

## Climate change induced by changes in cloud droplet radius

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It has been pointed out that the colder climate during the Mounder Minimum was associated with the smaller number of sunspots. When the number of sunspots is low, the solar activity is also low although the total solar irradiance hardly decreases. The intensity of galactic cosmic ray into the terrestrial atmosphere increases when the solar activity is low. While it is not understood clearly, yet, the cosmic ray intensity may change the number of cloud condensation nuclei and the cloud droplets' radii.

We have conducted a set of numerical experiments with a three-dimensional coupled atmosphere-ocean general circulation model and a vertically one-dimensional radiative-convective equilibrium model with different cloud droplet sizes. When the droplet size is decreased (increased), climate becomes colder (warmer) according to our experiments.