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Positive anomalies in Carbon Monoxide concentrations observed in the upper troposphere - lower stratosphere during the 2022 Asian summer monsoon season

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In the framework of the ACCLIP project (Asian summer monsoon Chemical and CLimate Impacts project), a measurement campaign was conducted during summer 2022 in the Western Pacific region, to investigate the impact of the Asian Summer Monsoon (ASM) on the composition of the upper troposphere and lower stratosphere (UTLS). Fifteen research flights were carried out by the NASA WB-57 stratospheric aircraft and 14 by the NCAR/NSF GV, with base in Osan (South Korea), covering a large region on the eastern edge of the ASM anticyclone.

We report on the Carbon Monoxide (CO) measurements performed by three different mid-infrared absorption spectrometers (COLD2, COMA and ACOS) installed onboard the WB-57 and by two different infrared absorption spectrometers (Aerodyne-CO and Picarro G2401) installed on the GV. Positive CO anomalies, never measured before in the UTLS outside direct biomass burning plumes, were collected by all sensors, showing a very good agreement. During the flight of the 19th of August, CO mixing ratio values higher than 250 ppb were registered at altitude around 14-15 km.

A comparison with the CO observations measured by the instrument COLD2 during the StratoClim (Stratospheric and upper tropospheric processes for better Climate predictions) campaign, conducted in summer 2017 from Kathmandu (Nepal), will be presented. Particular attention will be paid to the CO difference observed in the UTLS, by sampling the anticyclone directly from the Tibetan Plateau during StratoClim campaign or from the Western Pacific during ACCLIP.