

Increase in springtime tropospheric ozone at a mountainous site in Japan for the period 1998-2006

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The trend of tropospheric ozone from 1998 to 2006 was examined based on continuous measurements made at a site on Mt. Happa, Japan. We focused our study on springtime ozone, to coincide with the East Asian continental outflow that dominates the lower tropospheric ozone over Japan during this season. The observed increase of 1 ppbv per year in the mean ozone level was statistically significant. We also found that the probability distribution of the springtime ozone mixing ratios was substantially modified, with the ozone mixing ratios greatly increasing at the upper end of the probability distribution. This increase has been particularly large since 2003, with larger increases occurring at the higher percentiles. The number of high-ozone days doubled during 2003-2006 compared to 1999-2002. One of the very likely explanations is the enhancement of regional ozone pollution due to rapidly increasing anthropogenic emissions from East Asia.