Atoll Water Budget Modeling: Information Transfer and Training for the Federated States of Micronesia

Funded by:
US Geological Survey, Water Institute Program

Principal Investigator:
John Jenson

Funding: $10,300

Water shortages are a persistent concern for residents of atoll islands. Normally, water demand is met by rooftop rain catchment, but prolonged droughts, such as those associated with ENSO events in the western Pacific region, can exhaust water storage, leaving residents dependent on groundwater or imported water. In response to the recommendation by the FSM Advisory Council meeting of October 23, 2006 in Pohnpei, WERI researchers developed an accurate and practical saltwater intrusion and groundwater evaluation model for atoll islands in the FSM. During 2008 and 2009, the developers of the model presented initial demonstrations to a limited number of available water resource managers and government officials on Yap and Pohnpei. Use of the model to predict the amount of fresh groundwater during average seasonal climatic conditions as well as periods of intense drought for the atolls of the FSM was carried out during the summer of 2010, and results of this analysis, along with additional training on atoll island geology and hydrology, were presented to FSM officials on Pohnpei in October 2010. During this year's Advisory Council meeting on October 5, 2010, on Pohnpei, council members specifically requested further training and presentation of results to be given next year on Chuuk, which contains 11 of the 32 atolls in the FSM. (Item III.5, Education and Professional Training, FSM Critical Water Resources Research, Education And Training Needs: Continue Atoll Groundwater Modeling workshops in all FSM States with atoll islands.)

This is an information transfer project in which end-users will be trained by WERI instructors on the derivation of the model, the operation of the model, the application of the model to estimate the responses of atoll island aquifers in the Caroline Islands to expected types of seasonal and inter-annual changes in rainfall, and finally results of the model when applied to specific FSM atoll islands. Application of the model thus also meets and additional identified need to continue the development of appropriate groundwater management plans for low and high islands throughout the FSM (Item II.4, Water Quantity Projects).

The objective is to train users of the model so that they can independently operate it and interpret the results. Training will be tailored for application of the model to the atolls of Chuuk. Such use may include making forecasts of the effects of selected changes in rainfall on atoll islands affected by significant natural events, such ENSO-driven droughts, tropical storms, or wash-over events. A second objective is to establish an ongoing technical support relationship between the authors and users so that there will be a continuing dialogue to support continued successful use and application of the model to water resource management in the Federated States of Micronesia.