



High resolution satellite derived erodibility factors for WRF/Chem windblown dust simulations in Argentina

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A proper representation of dust sources is critical to accurately predict atmospheric particle concentrations in regional windblown dust simulations. The Weather Research and Forecasting model with Chemistry (WRF/Chem) includes a topographic-based erodibility map originally conceived for global scale modeling, which fails to identify the geographical location of dust sources in many regions of Argentina. Therefore, this study aims at developing a method to obtain a high-resolution erodibility map suitable for regional or local scale modeling using WRF/Chem. We present two independent approaches based on global methods to estimate soil erodibility using satellite retrievals, i.e. topography from the Shuttle Radar Topography Mission (SRTM) and surface reflectance from the Moderate Resolution Imaging Spectroradiometer (MODIS). Simulation results of a severe Zonda wind episode in the arid central-west Argentina serve as bases for the analysis of these methods. Simulated dust concentration at surface level is compared with particulate matter measurements at one site in Mendoza city. In addition, we use satellite aerosol optical depth (AOD) retrievals to investigate model performance in reproducing spatial distribution of dust emissions. The erodibility map based on surface reflectance from MODIS improves the representation of small scale features, and increases the overall dust aerosol loading with respect to the standard map included by default. Simulated concentrations are in good agreement with measurements as well as satellite derived dust spatial distribution.