SOIL AND ATMOSPHERIC SCIENCES

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ABSTRACTS

The Relationship Between Cl and SO_4 Particulate Concentrations and Air Masses. RICHARD H. GRANT AND WILLIAM W. MCFEE, Department of Agronomy, Purdue University, West Lafayette, Indiana 47907.——A study to describe the particulate characteristics of the surface layer of the atmosphere over a region of southwest Indiana was conducted. The particulate size distribution (mass median diameters (MMD) of 7, 3.3, 2, 1.1 μm and less than 1.1 μm) of sulfate and chlorine anions are determined for thirty-nine 24-hour periods between September 1985 and April 1986.

Results indicate that: 1) high concentrations of chlorine in large particles (MMD greater than or equal to 3.3 μm) correspond with southerly winds of maritime tropical air-mass air, 2) low concentrations of chlorine in large particles correspond with westerly winds of continental air-mass air, 3) high concentrations of sulfate in giant particles (MMD 7 μm) correspond with both synoptic situations but the maritime tropical air-mass air had higher concentrations of both giant particle and small particle (MMD < 1.1 μm) sulfate than the continental air-mass air at the site of measurement. It was concluded that the large particle sulfate and chlorine was at least partially due to sea salt particles from the maritime air mass.

Construction of Highway Embankments over Amorphous Peats and Mucks. C.W. LOVELL AND TIMOTHY CROWL, Purdue University, West Lafayette, Indiana 47907.——There are a large number of deposits of amorphous peat and muck scattered across the State of Indiana. Highway embankments constructed over these materials have experienced large settlements over extended periods of time, resulting in excessive distress to the roadways. This paper focuses on the development of a laboratory procedure to be used in the design of highway embankments across such materials to minimize settlement during their service lives.

The procedure has been identified on the assumption that embankments will be constructed using staged loading methods, allowing a majority of the settlement to occur during construction. Laboratory tests performed on samples produced from a thoroughly remolded slurry will be used for design. K_o triaxial tests will be performed to determine the failure envelope of the materials. Creep tests will be run at stress levels that will simulate the staged loading of the foundation materials to determine the coefficient of secondary compression for use in a settlement prediction model.

During subsequent embankment construction the failure envelope will be used to determine the magnitude of load that can be applied without shearing the foundation material. The duration of each load will be determined from the settlement prediction model.