# SoLIM: A GIS, Expert System and Fuzzy Logic Approach to Soil Mapping Under the Soil-Landscape Model Concept. (S05-zhu000538-Oral)

Authors:

- A.X.Zhu Geography, UW-Madison
- J.E.Burt Geography, UW-Madison
- B.Hudson USDA-NRCS
- S.Kunickis USDA-NRCS

# Abstract:

This paper presents an overall approach to soil mapping using GIS, artificial intelligence techniques and fuzzy logic concept under the soil-landscape framework. The approach is referred to as the Soil Land Inference Model (SoLIM). It consists of four major components: a similarity model, a set of GIS techniques, a suite of artificial intelligence methods and a fuzzy inference engine. The similarity model is for representing soils as continuum both in the spatial and attribute domains. The GIS techniques are used to characterize the soil-formative environment conditions (the landscape conditions). Artificial intelligence techniques are used to extract the relationships between soil and its environmental conditions. A set of inference techniques constructed under fuzzy logic (the fuzzy inference engine) are used to combine the formative environment conditions characterized using the GIS techniques with the soillandscape relationships extracted through the artificial intelligence techniques to predict the spatial distribution of soils. Case studies have demonstrated that this approach not only improves the accuracy of soil information products, but also shortens the cycle and reduces the costs of soil information production.

### **Corresponding Author Information:**

A-Xing Zhu University of Wisconsin-Madison 550 North Park Street Madison, WI 53706 phone: 608-262-0272 fax: 608-265-3991 e-mail: axing@geography.wisc.edu

# **Presentation Information:**

Presentation Date: Tuesday, November 12, 2002 Presentation Time: 10:00 am

Keywords: SoLIM, Predictive soil mapping, GIS, Fuzzy logic