



Evaluating Rainfall Variability and Drought Thresholds for Atolls and High Islands of the FSM



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All states of the FSM are vulnerable to damaging drought conditions, despite high average annual rainfall amounts (e.g., Yap Island = 120 inches, Chuuk Airport = 135 inches, Kolonia, Pohnpei = 185 inches, and Kosrae Airport = 205 inches). In the first few months of the calendar year that follows a strong El Niño, the rainfall across all of Micronesia tends to be well below normal. Sharply reduced rainfall can quickly become a life-threatening emergency as reservoirs and rain catchment systems run dry, and agricultural plants are damaged. This is especially true on atolls where the water lenses are thin and rain catchment is a prominent source of drinking water. Micronesia-wide severe droughts in 1983, 1992 and 1998 required the deployment of U.S. military assets to the islands of the FSM to help transport and generate drinking water supplies. Recently, a more localized severe drought occurred in the northern atolls of the Republic of the Marshall Islands. This drought was so severe over the first few months of 2013 that on 14 June, U.S. President Obama declared a disaster for the RMI, authorizing additional U.S. Government funding for relief and reconstruction. Another recent local severe drought occurred on the atoll of Kapingamarngi (Pohnpei State) where rainfall during the six-month period beginning in September 2010 through February 2011 was only 7.12 inches, or 7% of the normal 48.37 inches. These dry conditions at Kapingamarangi and at other islands close to the equator (e.g., Tarawa and

Nauru) are thought to have occurred because of a La Niña-related westward extension of cold sea surface temperatures along the equator. Small personal distillation units from government and non-government sources and reliable water shipments by the FSM and Pohnpei State governments averted a likely disaster.

The proposed project will compile and evaluate historical and current climate data from all FSM existing sources to include the first-order weather office station data and all secondary stations. The project P.I. has a good working relationship with all FSM weather office managers and access to nearly all data from secondary stations. The data will be analyzed to determine the state-by-state main and outer island character of rainfall, including the typical response to El Niño and the nature (e.g., severity and frequency) of the more localized extremes.

The objectives of this project are to:

- (1) compile as much of the FSM climate record as possible from the first order stations and the growing network of outer island stations;
- (2) analyze the climate records to provide a detailed picture of El Niño-related drought, and the nature of more localized droughts;
- (3) establish impact thresholds during periods of reduced rainfall; and,
- (4) develop an outreach itinerary for group discussion of drought during FSM visits.