

## Global monitoring of greenhouse gases using various earth observation platforms

Hitoshi Mukai<sup>1</sup>, Yukihiro Nojiri<sup>1</sup>, Toshinobu Machida<sup>1</sup>, Nobuko Saigusa<sup>1\*</sup>

<sup>1</sup>National Institute for Environmental Studies

Center for Global Environmental Research (CGER), National Institute for Environmental Studies (NIES) has established a fundamental infrastructure for strategic monitoring of global environment with an emphasis on climate change since the early 1990s. The monitoring covers the atmosphere, ocean, and terrestrial biosphere particularly in Asia and the Pacific regions. The data have been acquired from different kinds of earth observation platforms such as ground-based stations, ships, and airplanes. A large number of studies have been conducted based on the datasets to detect changes in the atmospheric greenhouse gas concentrations and in the carbon exchanges among the atmosphere, surface oceans, and terrestrial biosphere.

The long-term datasets help to estimate temporal and spatial variations of regional and global carbon budgets, to clarify the mechanisms of essential processes of carbon cycle, and to predict future climate changes and its uncertainties. Since the dataset obtained from the monitoring would be an essential source of knowledge for global carbon cycle studies as well as a valuable validation dataset for earth system modeling and remote sensing, further efforts are still required to establish more effective data acquisition, quality control, and data sharing systems.

Keywords: Greenhouse gas concentration, carbon budget, atmosphere, ocean, terrestrial