

全球雲解像モデルによる気候変動予測

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Climate Study Using a Global Cloud-resolving Model

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Abstract

We have developed a new type of atmospheric general circulation model, “global cloud-resolving model” which covers the globe with a mesh size of a few kilometers. This model enables us to directly simulate the multi-scale structure of the cloud systems of the Earth from meso-scale to planetary scale cloud disturbances. In particular, tropical cloud systems including Madden-Julian Oscillation and tropical cyclogenesis are realistically simulated by the global cloud-resolving model. It is contrasted with current atmospheric general circulation models that are used for climate projections, because they cannot simulate realistic tropical cloud disturbances in general. The global cloud-resolving model not only reproduces the geographical distribution of cloud-precipitation systems and their diurnal to intra-seasonal variabilities, but also more physically reproduces cloud properties by explicitly implementing cloud microphysical processes. It is expected that the global cloud-resolving model will play a major role in climate simulations, and that future climate projections will be more reliable than current approaches.

Key words : climate model, global cloud resolving model, cloud-precipitation systems, Madden-Julian Oscillation, tropical cyclone, climate sensitivity

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