USGS

WATER RESOURCES RESEARCH GRANT PROPOSAL

Project ID: 2002GU1B

Title: Groundwater Infiltration and Recharge in the Northern Guam Lens Aquifer during the record-breaking 1997-1998 ENSO event

Project Type: Research

Focus Categories: Water Quality, Climatological Processes, Drought

Keywords: Rainfall climate, groundwater, inter-annual variation, ENSO, drought, extreme events

Start Date: 03/01/2002

End Date: 02/28/2003

Federal Funds: $14,905

Non-Federal Matching Funds: $0

Congressional District:

Principal Investigator:
Mark Lander
WERI, University of Guam

Abstract

Well hydrographs and rainfall statistics will be studied for the major ENSO episode of 1997-1998 to explore the effects on the aquifer. The immediate objective is an analysis of well responses to a year that featured an abundance of rainfall (1997) followed immediately by the driest year ever recorded on Guam (1998). This will provide baseline information for identifying deviations from the average distribution that have measurable impacts on the aquifer, and implications for a water management plan. Results from this project will provide insight into how Guam• fs northern lens aquifer is affected by an extreme of inter-annual variation of rainfall. The major 1997-98 ENSO event was the largest year-to-year variation of rainfall ever recorded on Guam: from the approximately 130 inches of rainfall experienced during 1997 (including nearly 40 inches of monsoonal rains in August, and 20 inches of rain in 24 hours in Typhoon Paka in December), to the less than 60 inches of rain experienced during the drought year of 1998. This extreme event should provide insight into our understanding of rainfall-recharge relationships that will enable more accurate and precise estimates of recharge, and therefore sustainable yield, to be made for designated well fields and sectors of production in the aquifer. Such understanding will provide a basis for determining appropriate environmental and land use regulations and storm water management practices over the aquifer. The work will be done by the UOG PI (Mark A. Lander) and UOG student help in collaboration with UOG faculty member John Jenson. The results of this study should nicely compliment collaborative research to be undertaken by John Jenson and Steve Gingrich of the USGS Honolulu Field Office who will attempt to model the behavior of the northern Guam lens aquifer. This proposal directly supports three of the Guam Advisory Council• fs stated needs in Water Quality and Water Quantity:

* Conduct evapotranspiration and rainfall studies for northern Guam.
* Determine how global warming/climate change might affect sustainable yield.
* Identify environmental cues that could be structured into an early warning system for climate changes and associated impacts on Guam• fs water resources.