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## Potential Advantages of the synergy between Limb and Nadir Measurement

Limb and nadir measurements offer complementary insights into atmospheric composition. Limb observations, characterized by high vertical resolution and broad vertical coverage, primarily focus on the upper troposphere and above. In contrast, nadir measurements, with higher horizontal resolution but limited vertical resolution, provide valuable data for the lower and middle troposphere.

Recent efforts have explored how the synergy between limb and nadir measurements can enhance our understanding of atmospheric composition, particularly in the troposphere and lower stratosphere. These studies are part of the preparatory work for the CAIRT mission, which, if selected as part of the ESA Earth Explorer Mission 11 program, will fly in formation with the MetOp-SG satellite, carrying several nadir instruments.

During the CAIRT Phase 0, the benefits of the synergy between CAIRT, IASI-NG and S5 was demonstrated, particularly for ozone and other trace gases. The combination of limb and nadir data results in reduced total error and improved spatial resolution, especially in the upper troposphere and lower stratosphere (UTLS) region. Synergy between the two measurement types also shows promise for cloud studies.

This paper will present results for data from the GLORIA instrument, the CAIRT demostrator, during the CAREVALAB campaign, which performed both limb and nadir observations in a configuration that resembles CAIRT measurements.

## Topic

Upcoming Earth observation limb and occultation instruments

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