The GOSAT-GW greenhouse gas observing mission: Updates

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As part of the GOSAT-series greenhouse gas observing satellites, the Global Observing SATellite for Greenhouse gases and Water cycle (GOSAT-GW) is to be launched in 2024-2025. The GOSAT-GW satellite will make the first global, space-based observations of the atmospheric carbon dioxide (CO2), methane (CH4) and nitrogen dioxide (NO2) in the Earth's atmosphere at a horizontal/spatial resolution of 1–3 km by the single satellite platform. It will carry two sensors, one of which is TANSO-3, a high-resolution grating spectrometer designed to measure reflected sunlight in the 0.45-um NO2 band, the 0.76-um O2 A-band and the CO2 band at 1.61 um from visible to short-wave infrared wavelength regions to retrieve the column-averaged CO2 and CH4 dry air mole fraction (XCO2 and XCH4, respectively) and vertical column density of tropospheric NO2. The satellite will fly in a 13:30 sun-synchronous orbit with a 3-day ground-track repeat time, achieving a global coverage within 3 days. The objectives of the GOSAT-GW's GHG observing mission include (1) monitoring of whole atmosphere global-mean concentrations of GHGs, (2) verification of national (or country-specific) anthropogenic emissions inventory of GHGs, and (3) detection of GHGs emissions from large emission sources, such as megacities, power plants, and permafrost. A comprehensive validation exercise will be made to ensure that the products' quality meets with the precision needed to quantify the GHG sources and sinks on regional- to national/city-scales, and identify the anthropogenic emissions from large point sources. With a nominal lifetime of 7 years, the GOSAT-GW will provide space-based constraints on the anthropogenic GHG emissions, contributing to the mitigation of climate change, in particular, supporting the Global Stocktake (GST) mechanism, a key element in the Paris Agreement.

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