

Plans for developing an Earth system model with CH₄ dynamics

*Tadao Inoue¹, Tomohiro Hajima¹, Akihiko Ito²

1. Japan Agency for Marine-Earth Science and Technology, 2. National Institute for Environmental Studies

Methane (CH₄) is one of the important GHGs for climate prediction due to its relatively high radiative forcing next to that of CO₂, and now it is necessary to pay more attention to global CH₄ dynamics after Paris agreement. Under the control of CO₂ emission to keep a global temperature rise this century below 2 degrees Celsius above pre-industrial level, concentration of CH₄ in the atmosphere will be more influential to climate change. Furthermore, the atmospheric life time of CH₄ is around 9 years, it could be a good target for climate change mitigation. However, current Earth system models (ESMs) cannot project CH₄ concentration with fully coupled manner: some models can predict atmospheric CH₄ concentration but its predicted concentration is not based on the anthropogenic/natural CH₄ emission under climate interactions. In order to make climate projection with fully coupled CH₄ processes, we have started to couple CH₄ dynamics into our ESM, by introducing atmospheric chemistry model and the terrestrial CH₄ emission scheme into an ESM. In this presentation, brief introduction and the progress of our ESM development will be made, and plans for application of the ESM to CH₄-related simulations will be shown.

Keywords: Climate Change, Methane(CH₄), Earth System Model(ESM)