Japan Geoscience Union Meeting 2014
(28 April - 02 May 2014 at Pacifico YOKOHAMA, Kanagawa, Japan)

MIS31-01 Room:511 Time:May 2 09:00-09:15

Extensions of RCP2.6/4.5 with zero emission after 2100: as 2K/3K stabilization scenarios for MIROC-ESM

TACHIIRI, Kaoru[1*] ; HAJIMA, Tomohiro[1] ; KAWAMIYA, Michio[1]

[1]Japan Agency for Marine-Earth Science and Technology

Focusing that MIROC-ESM (an earth system model, no atmospheric chemistry version) output around 2K/3K rise in global mean surface air temperature in 2100 with the Representative Concentration Pathways (RCP) 2.6 and 4.5, we extend the experiments with zero-emission after 2100, as 2K/3K stabilization scenarios for the model. As MROC-ESM is a ”pessimistic” (with high climate sensitivity and small ecosystem carbon uptake) model, stabilization for this model means large chance of stabilization for many other models. The experiment, with fixed land use and other non-CO_2 forcing after 2100, is designed to 2300,and we are now just after 2200.

In the 2K stabilization scenario, RCP2.6 followed with zero emission, temperature rise from the pre-industrial state (PI) is slightly over 2K in 2100, and slowly decreased after the zero-emission period starts, and is just below 2K at 2200. Atmospheric CO_2 concentration (pCO_2) is 421ppm at 2100 and around 400ppm at 2200. On the other hand, in the 3K stabilization scenario, RCP4.5 followed with zero emission, temperature rise from PI is just over 3K, and then decreased after that slightly more rapidly than 2K stabilization scenario and is around 2.8K at 2200. pCO_2 is 540ppm at 2100 and just below 500ppm at 2200.

Looking at air temperature after stabilization (i.e., 2100), the 2K stabilization scenario have temperature rise in and around Antarctica, in Siberia and in Greenland, and decrease in Amazon and in northern lands. The 3K stabilization scenario has similar pattern, but with relatively small rise in and around Antarctica, and no significant increase in Greenland. Some increase in Siberia, and with significant decrease in Arctic Sea. Precipitation decreases in Western Pacific and increases in a part of Eastern Pacific and around Indian Ocean for 2K stabilization scenario. For 3K stabilization scenario, precipitation is decreased in some areas in southern Pacific.

Keywords: Representative Concentration Pathways, zero emission, stabilization, Earth system model