SOIL AND ATMOSPHERIC SCIENCES

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ABSTRACTS

An Agroclimatological Grid System: A Preliminary Report. J. M. Davis, Indiana University, Bloomington, Indiana 47401.——Significant advances have been made in modeling the physiological aspects of plant growth and the plant's microclimatological environment. To make operational use of these models on a day-to-day areal basis, microclimatological data must be collected and processed more efficiently. To that end, this paper describes the establishment of an 800-point agroclimatological grid data system for the southeastern United States. Grid point data consists of two main types: that data which is collected each day (e.g., air and soil temperatures, rainfall, soil moisture, etc.) and data that generally remains constant over time (e.g., grid point climatological data, soil horizon data, "major crop" grid data, etc.). A 3-D grid array is needed for some data sets. The grid is resolved by means of a variational analysis method. Analysis of the observed rainfall and temperature data is compared with the analysis of the grid data generated by the variational analysis procedure. Flow charts are provided which show how a complete system of plant models, microclimatological models, and grid data could be organized for efficient operational use. Consideration is also given to problems associated with areally sparse data.

Regionalizing Purdue's Soil Testing Procedures. Russell K. Stivers, Department of Agronomy, Purdue University, West Lafayette, Indiana 47907.——Recommended chemical soil testing procedures for phosphorus and for potassium for the North Central Region were compared to Purdue procedures for these plant nutrients. Soils were weighed rather than scooped in all experiments. In two experiments, each with six different soils and three replications per soil, there were no significant (probability $< .05$) differences in phosphorus test values between the Purdue procedure for Bray-1 phosphorus and the Regional procedure, both of which used aminonaphthol-sulfonic acid, sodium sufite, and sodium pyrosulfite in the reducing agent to develop the ammonium phosphomolybdate blue color. The main differences were in volumes and concentrations of reagents used in color development, resulting in different standard curves for percent light transmittance (660nm) versus concentration of phosphorus. The neutral normal ammonium acetate procedures used both by Purdue and by the Region to extract soil potassium differed from each other in (a) soil to extracting solution ratio, (b) in length of shaking time, and (c) in type of extraction vessel. These differences were made the basis for four treatments each with three replications in two different experiments, one with six soils and one

with eight other soils. These treatments resulted in significantly different soil test values for potassium with only one of the six silt loam or heavier soils, in none of the four sands or loams, and in three of the four organic soils.

Have the Mississinewa and Salamonie Reservoirs Changed the Climate at Marion and Huntington, Indiana? ROBERT F. DALE and PATRICK R. CLARE, Department of Agronomy, Purdue University, West Lafayette, Indiana 47907.——The effect of the Mississinewa and Salamonie reservoirs on modifying air temperatures at Huntington and Marion, Indiana, is small. Since these mesoclimatic anomalies are likely to be smaller than those induced by any changes in weather station location, instruments, or time of observation, it is mandatory that only homogeneous station records be used to identify reservoir effects. Under prevailing southwesterly flow, there is some evidence that the August daily mean maximum temperatures at Huntington, 13 km "downwind" from the Salamonie Reservoir, were decreased about 0.5°F by the reservoirs. Two techniques were used to investigate the temperature change, and recommendations are made for future work.

Soil Aggregates ($>$ 210 μ) Transported in Runoff from Northeastern Indiana Cropland. S. A. SCHROEDER, J. V. MANNERING, C. B. JOHNSON, Purdue University, West Lafayette, Indiana 47401.——To determine the percentage of soil loss as aggregates larger than 210 microns, samples of runoff were taken throughout three simulated rainfall tests on four soil types. The soils used were level Hoytville silty clay loam, Nappanee loam, and Haskins loam and gently sloping Morley loam. Work was conducted in the Black Creek Study Area of the Maumee basin in Allen County, Indiana.

Values ranged from approximately 3% to 29% depending upon the treatment and soil under consideration. It was concluded that the low velocity of runoff was the limiting factor in the transport of aggregates larger than 210 microns on the three soils with level ($<$ 2%) slopes. On the Morley soil (4% slope) the factor limiting soil loss in aggregate form appeared to be the poor structure of the soil *in situ*.

Therefore, these results indicated that effective measures for reducing erosion of aggregates larger than 210 microns on nearly level slopes must be based on prevention of detachment and dispersion of naturally-occurring aggregates by raindrop impact rather than on control measures designed to reduce runoff velocity.

Additional key words: erosion, aggregates.

Use of LANDSAT Imagery as a Base Map for Making a General Soils Map. KARL H. LANGLOIS, JR., United States Department of Agriculture, Soil Conservation Service, Monticello, Indiana 47960, LARRY C. OSTERHOLZ, Indiana Department of Natural Resources, Monticello, Indiana 47960 and FRANK R. KIRSCHNER, Laboratory for Applications of Remote Sensing, Purdue University, West Lafayette, Indiana 47907.——General soil maps provide important resource data for a wide range of uses. Previously, detailed soil maps were used with a county road map as a

base map to develop a general soil map. In White County, Indiana, LANDSAT imagery was used as a base map. LANDSAT imagery shows, in color, many patterns that depict soil landscape units. A major benefit of LANDSAT imagery is that it permits an evaluation of the soil landscape independent of the soil maps. Use of LANDSAT imagery also improves the accuracy of placing boundaries on a general soil map, and the ease in which it is made.

Mapping Unit Composition as Defined by Digital Analyses of LANDSAT Multispectral Data. Frank R. Kirschner, Sue A. Kaminsky, and Donna K. Scholz, Laboratory for Applications of Remote Sensing, Purdue University, West Lafayette, Indiana 47906.——Multispectral data obtained from LANDSAT and analyzed by digital computer was used to develop a classification (soils map) of a four-square-mile area of Clinton County, Indiana. Using spectral data, three distinctly different soil mapping units were investigated to determine the nature and extent of the inclusions in each. Fifteen spectrally different patterns were recognized based on their spectral response statistics. These spectral classes were placed into four soil groups and one vegetative group based upon the magnitude of their reflectance and the ratio between the visible and near infrared reflectance. The four soils groups can be related to four distinct soil drainage classes. These classes were used to characterize the inclusions within the mapping units. Results indicate that the composition of the soil mapping units can be quantified and characterized using multispectral digital data.