



Committee on Earth Observation Satellites

NASA-ESA-JAXA Dashboard

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CEOS SIT Technical Workshop 2020

1.3: COVID and Earth Observation from Space

Virtual Meeting

7-11 and 14-18 September 2020





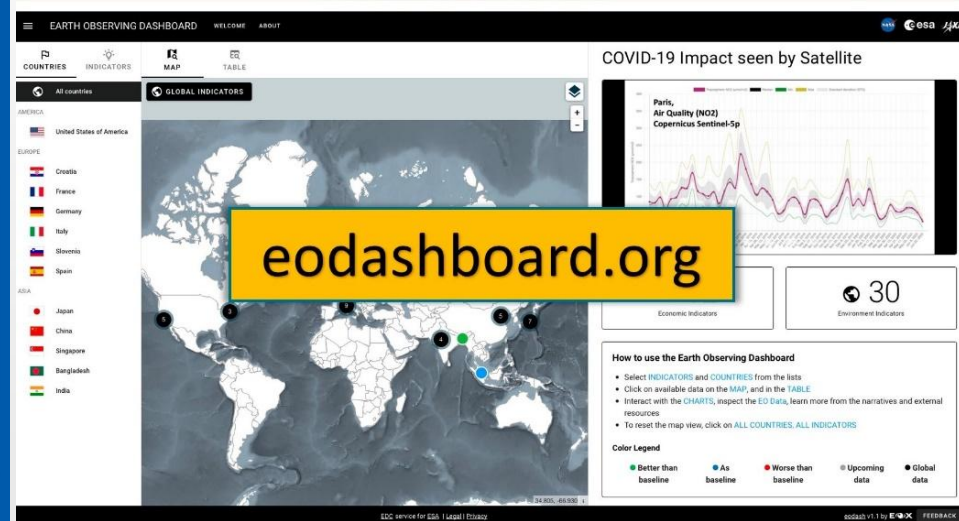
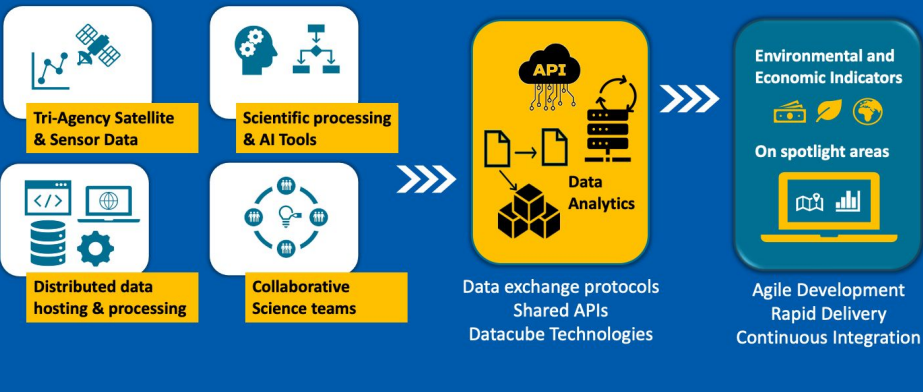
- **COVID-19 pandemic has caused various changes in socio-economic activities and some of the activities link with environmental changes.**
- **In April, JAXA, NASA and ESA launched a collaboration to analyze the changes in the global environment and socio-economic activities before and after the global epidemic using Earth observation satellite data from the three agencies.**
- **The collaboration has been carried out by 5 working groups: Air quality WG, Climate WG, Economic activity WG, Water quality WG and Agriculture WG.**
- **In the collaboration, the three space agencies have created the Earth Observing Dashboard and released it on 25 June.**



- Earth Observing Dashboard integrates multiple satellite data records with analytical tools to allow user-friendly tracking of changes in air and water quality, climate change, economic activity, and agriculture.
- Earth Observing Dashboard was developed by utilizing APIs and Datacube technologies.

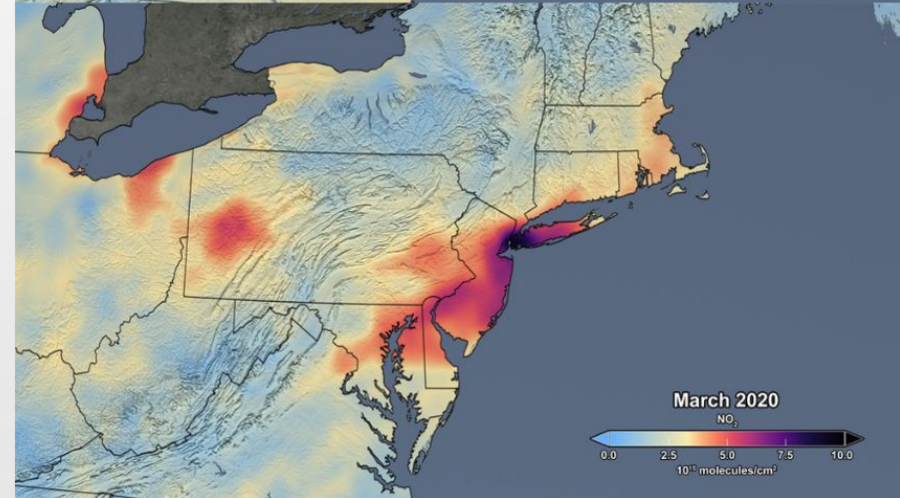
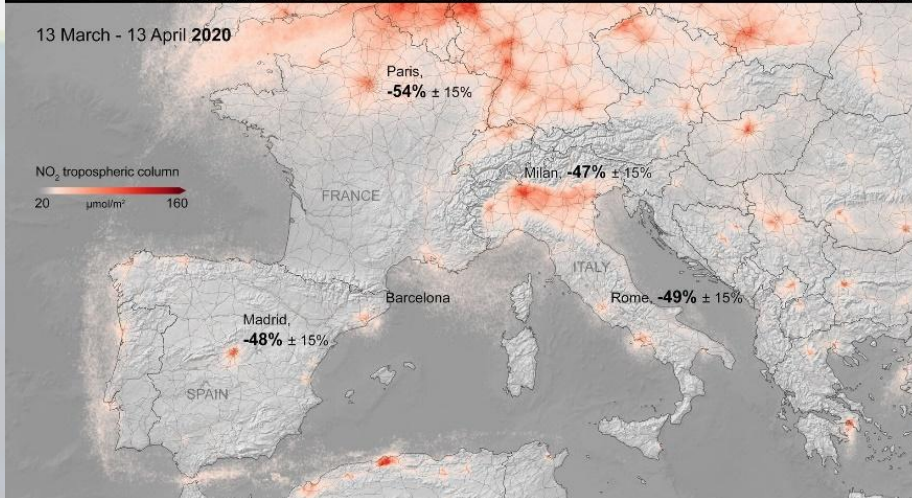
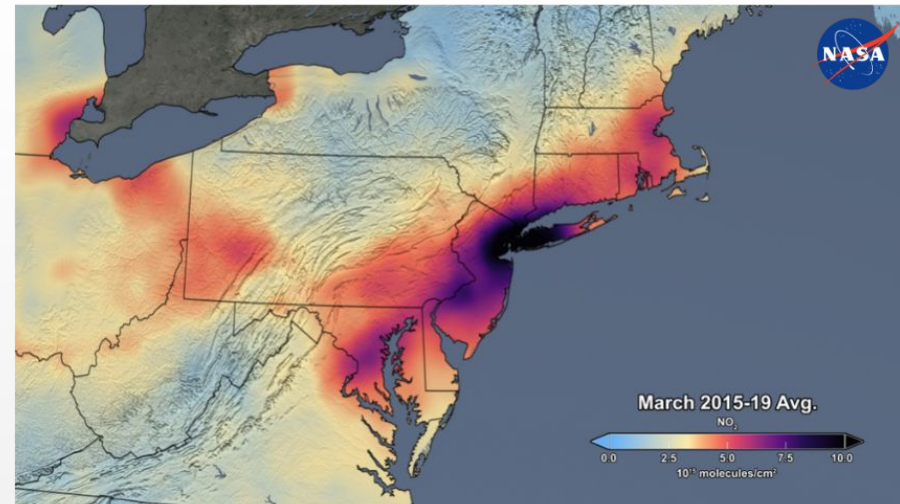
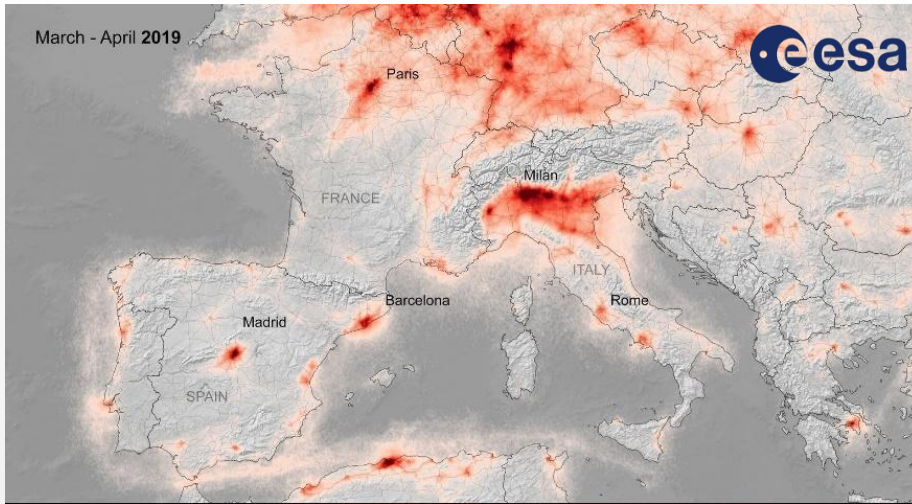
Earth Observing Dashboard

Integration of EO data, Science and Technology





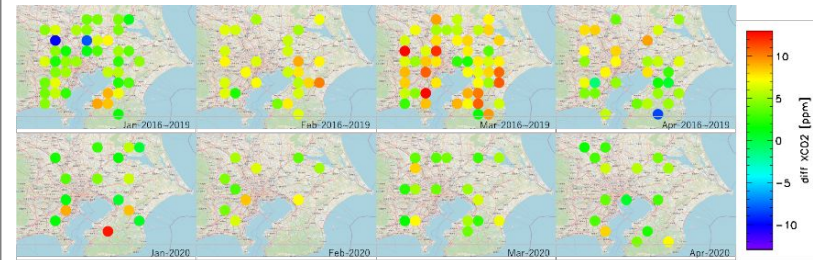
- NO₂ global map by Sentinel-5P and Aura**





- CO2 global map by OCO-2
- CO2 city scale map by GOSAT

Example of localized CO₂ from GOSAT over Tokyo

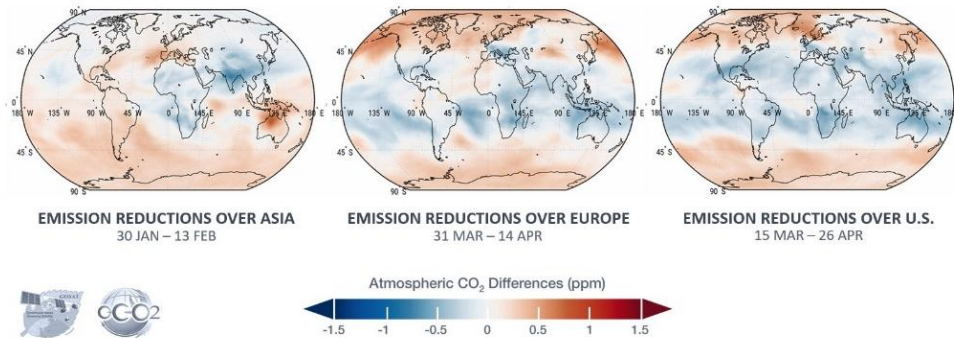


(top) Map of average 2016-2019 CO₂ over Tokyo for different months
(bottom) Map of average 2020 CO₂ over Tokyo for same months

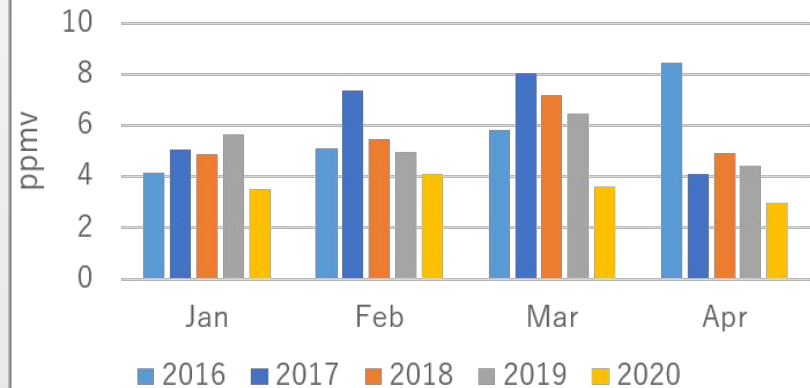
Comparisons of Observed CO₂ and Emission Changes



Assimilated OCO-2 difference in CO₂ concentrations in 2020 minus prior years average



Tokyo

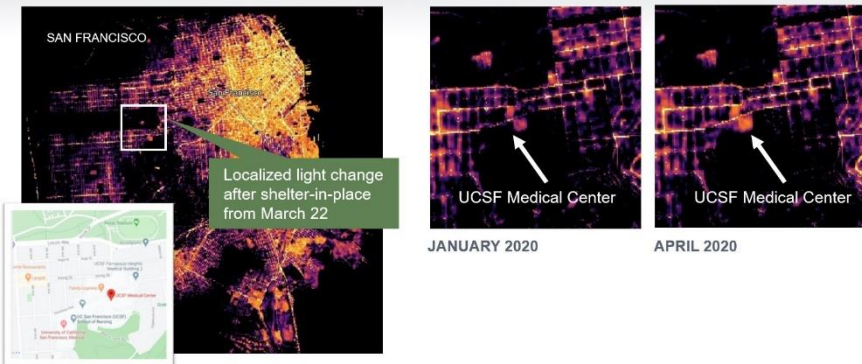


Average monthly abundances of CO₂ (relative scale) in the lower troposphere over Tokyo for past 4+ years from GOSAT



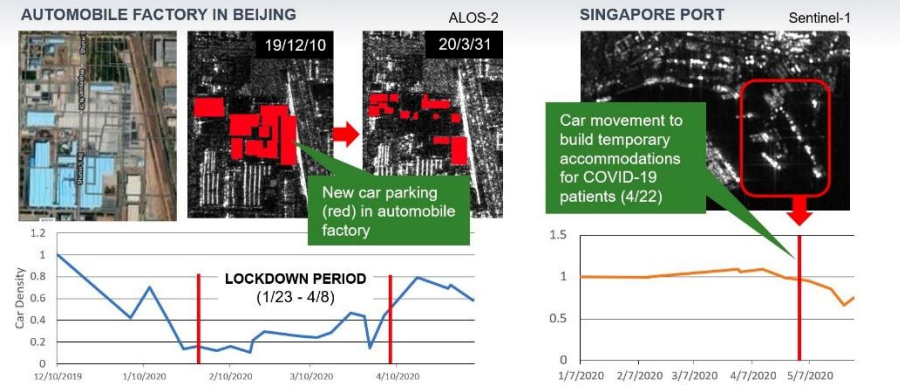
- NASA night light data
- Car density time series change by ALOS-2 and Sentinel-1

Earth at Night Data: San Francisco



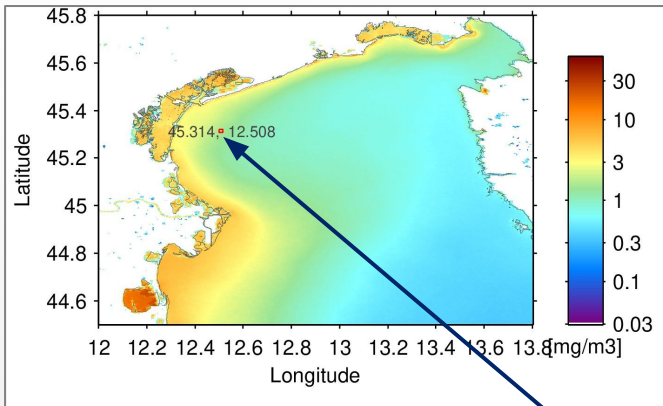
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Car density change using time series space-based radars (ALOS-2 and Sentinel-1)

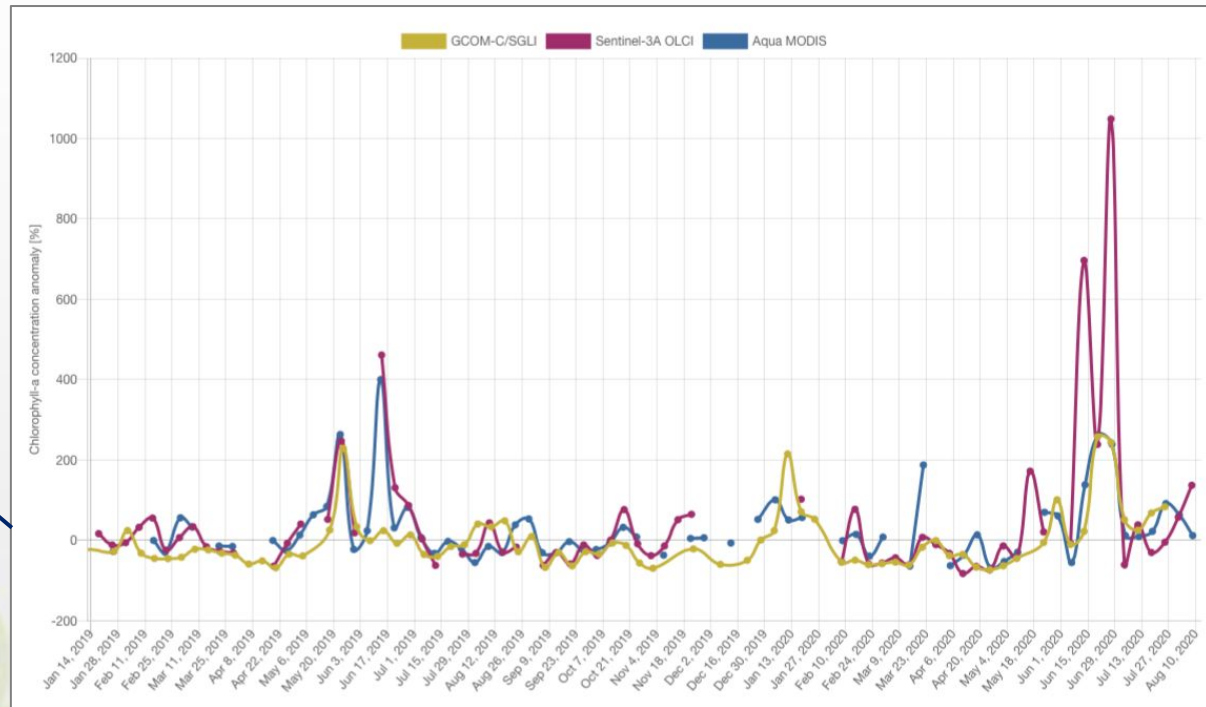




- Chlorophyll-a (Chl) concentration by GCOM-C, Sentinel-3 and Aqua



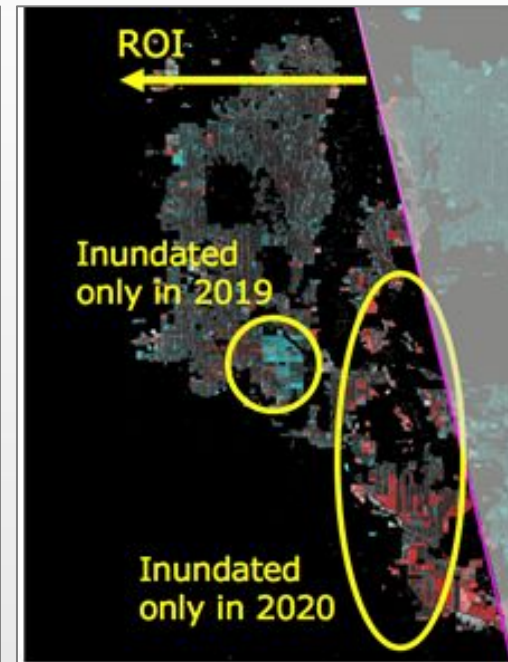
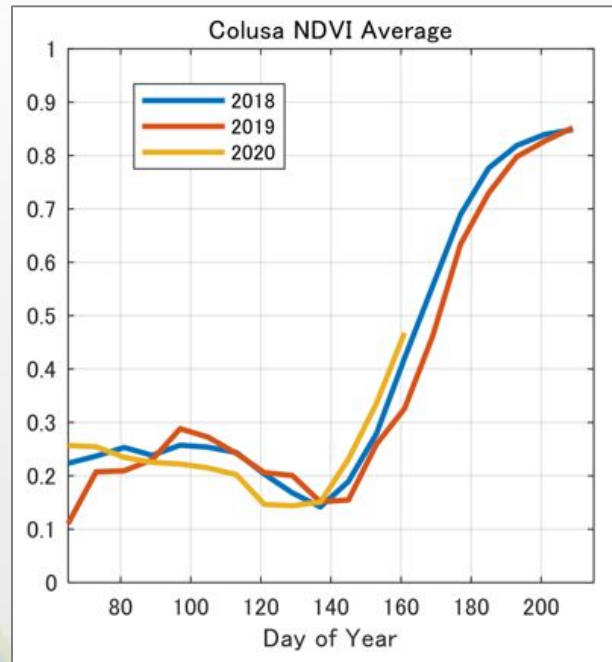
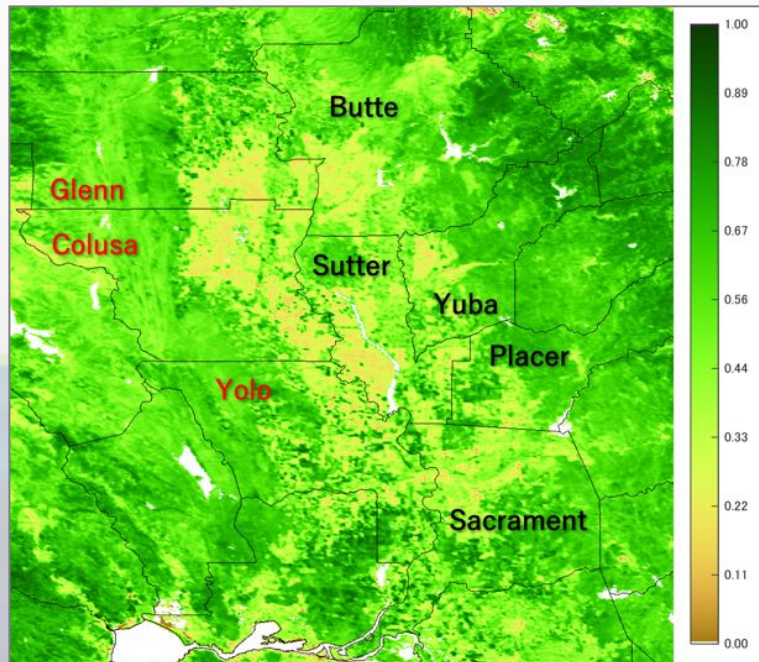
North Adriatic sea



Time series graph of Chl concentration from GCOM-C, Sentinel-3 and MODIS in North Adriatic sea



- Planting activity monitoring by NDVI from GCOM-C, Sentinel-2 and Landast-8





- **Continuous update after the first release on 25 June**
 - 7 July: Agriculture indicators
 - 21 August:
 - Africa and South America AOIs
 - New economic indicators (Slowdown Proxy Maps)
 - New agriculture indicators (Regional Crop Area map, Global Crop Area map) in cooperation with GEOGLAM
- **Total visitors (accepting cookies only) till 25 August: over 35,000**
- **JAXA, NASA and ESA have defined the procedure for adding new Area of Interest (AOI) of the existing indicators based on the requests from partner agencies who contribute to develop and verify the contents of the indicators.**
- **The three agencies are planning to continue the dashboard operation through the end of the year and discussions are on-going regarding future operations.**

- **JAXA for Earth on COVID-19**
<http://earth.jaxa.jp/covid19/en.html>
- **COVID-19 Dashboard – Earthdata/NASA**
<https://earthdata.nasa.gov/covid19/>
- **Rapid Action on coronavirus and EO (RACE) Dashboard**
<https://race.esa.int>