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P-5 Recent changes (2010-2013) of Satellite-Observed NO_2 Column Densities in East Asia

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We report recent changes of tropospheric NO_2 vertical column density (VCD) in East Asia observed from multiple satellites, highlighting on the declining trend over China since 2012. Tropospheric NO_2 VCD data from Global Ozone Monitoring Experiment (GOME), Scanning Imaging Absorption spectrometer for Atmospheric CHartographY (SCIAMACHY), Ozone Monitoring Instrument (OMI), and GOME-2, retrieved from the Royal Netherlands Meteorological Institute (KNMI) and available from the Tropospheric Emission Monitoring Internet Service (TEMIS), are utilized to investigate annual trends of NO_2 VCD since 2001. Until 2011, changes of NO_2 VCD over East Asia countries agree well with previous researches including the impact of economic downturn during 2008-2009 and following quick recovery in China. After peaking at 2011, NO_2 VCD observations from active instruments (OMI and GOME-2) over China started to show a slow decreasing trend, mostly led by the rapid changes in Jing-Jin-Ji (JJJ, Beijing-Tianjin-Hebei) region in northern China. The decreasing trend continues as of spring in 2014. Trends over Korea are weaker, but similar to those in China, with a slight peak in 2011, and Japan shows continuous declining trend since early 2000. Possible explanations for the trend, including policy-driven emission change and inter-annual variance of meteorology and satellite retrieval uncertainties, are discussed. We suggest further investigations on anthropogenic NO_x emission changes using bottom-up approach and the climatological impact from inter-annual variance of natural condition.