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Prediction of climate change of the 21st century

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IPCC (4th) had predicted global temperature would increase drastically up to 2-6 K in the coming century. However, such an increase has not been observed since 2000. Another prediction (IPCC 5th) was published in 2013, which modified the previous prediction by a much slower curve and sharper increase after 2050. The prediction through the Global Cooling Model (GCM) depends on the change in atmospheric CO_2 during the past 1000 years. Our group has examined the radiative forcing by the level of atmospheric CO_2 from zero to 800 ppm, and the result showed it increased the temperature up to only 0.6K even in the case of 800 ppm. Also, the climate change of the 21st century based on the relationship among galactic cosmic rays (GCRs) (Δ14C), sunspot number, and global temperature (δ14 C and sea-level change). The result indicated the temperature would decrease gradually since 2000. Application of the GCM to the Neoproterozoic Snowball Earth (total solar irradiation (TSI) was 94% of present-day; atmospheric CO_2 was 20-50 times) and Paleoproterozoic Snowball Earth (TSI was 85%, and the level of CO_2 was 100-1000 times) has been done by USA, France, and Germany, however, all failed to reconstruct the Snowball state. One possible scenario to reproduce Snowball Earth is to include GCRs-induced cloud in the GCM which was ca. 10 times more than the present-day Earth. Strong positive feedback of XCO_2 through the GCM, possibly reaching to ten times than sole radiative forcing might be overestimated.

Biography

Shigenori Maruyama completed his PhD in Geology at the age of 29 years from Nagoya University of Japan, held positions at Toyama University, University of Tokyo, and the School of Earth Science, Stanford University as a Postdoctoral Research Fellow. He is a professor at the Earth-Life Science Institute, Tokyo Institute of Technology, Japan, having published more than 330 papers in reputed journals.

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