



## SEAFRAME SEA LEVEL AND CLIMATE VARIABILITY NETWORK

### FUNDAMENTAL PURPOSE

Sophisticated **Sea Level Fine Resolution Acoustic Measuring Equipment (Seaframe)** monitoring stations throughout the South Pacific are fundamental to the success of this challenging project.

The South Pacific Sea Level and Climate Monitoring Project began in July 1991. By June 1995 11 Seaframe stations had been established in the South Pacific at Cook Islands, Fiji, Kiribati, Marshall Islands, Nauru, Papua New Guinea, Solomon Islands, Tonga, Tuvalu, Vanuatu and Samoa.

An additional station is being established at Pohnpei in the Federated States of Micronesia and feasibility studies for stations in two other Pacific Island countries are planned for later this year.

The stations measure water levels; barometric pressure; and wind speed, direction, and gusts and air and water temperatures. All these measurements are needed to enhance the value of the relative sea level measurements and place them in context. El Nino can cause sea levels to change between 30 and 50cm and storm surges can make a difference of more than a metre.

This is why decades of data are needed to determine credible trends.

Relative sea levels refer to levels being relative to the land. But land movement can cause uncertainty in the determination of Absolute sea level.

A Continuous Global-Positioning System (CGPS) network is being installed and linked to Seaframe gauges. All Seaframe sites will have CGPS stations located near them by mid-2003. The new network will measure vertical and horizontal earth movements and help calculate absolute sea levels.

### ACCURATE GAUGES

The US National Oceanic and Atmospheric Administration developed Seaframe gauges in the 1980s.

Conventional tide gauges had, until then, measured water levels to an accuracy of 1cm. This was not sensitive enough to measure small and gradual changes in just a few decades.

Seaframe sensors can accurately measure to one millimetre.

The stand-alone units are designed to be reliable, even in extreme weather conditions.

### THE DATA

All parameters (water levels, wind, air and sea temperatures, atmospheric pressure) are sampled at one second intervals. Water-level readings are taken and averaged over three minutes and meteorological data is collected and averaged for 2 minutes at the hour.

### RELIABLE POWER AND COMMUNICATIONS

The Seaframe units are powered by solar panels and mains electricity, and have back-up lithium batteries and a back-up data logger.

Data is retrieved remotely via satellite and telephone links and stored at the National Tidal Facility Australia (NTFA) at Flinders University in Adelaide, where it is checked, analysed and quality controlled. Another archive site will be set up during this phase, in partnership with the South Pacific Applied Geosciences Commission (SOPAC) in Suva. And the internationally recognised data centre at the University of Hawaii Sea-Level Centre (UHLSC) will continue to receive this data for the benefit of the world's scientists.



### APPLICATIONS

The long-term results of the project will be applicable to a variety of issues in each country, including coastal management, planning, education, adaptation options, hazard mitigation and national development. Tidal and sea level information is already being used to assist the region's navigation, fisheries, water-resource planning and management, environment and coastal-development planning and forecasting of extreme weather conditions.

### SUSTAINED EFFORT

The PICs will need scientists who can analyse and understand this data if the project's benefits are to be sustained after Australian funding under this project concludes.

A major priority in Phase III will be to transfer technology, enhance human resources and build capacity in the region. To this end, local personnel from counterpart organisations will receive

increased training and be called on by the Australian project partners to help with observations, project management and maintenance.

### FURTHER INFORMATION

**Dr Chalapan Kaluwin** Regional Coordinator  
AMSAT  
PO Box 5212  
Apia SAMOA  
Telephone +685 24 689  
Facsimile +685 25 706  
Email [amsatck@samoa.ws](mailto:amsatck@samoa.ws)

**Dr Wolfgang Scherer** Director  
NTFA  
GPO BOX 2100  
Adelaide SA 5001 AUSTRALIA  
Telephone +61 8 8201 7532  
Facsimile +61 8 8201 7523  
Email [ntf@flinders.edu.au](mailto:ntf@flinders.edu.au)

### SEAFRAME AND CGPS SITES

