



Is atomic oxygen the primary driver of long-term trends in the ionosphere-upper atmosphere?

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Atmospheric climate is changing not only near surface; it changes also in the upper atmosphere, the mesosphere-thermosphere-ionosphere system. The increasing concentration of greenhouse gases is generally accepted to be the main driver of these climatic changes. However, there are also other drivers of long-term changes and trends in the upper atmosphere, namely stratospheric ozone depletion, long-term changes of solar and geomagnetic activity, secular changes of the Earth's magnetic field, long-term changes of atmospheric circulation, of atmospheric wave activity and of mesospheric water vapor concentration. Recently Oliver et al. (2013) and Oliver et al. (2014) suggested two other possibilities of main drivers of trends in the thermosphere and ionosphere, the increasing thermospheric gravity wave activity, and/or the increasing concentration of atomic oxygen near 120 km (base of the thermosphere) due to the decreasing turbopause height. Here I show that these suggestions are not supported by various other data and results, and that the carbon dioxide remains to be the primary trend driver in the upper atmosphere-ionosphere system.