

Modeling the radiative impact of dust storms on biogenic volatile organic compounds (BVOCs) emissions in East Asia

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Biogenic volatile organic compounds (BVOCs) play an important role in regional and global atmospheric chemistry, carbon cycles, and climate. Emissions of BVOCs are highly sensitive to vegetation types and climatic conditions including downward solar radiation, vegetation temperature, which could be strongly influenced by dust storms. In this study, a regional atmosphere-chemistry-land model, (WRF-Chem) is used to simulate dust emissions, transport, and the associated radiation forcing. The impacts of dust aerosol on BVOCs emissions in downwind areas, such as East China, Korean Peninsula, and Japan are calculated online with a biogenic emission model in the WRF-Chem. The simulation period covers the spring season in 2011 when several severe dust storms starting from the Gobi Desert and Northeastern China were observed. Satellite measurements of aerosol optical depth (AOD) and observation of surface radiation datasets are used to evaluate the model performance in simulating dust aerosol concentration and its radiative forcing. The results from this work demonstrate the influence and importance of dust storms on BVOC emissions in East Asia.

Keywords: BVOCs, dust storms, East Asia, AOD