Assessment of regional scale aerosols and gaseous characteristics in East Asia from satellite observation data

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Trends from 2000 to 2016 in regional air quality including aerosols, ozone (O_3), Sulfur dioxide(SO_2), nitrogen dioxide(NO_2), and formaldehyde (CH_2O) were investigated based on measurements of the earth observing satellites over East Asia (110ºE - 150ºE and 20ºN - 56ºN). Satellite observations show that regional aerosol pollution is mainly concentrated in China. The annual frequency of aerosol optical depth(AOD) has been substantially increased between 2000 and 2014 increasing ~0.179 AOD/year. After 2015, there is remarkable decrease in annual frequency probably due to both reduction of anthropogenic emissions and changes of meteorological conditions. This pattern is similar to the annual frequency of NO_2 but steady decrease in the annual frequency of SO_2 is shown during the last decade. However, there is a large increase in the tropospheric O_3. Obviously, secondary pollutants have been increased and connected with severe haze events. Furthermore, these trends of air pollutants may be related to the emissions as well as the atmospheric circulation in East Asia.