4.151 Characteristics of precipitation response to the severe hazes in Korea peninsula.

Early Career Scientist

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Abstract:

The quantitative understanding of aerosol-cloud-precipitation interactions is still insufficient despite substantial efforts to solve this problem since it has inherent complexity. In East Asia, Korea is located in the downwind of China and likely to be vulnerable to long-range transported aerosols, which are expected have an inadvertent weather modification. With this regard, we used observed aerosol data of surface in Seoul (SL) and Baengnyeongdo (BN) from 2011 to 2016 to classify hazes types to long-range transported haze (LH), yellow sand (YS), urban haze (UH) and mixed haze (MH) (Lee et al., 2017). To demonstrate a possible evidence of aerosol impacts on precipitation with long-range transported hazes and yellow sand, we have analyzed the difference of precipitation timing between observational precipitation and forecasting precipitation when the weather forecast failed to catch the precipitation during classified hazes, especially LH and YS. We interestingly found that precipitation timing during LH tends to coincide with aerosol variations specifically in terms of temporal covariation, which is contrast to YS, such as YS following precipitation. Precipitation timing mostly seems to be controlled by large scale synoptic forcing during the YS event, whereas enhanced aerosol loadings in severe hazes are thought to impact clouds and precipitation in temporal scale

like timing of observed precipitation. So we briefly conduct numerical simulations to assess how LH could modify the clouds and precipitation. Simulated results show that cloud fraction with increased aerosol is increased, whereas precipitation rate is decreased. In spite of lacked cloud information of observed data and detailed cloud resolving simulation not represented, the results would prove aerosol-cloud-precipitation interaction in both observation and model. The quantitative evaluations of its results need more detailed modeling works using suitable cloud physical scheme to evaluate extended precipitation.