



## **Nighttime mesospheric ozone changes observed from ground-based Ku-band radiometer**

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In the high polar latitudes, charged particles from space are guided by the Earth's magnetic field into our atmosphere. The middle atmospheric (mesosphere and lower thermosphere) ozone responds to energetic particle precipitation, e.g., Solar proton events and Aurora, and dynamics, e.g., Sudden stratospheric warming. Important questions regarding particle precipitation are unresolved as of today. These include the question of what are the key chemical changes in the upper atmosphere, and how are changes in the upper atmosphere coupled with atmospheric layers below. Middle atmospheric ozone, as a key factor of the chemical changes, is important to help to understand these processes. Satellites and the microwave radiometers which observe ozone emissions at 250 GHz provide ozone profile information. However, the measurement response is limited to  $\sim 75$ km vertically. The Ku-band radiometer MOSAIC measures the emission line at 11.07GHz, providing ozone density in the mesosphere and the lower thermosphere. The ozone VMR retrieved from MOSAIC radiometer is compared with the available satellite data. The changes of the secondary ozone maxima at the lower thermosphere from 2002 to 2018 are reported.