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# Seasonal effects of wind-blown dust emissions on size-resolved aerosol acidity over the U.S

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Wind-blown dust emitted by the Earth's surface is one of the major sources of dust emissions especially in non-vegetated areas like deserts and can affect both climate and human health. Acidity is an important property of atmospheric aerosols impacting a series of related processes and can be affected by these emissions of alkaline dust. In this work, we use a wind-blown dust emissions model to quantify the wind-blown dust emissions over the continental United States during February and July 2017. The modeling domain covers a region of 4752 × 2952 $km^2$ including northern Mexico and southern Canada with a horizontal grid resolution of 36 × 36 km. Then, the hybrid version of aerosol dynamics in PMCAMx (Particulate Matter Comprehensive Air-quality Model with Extensions) chemical transport model is used to simulate size-resolved aerosol acidity. In this version of PMCAMx for fine ($PM_1$) particles, bulk equilibrium is assumed, while for larger particles a dynamic model is used to simulate the mass transfer to each size section. Two cases of simulations are performed. The first is the base case simulation and includes the wind-blown dust emissions for both months. The second one neglects these emissions in order to study their effects on aerosol acidity during a wintertime and a summertime period as a function of particle size and altitude.