Impact of Soil Moisture and Soil Texture on Dust Generation. (S11-neumann031420-Oral)

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Abstract:

In California's Central Valley, soil-derived materials are important components of PM10. Particularly during harvest and land preparation, agricultural operations can be major contributors to the high concentration of airborne particulates, which may contribute to respiratory problems among agricultural workers and the public at large. Difficulties in controlling environmental conditions during field dust sampling led us to develop a laboratory dust generator that provides reproducible soil dust samples. The mineralogical and chemical compositions of the field-collected and laboratory-generated dusts from the same agricultural plots were shown to be similar. Using this laboratory dust generator, we compared the concentrations and sizes of dust generated by soils of different textures over a range of gravimetric water contents. Results indicate that concentrations of dust generated increase with increasing clay and silt content, and decrease with increasing sand and moisture content. Insights from this study may be useful in prediction of dust emission rates from different soils, which can help in formulating strategies to reduce PM10 and PM2.5 emissions during agricultural operations.

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Presentation Information:

Presentation Date: Wednesday, November 13, 2002

Presentation Time: 3:30 pm

Keywords:
dust emission, dust generation, PM10, PM2.5