

Global megacity stories: GHG emissions and CO₂ uptake by surrounding forests and farmlands utilizing satellite technology

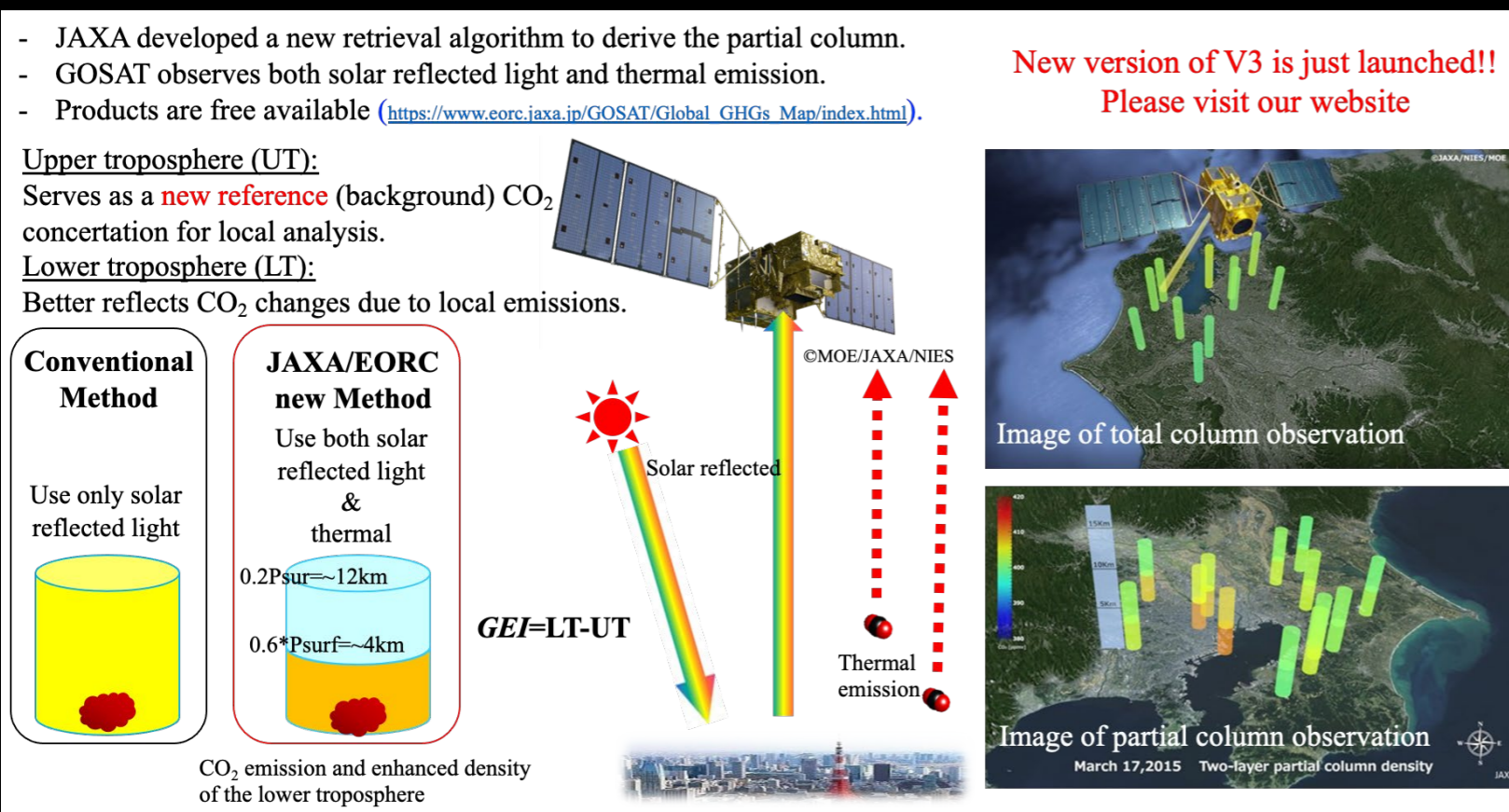


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How to estimate the megacities emissions and removal:

JAXA developed the space-based surface GHG Emission Indicator (GEI) for tracking emission changes as well as simultaneous solar-induced chlorophyll fluorescence (SIF) measurement as a proxy of plant photosynthetic activity at key subnational policy-relevant levels, such as cities. In addition, JAXA developed the new commercial airliner-based observation technique utilizing satellite technology to support on local emission estimate by observing CO₂ and SIF with simultaneous observation of Nitrogen Oxide (NO₂), which is co-emitted with CO₂ during fossil fuel combustion, as CO₂ emission maker.

JAXA partial column GHG product and GEI



Remote sensing from commercial airliner (GOBLEU*)



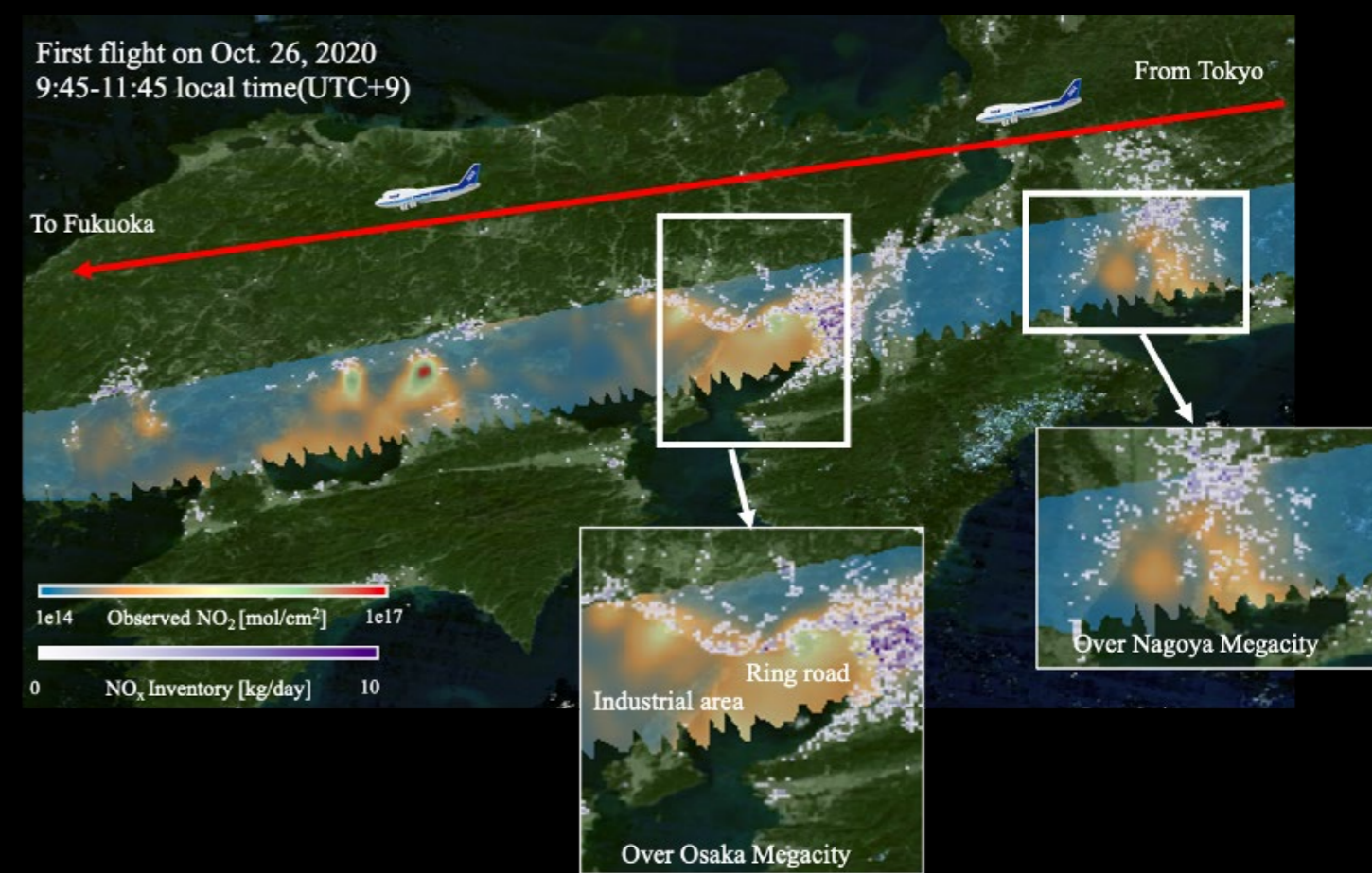
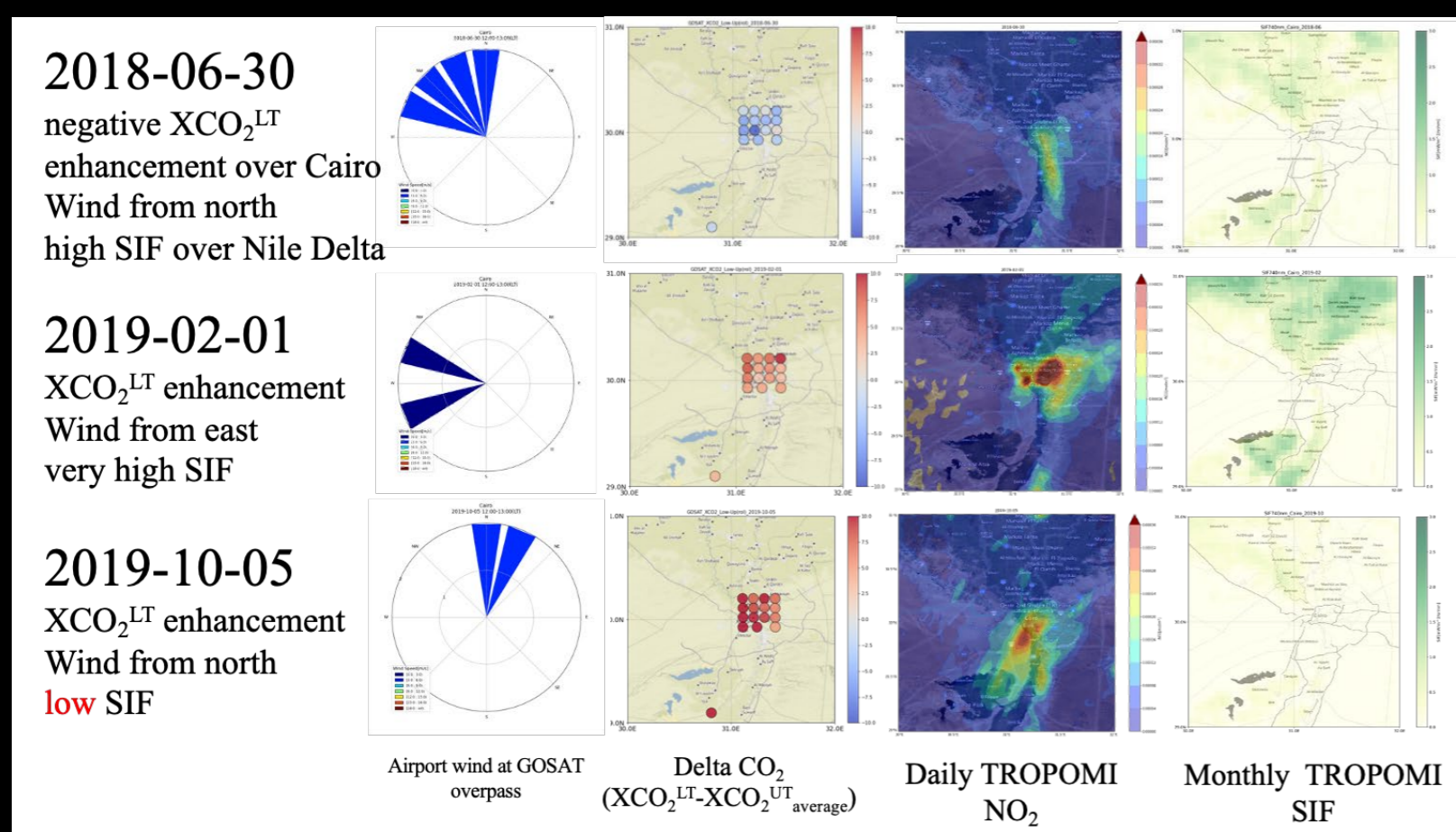
GOBLEU: the Greenhouse gas Observations of Biospheric and Local Emissions from the Upper sky

Crops Consume Cairo's Carbon Dioxide (CO₂)

Cairo, the most populated city in Africa, is located on the fertile floodplain of the Nile River and is surrounded by farmland, with a high concentration of farmland to the north. GOSAT can observe how crops on surrounding farmlands consume CO₂ by looking at SIF during two growing season. In the summer, the observations of the present there were low CO₂ levels over Cairo, correlated with high SIF. The results highlight that the surrounding farmland will partially assist to decrease the atmospheric CO₂ concentration.

Visualizing Japan's emission mitigation effort

The localized spatial distribution of NO₂ images observed by GOBLEU over Japan megacities will depict our emission mitigation effort in a timely manner with technology development for emission reduction.



- Remote sensing technologies on both satellites and aircraft are capable of monitoring GHG and its emission/removal makers in global megacities.
- The data stream enables easy visualization of GHG emissions for immediate utilization in mitigation and adaptation measures by local authorities and other entities.