



Analysis of affecting factors on ozone variation in the summer monsoon region

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The Asian monsoon impacts the lives of more than a billion people, and exerts the great influence over global climate. It becomes a pressing concern that the monsoon convection system coupled to anthropogenic activities. It is important to assess the ozone variation over the Asian-Pacific region (AP) and impacts of East Asian Summer Monsoon (EASM). It is beneficial to understand the correlative relationship between the human activity and climate change in the region with the complex interaction.

Ozone plays a very important role because it protects any living organisms at the Earth's surface against the harmful solar UVB and UVC radiation. In the stratosphere, ozone plays a critical role in the energy budget because it absorbs both solar UV and terrestrial IR radiation. Furthermore, ozone in the tropopause acts as a strong greenhouse gas, and increasing ozone trends at these altitudes contribute to climate change. Tropospheric column ozone is a key trace gas owing to its important roles in atmospheric chemistry, air quality, and climate change. Despite its relatively small quantity, however, tropospheric ozone is the primary precursor for hydroxyl radicals, which control the lifetimes of many gas species in the troposphere.

The daily dataset of coherent total column ozone were created from FY3/TOU from 2008 to 2017. Using total column ozone from FY3/TOU and tropospheric and stratospheric column ozone from AURA OMI/MLS satellite data, the seasonal variations of the climatological ozone in the region (40°E-160°E, 0-60°N) are analyzed for the total, tropospheric and stratospheric column, respectively. Differences of ozone and circulation pattern between strong and weak East Asian summer monsoon year are also investigated. It is revealed that the combination of the monsoon anomaly and the upper westerly jet anomaly affects obviously distribution of the tropospheric and stratospheric ozone during summer in the East Asia and the western Pacific regions.