



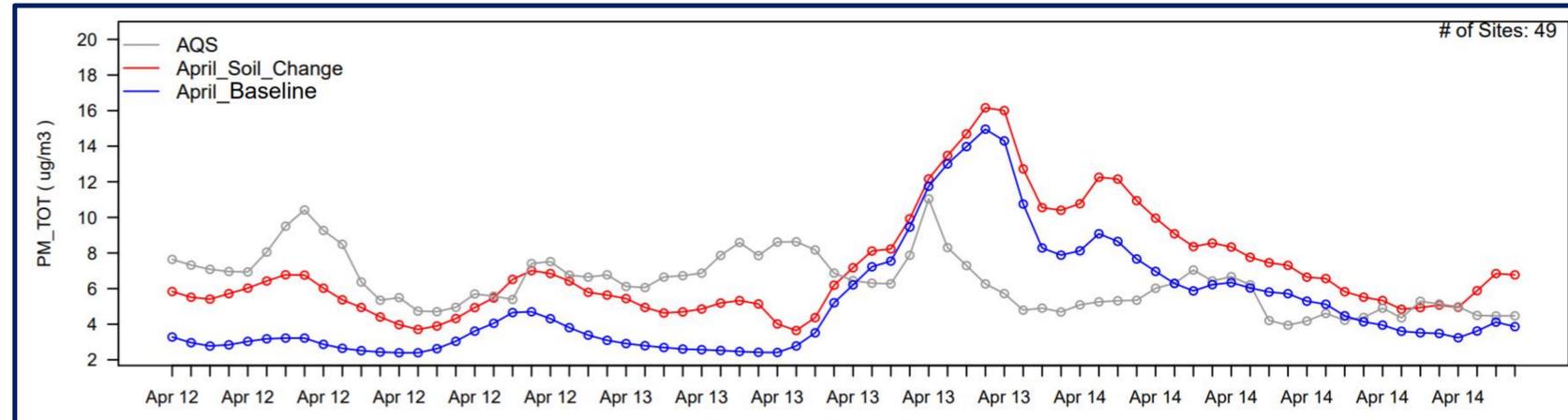
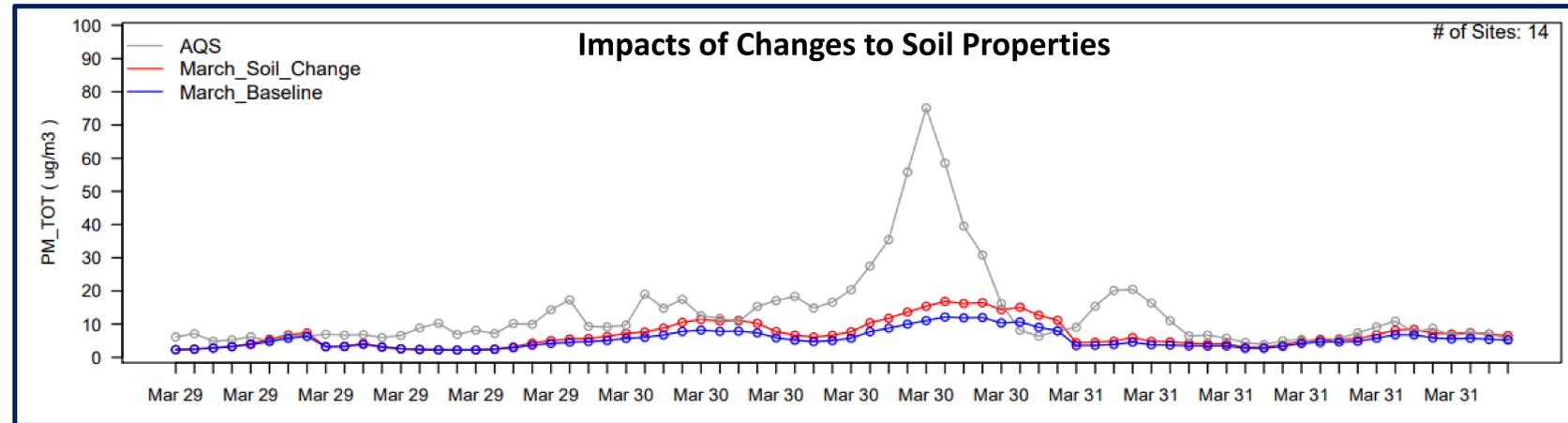
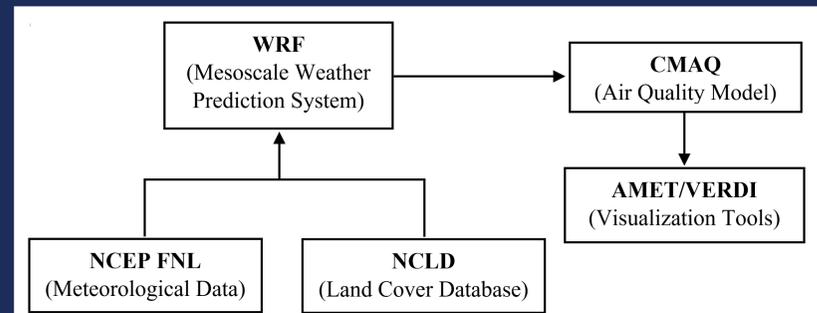
Modeling Current and Future Windblown Dust Events In Utah Using CMAQ 5.3.1

Objective: Develop a dust emission and transport modeling framework to predict current and future dust events. Use “what if” scenarios to guide government land use policies and assess future climate impacts.

Model Framework : A dust emission and transport modeling framework is based on the following key programs and data:

- NCEP FNL Operational Analysis Data
- National Land Cover Database (NLCD)
- Weather Research and Forecasting (WRF)
- Community Multiscale Air Quality (CMAQ) Modeling System

Meteorological data is taken from NCEP FNL Operational Analysis database. Land use and soil type data is taken from the National Land Cover Database (NLCD). Soil properties for a given soil type are given by a look-up table in the CMAQ dust module.



Approach: CMAQ v5.3.1 includes a dust module that uses meteorological data, land use categories, snow cover and the following soil properties to determine dust emissions:

- Silt, clay, coarse and fine sand fractions
- Mean diameters of silt, clay, coarse and fine sand particles

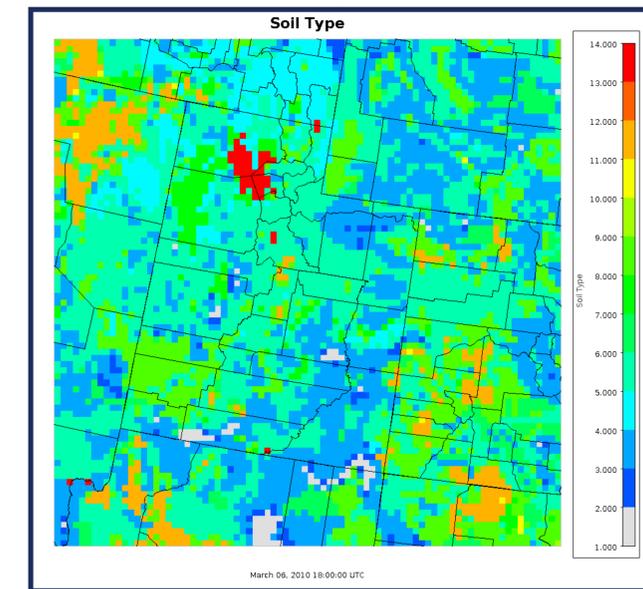
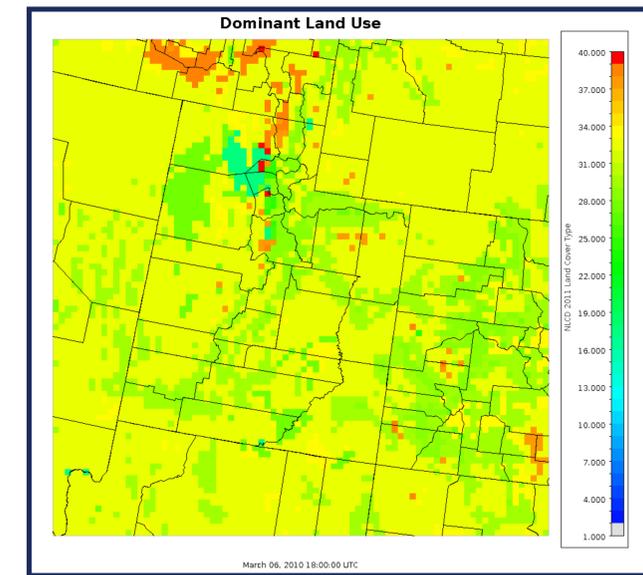
Land use category, snow cover and soil properties can be manipulated to perform “what if” scenarios using WRF utility programs.

Initial Results:

- Increase in silt soil fraction shows increase in dust emissions
- Unrealistic snow cover produced by WRF PX land use model needs to be modified

Example “What If” Scenarios:

- Increased dry lakebed around the Great Salt Lake
- Addition of a dust emission source near Salt Lake - Utah County line



CMAQ Dust Model