

GEOCHEMICAL AND LITHOLOGICAL SUSCEPTIBILITY

Kramer (1976), McMaster University

Objective

To identify the interactions of soils and rocks with acid precipitation and associated metals in order to predict the resulting water quality.

Criteria

- (1) Mineralogy of surficial deposits, surficial and subsurface bedrock hydrology, and soil depth.
- (2) CEC, pH and base saturation.
- (3) Provenance of deposits.

Sensitivity Class Definitions

Kind	Alkalinity	pH	Buffering Capacity to Acid Rain
Calcareous rock and soil	2 meq/l	8	very large
Fine grained non-calcareous soils and sediment	0.2 to 1 meq/l	6-7	can be altered
Non-calcareous rock outcrop	0.1 meq/l	4-7	is altered by acid rain

Interpretation

A calcareous region buffers even intense acid loadings at about pH 8.0. Unconsolidated sediment within an alumino-silicate region buffers acid loadings at pH 6.5, whereas alumino-silicate outcrops are generally acidified.

Evaluation

The mineralogy of the unconsolidated post-glacial cover is the most important parameter in H⁺ ion assimilation in non-calcareous terrain. Hydrologic information, surficial and subsurface, is required especially where lower soil horizons may be calcareous.