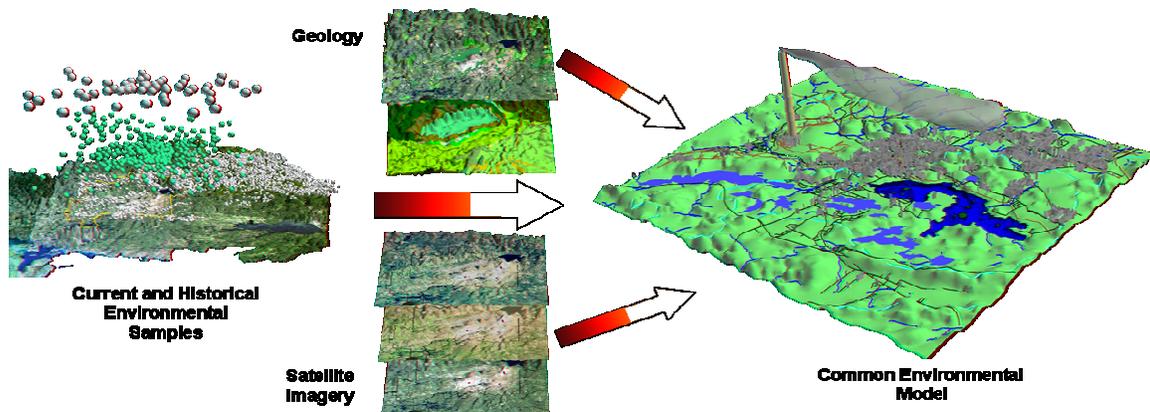


Multi-dimensional ecosystem modeling and its importance in comprehending and interpreting complex anthropogenically impacted ecosystems.

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The goal is to find new and innovative ways of displaying and interpreting environmental data gathered through sampling and monitoring by visualizing, analyzing and interpreting the data in 3 or more dimensions. Utilizing Laurentian University's CIMTEC Virtual Reality Facility, a multi-dimensional model of the Sudbury ecosystem will be produced to better explain the variability in traditional environmental studies. Instead of viewing only a single feature or component of the environmental landscape, multi-dimensional models would be used to verify if results seen in the primary data collected during a study is partially influenced by another factor, not just, for example, a point source of contaminant. This will be done using spatial analysis, multivariate statistics and computational fluid dynamic modeling of the primary and secondary datasets and through the creation of a Common Environmental Model. The primary dataset, collected in 2001 represents a landmark in the history of environmental sampling; over 4000 soil samples were collected at 4 different depths from 370 natural undisturbed locations within 100 km of the City of Greater Sudbury, 8000 soil samples were also collected at 3 different depths in urban areas, 4300 water samples were collected from lakes located around the City and snow samples were collected from about 60 sites around Sudbury. All of these samples are currently being analyzed for heavy metals by traditional geochemical methods. These samples form the base of the multi-dimensional model; the snow samples contain the atmospherically deposited contaminants, the soil contains the historical record of the contaminants that have been deposited and finally the lake samples contain the contaminants that eroded from the soil. The secondary datasets consist of various data that relate in one way or another to the primary data. The most significant dataset is the analytical results of the soil and water samples that were collected in the Sudbury region for over 30 years as a requirement for environmental impact monitoring of the smelters. These historical datasets would be used to model the fourth dimension; the change in the contaminant concentrations over time. Other datasets include, but are not limited to geology, watershed units, city infrastructure and other environmental analysis.



Integration of multiple datasets into the Common Environmental Model for analysis.