

GLOBAL SOIL DATA BASES FOR ENVIRONMENTAL MODELING

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Understanding global processes requires integrating information on physical, chemical, and biological processes at a variety of spatial and temporal scales. Many of these processes depend on or interact with the world's body of soils--the pedosphere. Soil maps provide a stratification of the landscape designed to separate major elements based on observable soil properties. Traditionally, soil scientists have made their stratifications sensitive to agricultural productivity, but other ecological processes are now considered. Carbon storage in soils is an indicator of fertility and also a source or sink for atmospheric carbon dioxide or methane, which influences greenhouse gas concentrations. The dynamics of soil moisture is significant, not just for crop survival, but as a component of general circulation models of the atmosphere. The existing data bases of soil distribution and properties can provide valuable information for these additional interpretations. A key link is a soil taxonomic system that can account for the physical and chemical properties that vary within seasons, such as soil moisture and soil temperature regimes. Global soil data bases at mapping scales of 1:30,000,000 and 1:5,000,000 have been developed that include attribute files of soil properties by taxonomic class. The data bases are used to produce interpretive maps and data sets relevant to interdisciplinary global change research.

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