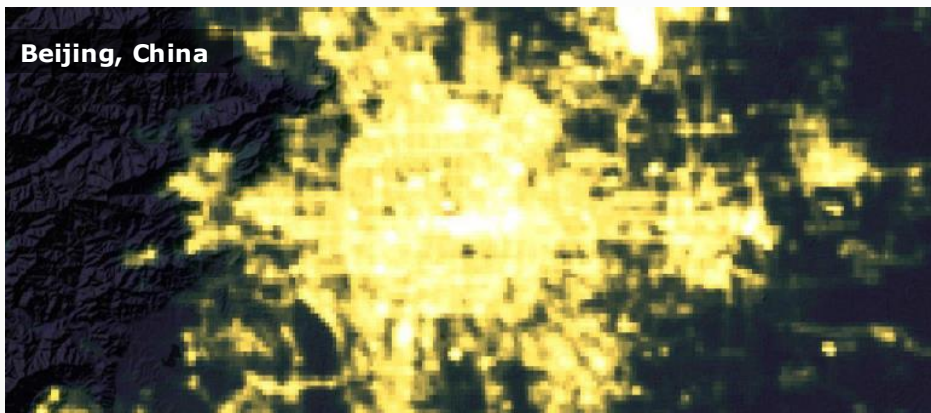
Wide-Area Millimetric-Precision Ground Deformation

Pistoia, Italy: Subsidence due to water extraction



Electrification and Overall Economic Activity

Beijing, China



VIIRS-DNB Night-Time Lights
monthly average (**500 m**)



Built-up areas (DLR World Settlement Footprint, 10 m)



LuoJia 1-01 Night-Time Lights (**130 m**)



ESA and the Development Sector



ESA EO programmes in Support of International Development



Dedicated programmatic instruments to channel ESA's cooperation with International Financial Institutions

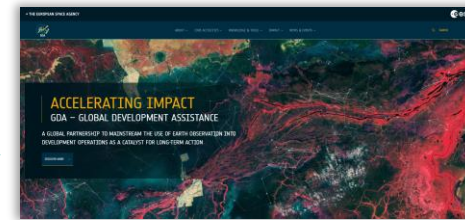
- **eoworld, eotap, etc.:** 2008-2015
Small-scale **demonstrations of EO services** in support of IFI projects to **raise awareness**



- **EO4SD:** 2016-2023
Consolidation of requirements and strategic engagement of development stakeholders to **build capacity** on EO services



- **GDA:** 2020-2026+
Mainstreaming of EO into development operations and financing, and **skills transfer** to IFI and client state stakeholders



gda.esa.int

