The climate effect of the ozone concentration change in the lower stratosphere : HadGEM2-AO experiment study

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It is important that ozone-climate response as atmospheric CO2 concentration increases, the lower stratosphere ozone depletion and stratospheric cooling draw much attentions by many researchers. A variations in stratosphere ozone influence climate via direct radiative effects and the resulting temperature and circulation changes. We have investigated the effect of the ozone concentration change and its relation to climate change over the East-Asia. We have used the climate model which is HadGEM2-AO with a horizontal resolution of N96 (1.875x1.25) and 38 vertical levels (L38, from the surface to approximately 40km) and perform two 36-year integrations using prescribed ozone. The model simulation have used a AC&C/SPARC ozone dataset. One experiment follows historical ozone concentration change, another is fixed ozone concentration at 1970 value. The largest decrease in the lower stratosphere during spring have occurred at high latitudes because of large depletion in polar region. The reduction of ozone concentration affects directly temperature and wind fields in upper troposphere and lower stratosphere. Temperature decrease due to ozone concentration reduction have appeared in the lower stratosphere during spring and it have been accelerated poleward side of subtropical jet during Summer.

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