Spatial and Temporal Variation of Solar Insolation Over Landscapes as a Tool for Mapping Soils in the Field. (5148)

Authors:

- D.J. Merkler* - *USDA-NRCS*
- P.J. Drohan - *UNLV - Dept Geoscience, Las Vegas, NV*
- M. Sappington - *NPS-LMNRA, Boulder City, NV*

Abstract:

At a landscape scale, topography is the major factor modifying the distribution of solar insolation. Variability in elevation, surface orientation (slope and aspect), and shadows cast by topographic features create strong local gradients of insolation. These gradients of solar insolation lead to spatial and temporal variability of local energy and water balance, which determine microenvironmental and microclimatological factors such as air and soil temperature regimes, evapotranspiration, and available water supplying capacity of the soils. These factors in turn affect the spatial patterning of soils and plant communities across the landscape. We propose the use of spatial solar radiation models, which provide a cost-efficient means for understanding the spatial and temporal variation of insolation on the landscape, as an improvement over simply using slope and aspect effects in developing soil mapping concepts. Such models are best made available within a geographic information system (GIS) platform, whereby insolation maps can be conveniently generated and related to digital soil layers.

Speaker Information: Douglas Merkler, USDA-NRCS, 5820 South Pecos Rd., Bldg. A, Suite 400, Las Vegas, NV 89120; Phone: 702-262-9047 ex 106; E-mail: dlmerkler@earthlink.net

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