

## GPS signal delays in dust aerosols during Asian dust storm

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The Asian dust storm (the so-called Yellow Sand Storm), which is a typical example of mineral aerosol, frequently originates in sand deserts. Absorption and scattering from dust particles during a storm is one of the possible causes of copolarization attenuation between the communication systems operating in the microwave and millimeter wavelength band during sand storms. The processes of emission, transport, dry and wet deposition of Asian dust storm are closely associated with atmospheric wet/dry conditions as well as air-pressure. In this study, the GPS tropospheric delays were calculated during a progress of Asian dust storm. The actual zenith wet delay changes are correlated with the changes in the PM 10 level. Based on these preliminary results, the increasing of the zenith wet delay, when the density of PM10 were increased, might be caused by the cloud effect which has occurred due to occurring of rainfall. And note that there is no rainfall record during the following days. However, the zenith hydrostatic delay does not seem to have any correlation with the PM10 variation. Consequently, the actual ZWD changes are correlated with the changes in the PM 10 level. The continuous tracking of tropospheric delay variations estimated by GPS with ground-based meteorological data would be useful to characterize the attributes of Asian dust storm in terms of the formation, emission, transport, deposition and dissipation. If there is a specific correlation between the dust storm density and the tropospheric conditions, as determined by GPS, this approach will also contribute a new observing technique to monitor the dust storm dynamics by providing continuous and reliable GPS observations.

Keywords: GPS, tropospheric delay, aerosol, Asian dust storm, PM10