

VPAST Lecture in EMERGING TECHNOLOGY

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"Environmental Data Treatment to Extract the Knowledge Needed to "Advanced Decision-Making" - Mixed Approach to Modeling and to Simulate "Natural or Not" Processes Effects in the Environmental Sciences: From the GIS to the Data Mining through the Determinist Modeling"

March 29, 2005

3:00 P.M.

Big 12 Room, K-State Student Union

Environmental Engineering Sciences must bring up advanced methods to help decision making. In the environmental resources or environmental impacts management linking with - hydrology and river floods, hydrodynamics and available water resources, atmosphere dynamics and the air pollutant and greenhouse effect - many environmental data exist. One of the issues is how can be explored the environmental data which can be geographical data or not, qualitative or quantitative data, time data, to extract the knowledge needed to evaluate the environmental consequences and need to authorities.

In this context, the research team approach is based on 3 steps: these methods are introduced with 3 examples: these permit one to show the increasing complexity of the research and technical problems.

- **first**, the GIS and spatial analysis capabilities were explored to make an adaptive tool for the emergency plan when river flood appears,
- **second**, all the effects of the process were not available, it was necessary to develop tools to anticipate the effects of a new scheme of the process: a determinist modeling inter operating with a GIS can permit one to obtain new information about it. An example of water resource is introduced with the management of the lake/river and aquifer water exchanges for nature conservation needs,
- **third**, to evaluate safety risk, to release pollutant warning (if concentration is greater than given threshold, for instance), the process forecast must be computed. This approach is based on a new analysis method combining computing sciences, shape recognition, data mining, spatial analysis (geomatics) and determinist modeling. For the atmosphere, the ozone and odors forecasting belongs to these open problems.

Sponsored by the Office of the Vice Provost for Academic Services and Technology and the Department of Civil Engineering