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Airborne measurements of glyoxal in Korea using newly developed CEAS (Cavity Enhanced Absorption Spectroscopic) system

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Glyoxal (CHOCHO) is a good indicator of the oxidation processes of volatile organic compounds (VOCs) to track their faith in the troposphere. Due to its high water solubility and oligomerization capability, glyoxal has been proposed to play an important role in secondary organic aerosol (SOA) formation. However, the difficulties in CHOCHO detection limits the detailed understandings on mechanistic controls and significance of that processes. In addition, the glyoxal hot spots over the globe observed from satellite platforms urge the development of reliable measurement methods specifically for the capability of in-situ airborne measurements. In support of that, we developed a light emitting diode based Cavity Enhanced Absorption Spectrometer (CEAS) for airborne mission for glyoxal measurements with < 80 ppt detection limit (10 second average), and which was successfully deployed on NASA DC-8 research aircraft during the KORUS-AQ mission, conducted from May to June 2016. During this presentation, the recent glyoxal measurements from that mission in a long with comparisons from previous airborne measurements (SENEX2013 and SONGNEX2014) as well as ground missions (i.e. CalNEX 2010, SOAS2013, UBWOS2014 and CARE Beijing-NCP2014) will be also covered. 0-dimensional box modeling work to estimate gyoxals contribution to SOA formation as well as its relation with aerosol liquid water content to understand the mechanistic controls in its abundances will also be discussed.