

# Temporally and spatially coincident observation of NO<sub>2</sub>, CO<sub>2</sub> and CH<sub>4</sub> by manned and unmanned airplanes toward to detection of anthropogenic carbon signature

\*Hiroshi Suto<sup>1</sup>, Akihiko Kuze<sup>1</sup>

## 1. JAXA

Satellite-based carbon observation such as GOSAT, GOSAT-2, OCO-2, OCO-3, TROPOMI are successfully and operationally monitoring the global distribution of CO<sub>2</sub>, CH<sub>4</sub>. 15 years ago, it is a challenging issue to remotely observing Greenhouse gases with globally. Finally, it become to common tool to monitor the globe. Satellite-based observation is suitable for global mapping with several km to 10 km spatial resolution. However, a lot of anthropogenic carbon sources such as power plant, industry and coal mining are located in regional area, and it is also challenging to estimating the individual flux by satellite-based observation, since the signature of these emissions are very small against the current satellite observation detectability. To clearly detecting anthropogenic carbon signature, airborne observation is useful with fine special resolution and imaging capability. Airborne observation can detect the emission signature with several m to 100 m spatial resolution. To detecting the emission signature, the demonstration of airborne observation for greenhouse gases and NO<sub>2</sub> by man and unmanned airplanes with imaging spectrometers are carried out. The latest result will be presented with our design concept and observation strategy.

Keywords: CO<sub>2</sub>, CH<sub>4</sub>, NO<sub>2</sub>, Airplane