

Thermosphere response to doubling CO₂: simulation results with GAIA model

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Using the whole atmosphere model GAIA, we investigate the influence of doubling CO₂ on the thermosphere. Our results reveal consist cooling in the upper thermosphere as reported in previous work. Furthermore, we find that the cooling effect has distinct spatial and seasonal variation. First, it is stronger in polar regions than at lower latitudes. Second, it is stronger in local summer than in local winter. Third, it is stronger at night than at day. We investigate the mechanism for these variations by examining changes in the global circulation and composition.

Keywords: thermosphere, CO₂, vertical coupling