Integrating General Knowledge with Location Specific Knowledge for Knowledge-based Fuzzy Soil Mapping. (S05-shi090714-Oral)

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Abstract:

During building a knowledge-based system for fuzzy soil mapping, we have observed two types of knowledge from soil scientists: the knowledge about the general relationship between the soil and the environmental conditions of a given mapping area; and the knowledge about the association between a certain soil and a specific landscape. Of great value is the specific knowledge that is not totally consistent with the general knowledge. The addition of this kind of specific knowledge should lead to a more comprehensive representation of the soil scientist's knowledge, thus results in more accurate soil mapping. Based on this thought, the soil inference procedure is designed as follows: 1. Use the general knowledge and rule-based reasoning to derive the main pattern of the soil distribution in the mapping area; 2. Use the specific knowledge and case-based reasoning to fine-tune the result from the first step. For a study area in Southern Wisconsin, this integrating methodology demonstrated advantages not only over the traditional manual mapping process, but also over the computerized methodology that employs only one of the two types of knowledge and one of the two reasoning methods.

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