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Oral

The lack of high-resolution atmospheric thermodynamic structure observations inside or near the weather events (e.g., storms, hurricane etc.) impedes our understanding of the physical processes and the predicting capability in numerical weather prediction models. The side-looking airborne GNSS radio occultation (ARO) technique has been proved to be a viable sensing option to offer dense soundings near weather events next to the flight tracks. The global fleet of commercial aircrafts equipped with high-grade GNSS receiver could offer unprecedented number of ARO soundings across the globe. In this study, raw ARO measurements recorded from selective Airbus commercial aircrafts were processed. The preliminary quality assessment of the Airbus ARO soundings were carried out. For the first time, the atmospheric bending angle and refractivity profiles were successfully retrieved and compared with the close-coincident ECMWF ERA5 reanalysis profiles. All the Airbus ARO soundings consistently sense the atmosphere from the aircraft cruising height (~12 km) down to ~5 km above the mean sea level, and a few soundings reach close to the surface. The ARO refractivity retrievals demonstrate near-zero mean bias with less than ~5% standard-deviation in comparison with the collocated ERA5 profiles. In the future, the ARO soundings from large-scale commercial aircrafts could complement the spaceborne GNSS RO to improve the operational weather forecasts and air travel safety.

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