USGS

WATER RESOURCES RESEARCH GRANT PROPOSAL

Title: Web-based integration of multiporosity groundwater modeling with field verification in a virtual workshop environment

Focus Categories: GW, WQ

Keywords: Groundwater modeling, collaborative technologies, field verification, information dissemination

Duration: One Year (April 1999 to March 2000)

Federal Funds Requested: $15,000

Non-Federal Funds: $30,000

Principal Investigator: Dr. David E. Loper: Florida State University, Tallahassee, Geophysical Fluid Dynamics Institute

Congressional District: Florida District #2

Statement of critical regional water problems

Ground water is a critical regional resource, about which we know surprisingly little. There is a strong need for better fundamental understanding of underground flow of water and transport of pollutants, particularly in karstic aquifers, and for the application of this knowledge to the management and protection of water and water-related resources. Substantial progress on these formidable problems will require cooperative interaction among and between scientists, engineers and managers in a variety of administrative entities, including universities, governmental agencies and private industry. This cooperation will include development of new conceptual models of karstic and multi-porosity aquifers, implementation of new mathematical and numerical models, assessing the need for field data to evaluate the model parameters and verify model predictions, collecting the necessary field data, at least on a pilot-project level, developing operational models using 'real-world' problems and disseminating the model results to those managing and protecting the natural resources of the region.

Statement of the results and benefits

In recognition of the problems listed in item 9, the community of groundwater scientists within Florida and adjacent states has formed a new scientific organization called the Hydrology Consortium. The Consortium has more than 100 members affiliated with all major universities and water management districts within Florida, the Florida Department of Environmental Protection, the USGS, NWS, USAF, several municipalities and many private companies. An initial but crucial step toward implementing the Consortium

objectives will be to establish a web-based, virtual workshop arena where information can be shared. Initially the virtual workshop will address the topic of multiporosity aquifer modeling, with a focus on development of new models and field verification of all models. The virtual site will be serve as a communication hub through which the participants can communicate, hopefully with synergistic results. The virtual workshop will begin as a continuation and outgrowth of the Second Workshop of the Hydrogeology Consortium to be held in May 1999, under the direction of Dr. Rodney DeHan of the Florida Department of Environmental Protection. To the extent practical from that time on, the work of that group will be managed through the continuing virtual workshop format. While the proposed research grant is for one year, the virtual format will be continued for an indefinite period.

Nature, scope, and objectives of the research

Efforts to develop and implement projects and protective policies for groundwater resources have been hampered by traditional scientific difficulties inherent in all groundwater-related work, including: the hidden nature of the resource, the complexity of its flow paths, the lack of homogeneity of its water-bearing formations and geologic framework, its interaction with surface waters and the high cost of groundwater data acquisition. Overlain on these scientific difficulties are the differences in viewpoint and in mission of those involved in this arena and the diversity of administrative units involved. In particular, researchers are often hampered by the fact that water-resource information is spread across the collective memories of practitioners, theoreticians, and resource managers. The scientific goals of the Hydrogeology Consortium are the development and application of models that reasonably predict the flow of ground water through karstic systems. However, in order to achieve these goals, an environment needs to be developed which fosters and facilitates meaningful interactions among and between Consortium members, which include scientists, engineers and managers in a variety of administrative entities (i.e., universities, governmental agencies and private industry).

The proposed project is directed at creating the necessary cooperative environment in the form of a web-based virtual, interactive conference/workshop arena. Access to the virtual arena will be pass-worded on an invitation basis at least for the first year. A longer-term goal will be to create an information dissemination component to serve the public and other groups such as secondary education and government.

By means of face-to-face workshops with a strong follow-up in the virtual arena, a strong "sense of community" will be developed among people working in the academic, governmental and private sectors, thereby fostering more efficient communication and utilization of scientifically valid information in management and protection of water-related resources. This is particularly critical when efforts to model karstic systems are tied to field verification that may be conducted over decades by researchers of many affiliations. The interactive nature of the virtual workshop creates an arena where individuals can share knowledge developed over the years of their practice. This interaction should allow significant "gray literature" to be brought forward for discussion and integration into the collective thought processes of the conference participants. The

virtual arena will foster more rapid development of technical information by the synergistic interactions of the participants.

The scope of this research will be to establish the first virtual workshop using commercially available software, commonly known as "conferencing software or "groupware". The concept of the virtual conference or workshop will be discussed and prototyped at the second annual meeting of the Hydrogeology Consortium, to be held in May, 1999. The organizer of that workshop, Dr. Rodney DeHan of the Florida Department of Environmental Protection will work closely with the PI to ensure coordination between the face-to-face workshop and the virtual workshop. Once up and operational, the scope of the virtual workshop will be expanded to include interactions between individuals and groups within the consortium membership throughout the next 12 months. The research aspects of this process will be to determine the best ways to optimize interactions between the members of the consortium.

The following are objectives of the project: · Establish a web-based virtual-workshop environment by May 1, 1999, using commercially available software "groupware" running on an internet server provided by the Geophysical Fluid Dynamics Institute at Florida State University. Key members of the Hydrogeology Consortium (such as the members of the Steering Committee) will be trained on the operation of the groupware prior to the workshop.

- Prepare a demonstration session: a topic related to karst modeling, and timely for Florida, will be selected and a demonstration will be planned and prepared for the second annual meeting of the Hydrogeology Consortium.
- Demonstrate the operation of the virtual workshop at the second annual meeting of the Hydrogeology Consortium in May 1999. Members of the Consortium who have been trained beforehand will serve as facilitators at the face-to-face workshop in late May.
- Continue the virtual workshop. The members of the Hydrogeology Consortium will continue to interact on the karst modeling problem using the internet site maintained by the Geophysical Fluid Dynamics Institute.
- Information dissemination: throughout the period of June 1999 through March 2000, access to the virtual workshop will be expanded to include other interested individuals and groups. The specialized and technical subject areas discussed in the virtual workshop will be summarized and explained in less technical terms so that policy makers and secondary educators will find the information useful.