

A numerical simulation study of climate change induced by changes in cloud properties

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The terrestrial climate has been changing since the Earth's birth. There are some important factors to trigger the climate change. The faint young sun, land-sea configuration and atmospheric composition are examples of the important factors. Another important factor may be cloud properties. Cloud droplet size, cloud water/ice content, and the height and amount of clouds can affect the climate. It has been pointed out that changes in the intensity of galactic cosmic ray may change the cloud properties. The intensity of cosmic ray may be affected by the solar activity.

We have conducted a set of numerical simulations of a three-dimensional global atmosphere-ocean model and a vertically one-dimensional radiative-convective equilibrium model in order to address the effect of cloud properties on the climate. According to our results, the climate cools (warms) as cloud droplet size is reduced (increased) in the atmospheric radiation computations.