



Aerosol - cloud - water vapor relations for cloud systems of different heights

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Here we examine the annual and seasonal aerosol - cloud relations over three major urban clusters of China, for different cloud heights and atmospheric water vapor amounts, using a decade of Aerosol Optical Depth at 550nm (AOD), Cloud Cover (CC), Cloud Optical Depth (COD), Water Vapor (WV) and Cloud Top Pressure (CTP) data from the MODIS instrument. Over all regions (spanning from temperate to tropical monsoon climates) and for all seasons, CC is found to increase with AOD, WV and cloud height. Aerosols, at low WV environments and under constant cloud height, have less impact on CC than at high WV environments. In addition, AOD has a varying influence on COD depending on CTP. Finally, COD is found to increase with height for low and middle height clouds, and with increasing AOD, especially at low AOD, the latter being in line with the expected first indirect effect. This research has been financed under the FP7 Programme MarcoPolo (Grand Number 606953, Theme SPA.2013.3.2-01).