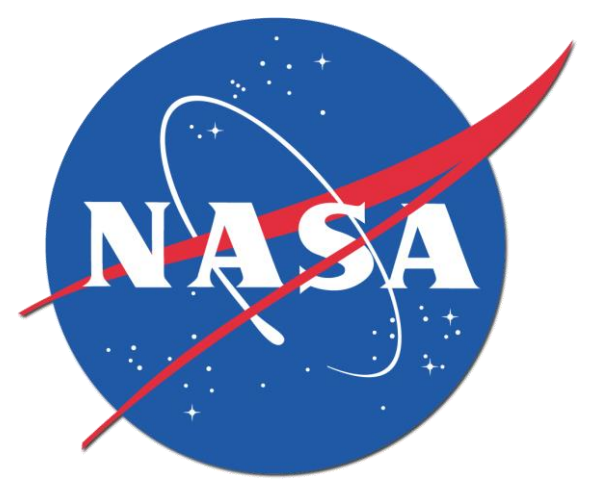


Stratosphere Troposphere Response using Infrared Vertically-resolved light Explorer (STRIVE) Mission

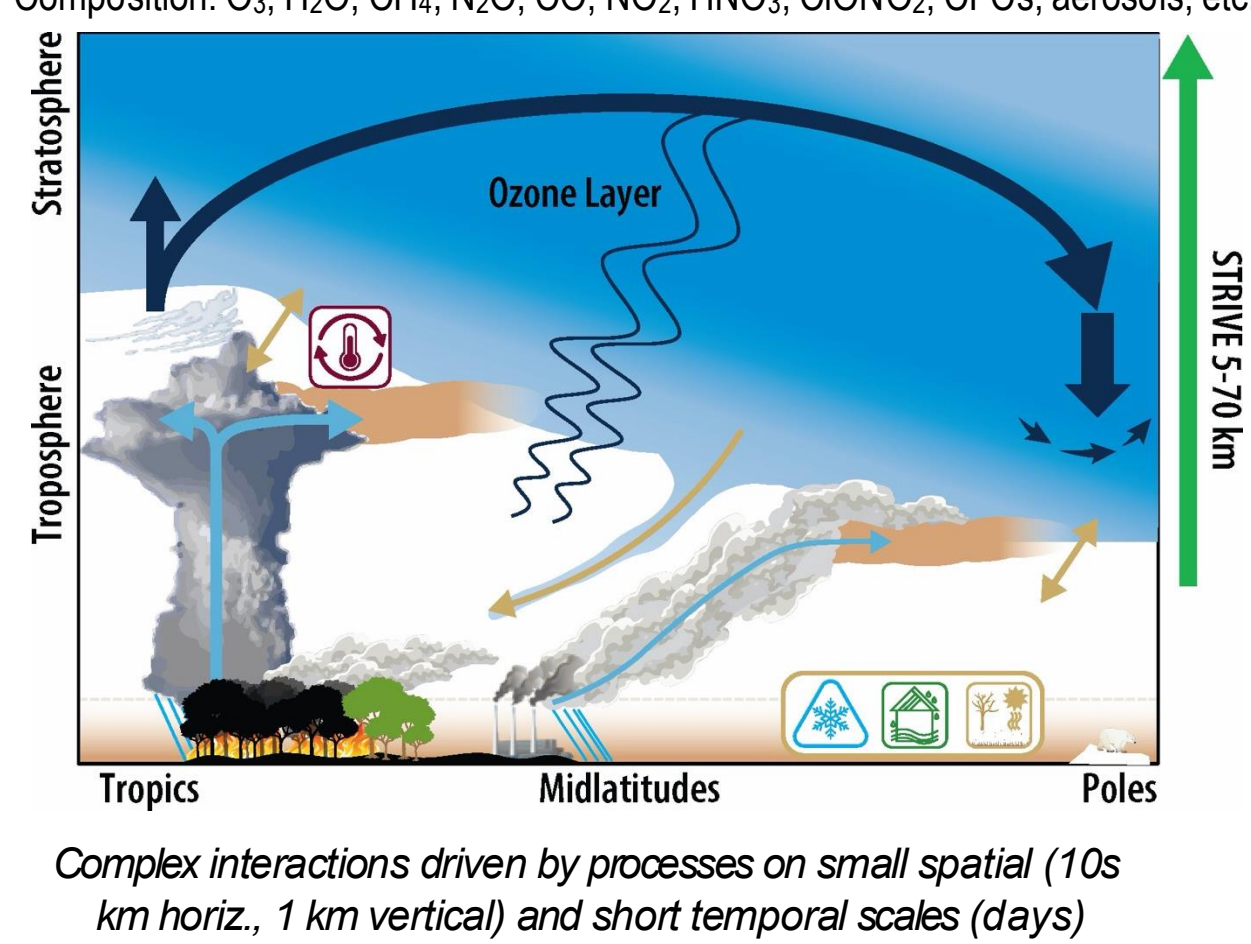


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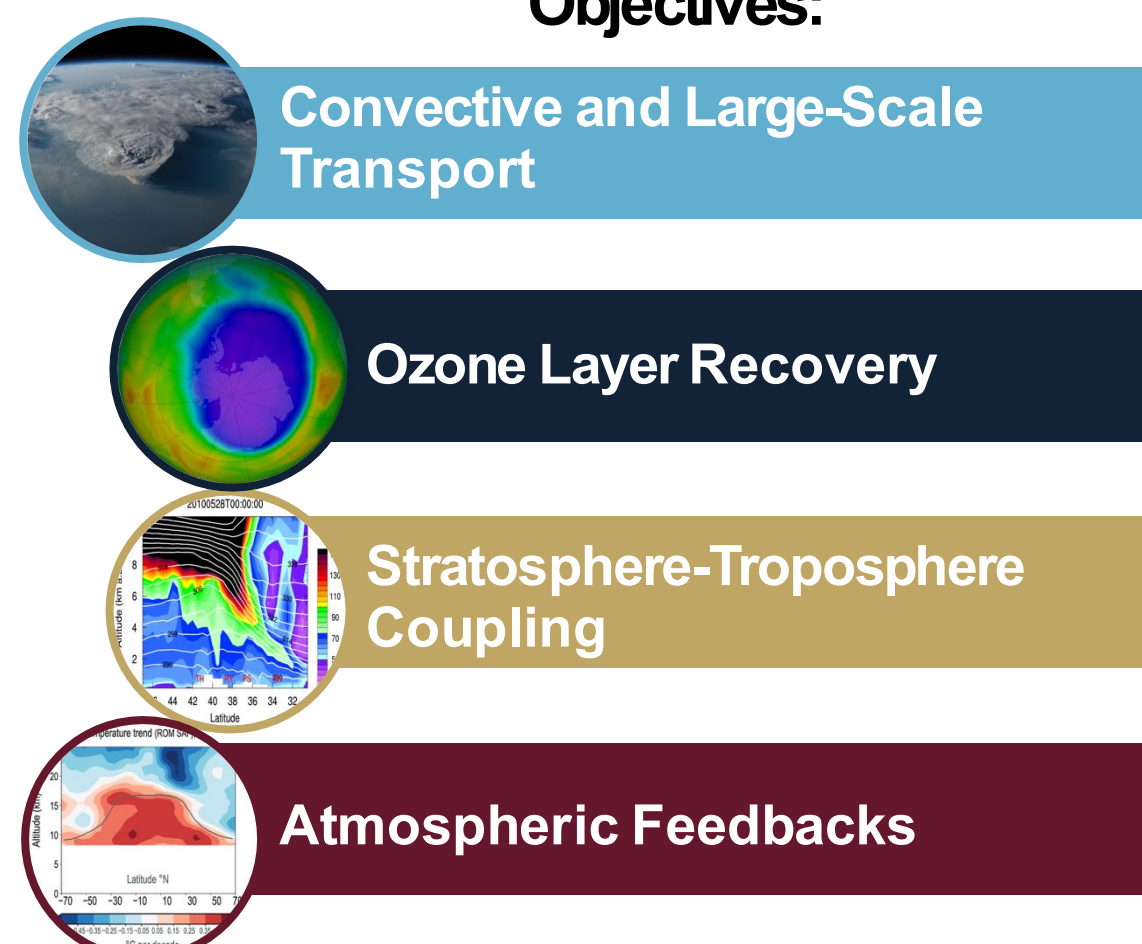
¹NASA Goddard Space Flight Center, Greenbelt, MD, USA

The Stratosphere Troposphere Response using Infrared Vertically-resolved light Explorer (STRIVE) is a new satellite mission selected for formulation as part of NASA's Earth Systems Explorers Program. STRIVE includes the Advanced Limb Infrared Chemistry Experiment (ALICE), a limb-scanning infrared imaging spectrometer along with the Aerosol Radiometer for Global Observations of the Stratosphere (ARGOS), a limb-viewing dual wavelength multi-aperture near-infrared radiometer. Together they provide high vertical resolution (~1 km) measurements of temperature, ozone and other important trace gases, aerosol extinction and properties with significant daily global coverage to better understand atmospheric response to natural and anthropogenic forcing.

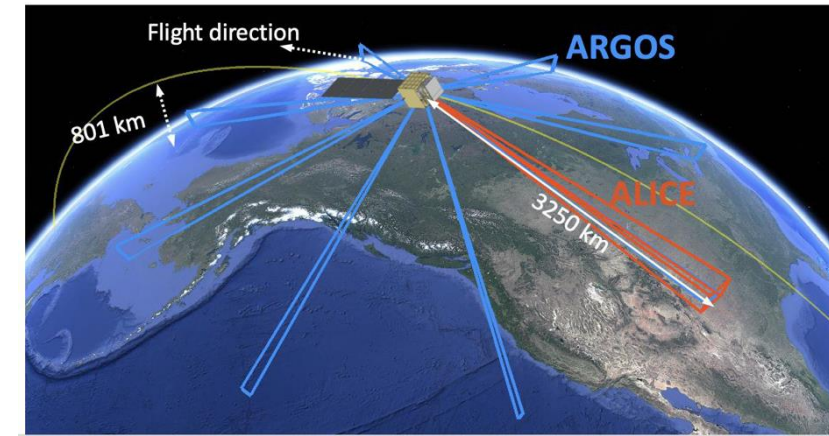
Composition: O₃, H₂O, CH₄, N₂O, CO, NO₂, HNO₃, ClONO₂, CFCs, aerosols, etc...



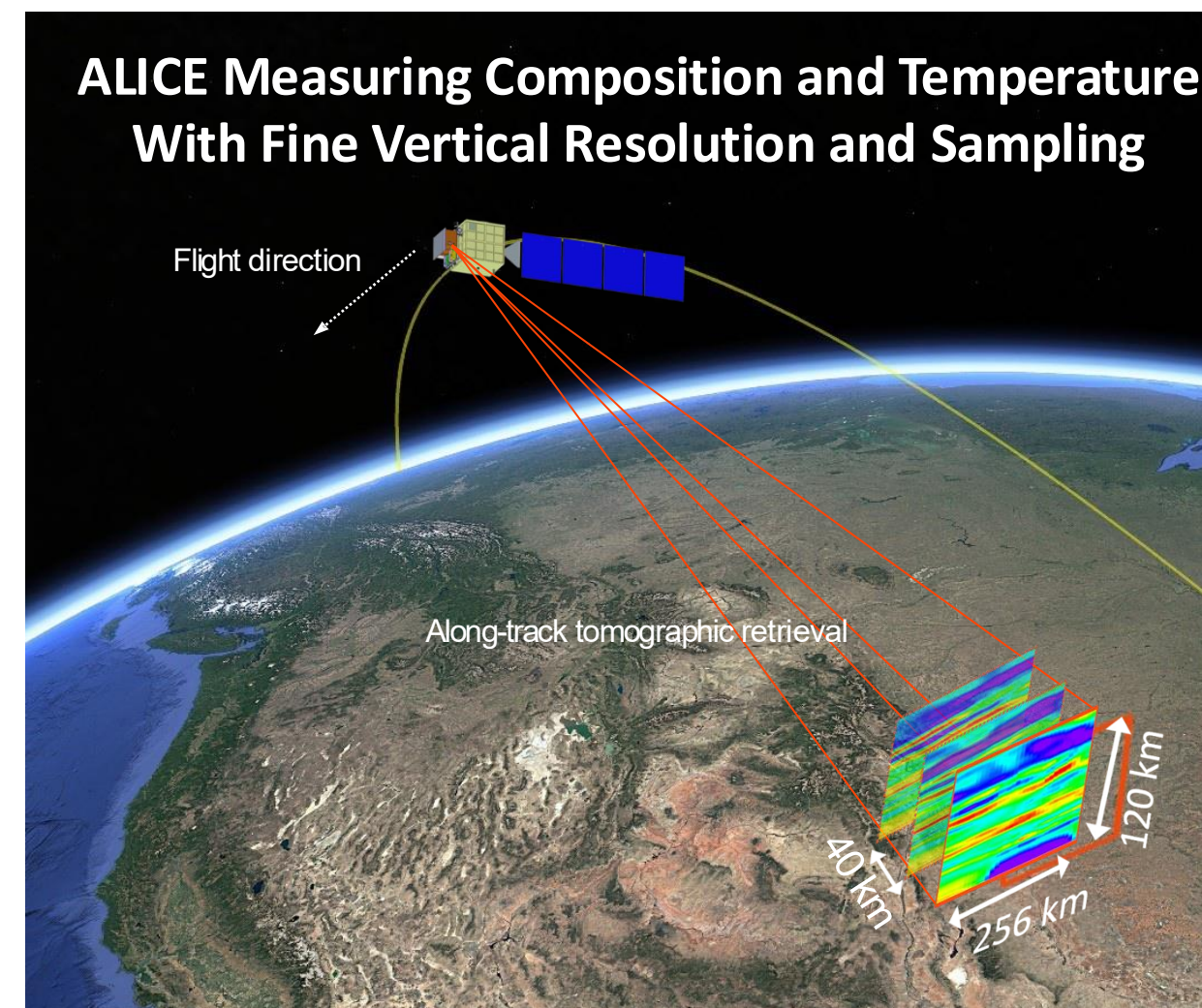
Objectives:



STRIVE has the novel ability to resolve small-scale vertical structures of atmospheric composition and temperature, enabling new insights into processes of troposphere-stratosphere interactions

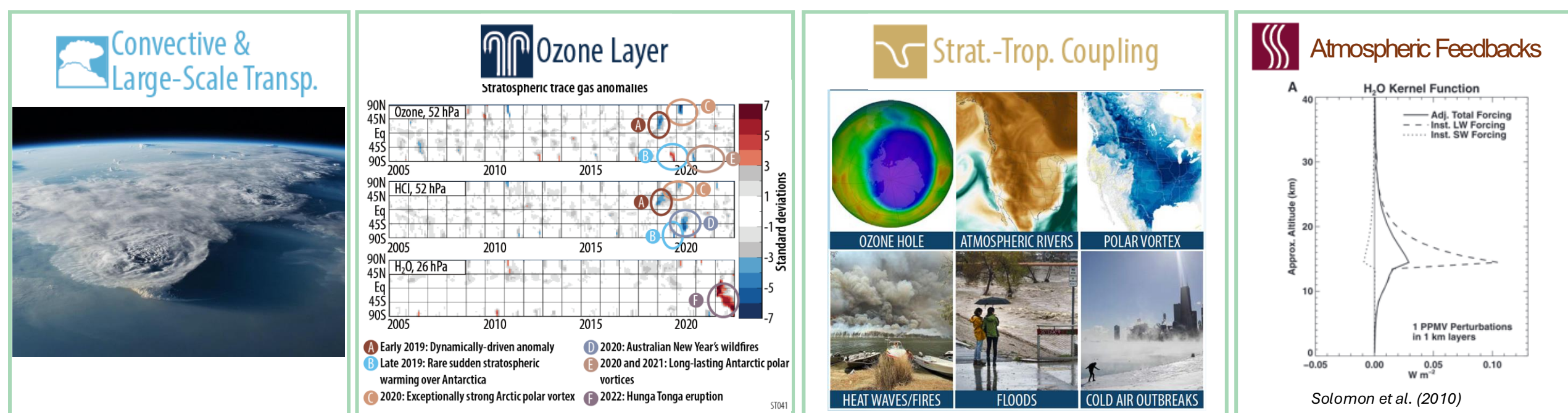


- Sun synchronous orbit (801 km) observing Earth's Limb at ~3250 km distance
- Afternoon equator crossing time (13:30 local time) for connecting to longer term record and synergies with JPSS instruments
- 3-year prime mission
- Dec. 2030 planned launch



The goal of STRIVE is to observe the detailed fingerprints of the processes impacting composition and temperature of the UTLS, thus constraining their critical influence on weather, climate, the ozone layer, and air quality.

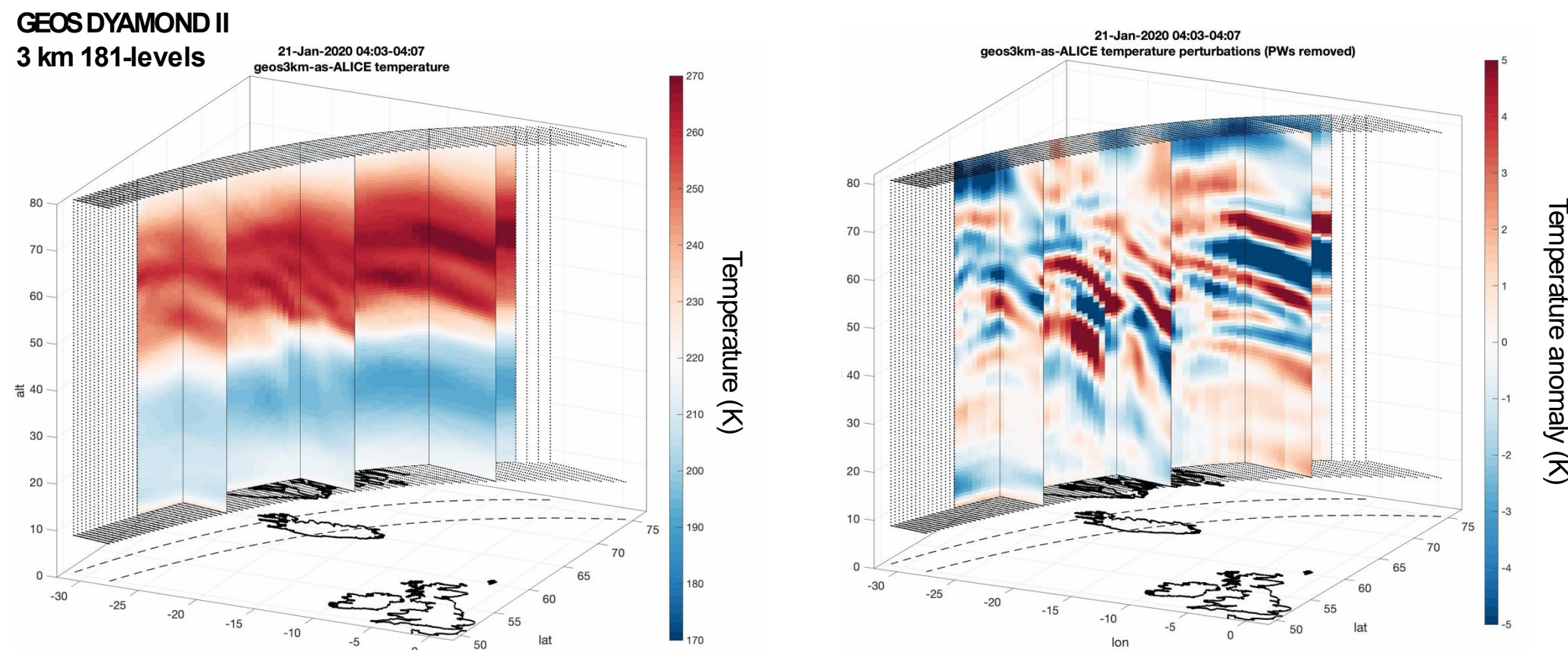
STRIVE would measure infrared radiation emitted (ALICE) and near-IR scattered from the atmospheric limb (ARGOS) to provide profiles of many atmospheric constituents and temperature with fine vertical resolution and unparalleled horizontal sampling.



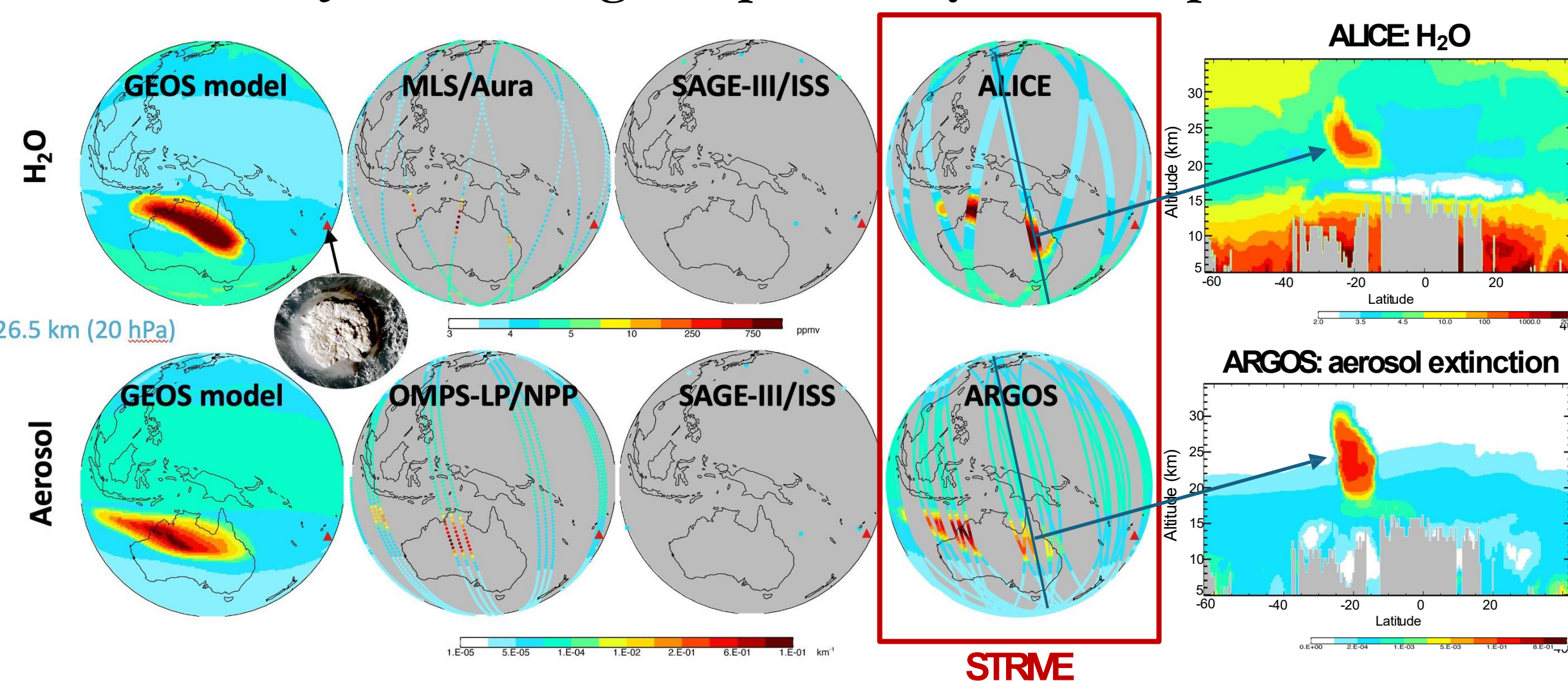
- STRIVE's detailed pollutant, water vapor, aerosol, cloud, and temperature observations in the UTLS will quantify vertical transport fluxes connecting the troposphere to the global atmosphere.
- STRIVE's broad coverage of trace gases, aerosols, and temperature at high resolution provides a comprehensive view of the chemical, radiative, and dynamical mechanisms affecting the stratospheric ozone layer.

- STRIVE observes troposphere-stratosphere coupling to view processes key to seasonal weather predictability and directly quantifies stratosphere-troposphere exchange of ozone.
- STRIVE measures the fine scale gradients in radiatively active species that are key to quantifying atmospheric feedbacks in the UTLS.

ALICE-like 3D sampling of gravity waves over Iceland

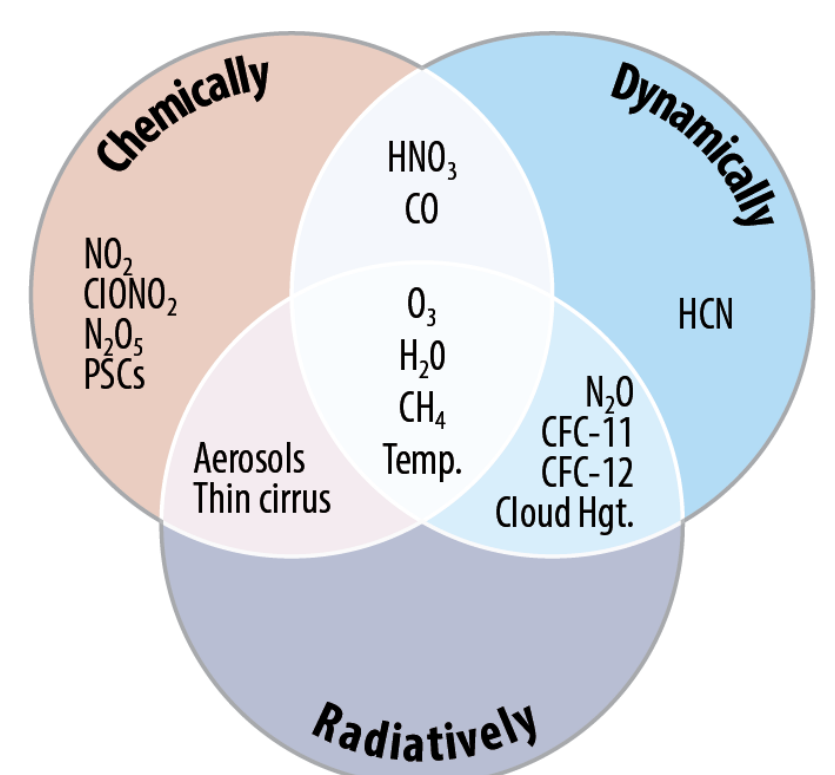
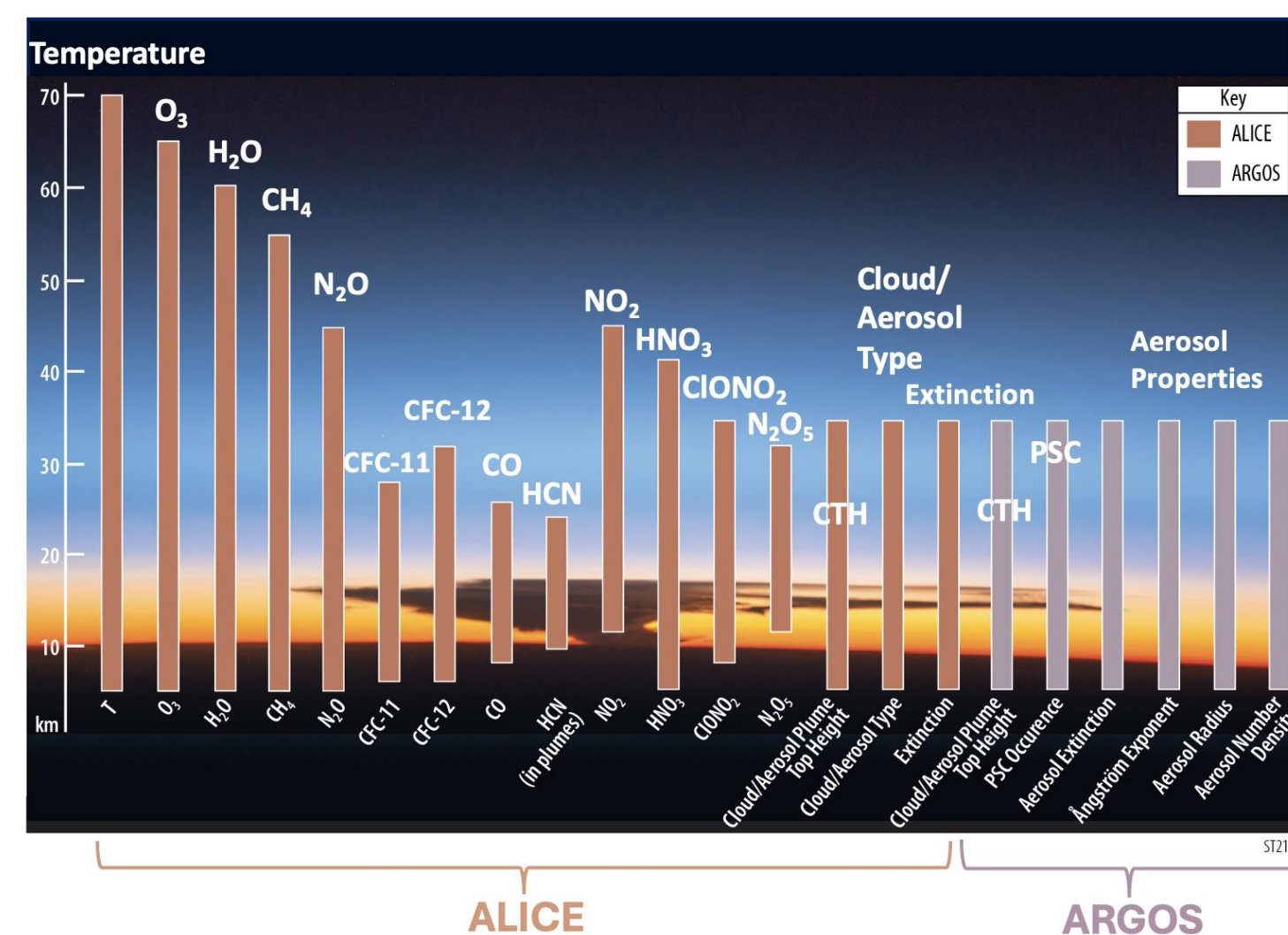


Jan. 2022 Hunga Eruption: 3 days after eruption



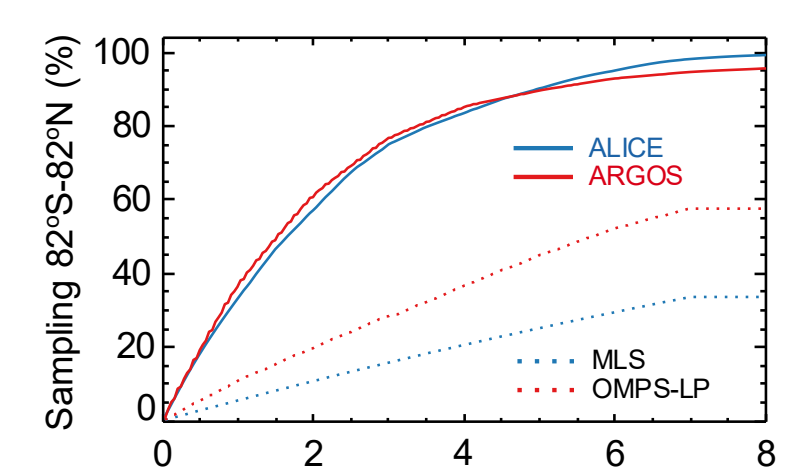
GEOS model sampled at MLS/OMPS-LP/SAGE/ALICE/ARGOS profile locations

STRIVE Products and their Altitude Range



Additional species with enhancement options: OCS, polar ClO, CCl₄, HCFC-22, SF₆, NH₃, PAN, plume SO₂, among others

The proposed 3-year mission uses a sun synchronous orbit with an afternoon equator crossing time (13:30 local time) for connecting to the longer-term record. ALICE and ARGOS each provide close to 40% global coverage each day and >85% over 5 days.



Societal Applications/Benefits

STRIVE reveals how the upper troposphere and stratosphere shape extreme weather, smoke and ash transport, and ozone recovery

