

Development of global dataset of soil clay minerals for biogeochemical studies

*Akihiko Ito^{1,2}, Rota Wagai³

1. National Institute for Environmental Studies, 2. Japan Agency for Marine-Earth Science and Technology, 3. National Agriculture and Food Research Organization

Clay minerals play important roles in terrestrial biogeochemistry and atmospheric physics, but their data have been only partially compiled at global scale. We present a comprehensive global dataset of clay minerals in the topsoil and subsoil at different spatial resolutions. The data of soil clay mineral composition were gathered through a literature survey and aggregated by soil orders of the Soil Taxonomy for each of the nine clay mineral groups: chlorite, gibbsite, kaolinite, mica/illite/mica, quartz, smectite, vermiculite, non-crystalline, iron oxide, and others. Using a global soil map, a global dataset of soil clay minerals distribution was developed at resolutions of 2' to 2° grid cells. The data uncertainty associated with data variability and assumption was evaluated using a Monte Carlo method, and validity of the clay mineral distribution obtained in this study was examined by comparing with other datasets. The global soil clay data offer spatially explicit studies on terrestrial biogeochemical cycles, dust emission to the atmosphere, and other interdisciplinary earth sciences.

Keywords: Clay mineral, Soil