

Title: Modeling the Impact of Land Use Changes on Utah Dust Emissions

Characterization of dust emission and transport in Utah is important as population expands and topography changes. Increased dust concentrations can impact environmental issues such as air quality and mountain snow melt rates. The purpose of this research is to understand how changes in both land use and meteorological conditions affect emitted dust concentrations. Quantifying the impact of land use changes on dust emissions, and by extension environmental issues, can help inform land use policies. Investigation of land use impacts is accomplished using a computer modeling framework based on the Weather Research and Forecasting model (WRF) paired with the Community Multiscale Air Quality model (CMAQ). An example of one such land use change is the shrinking of the Great Salt Lake (GSL). For this study, the model domain is manually edited to modify the GSL shoreline, changing the default land use, which increases the amount of erodible land available to emit dust. These changes can then be coupled with weather patterns that vary in wind speed and direction to better understand the impact of land use changes in an assortment of weather events. Simulation results show localized increases in dust concentrations around the GSL as the lake level decreases. The changes in predicted dust concentration magnitude and distribution are shown to depend on the nature of the weather event.

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