

Tuvalu-Funafuti

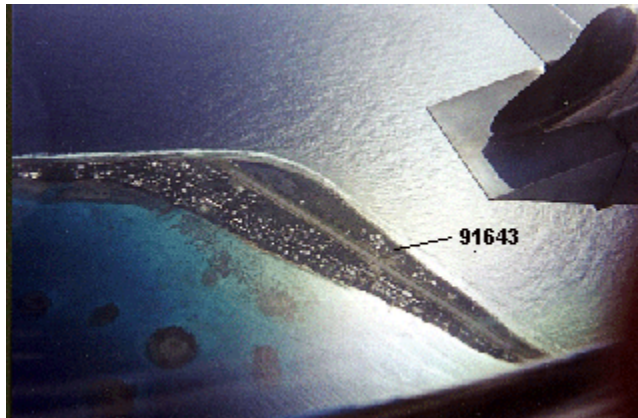
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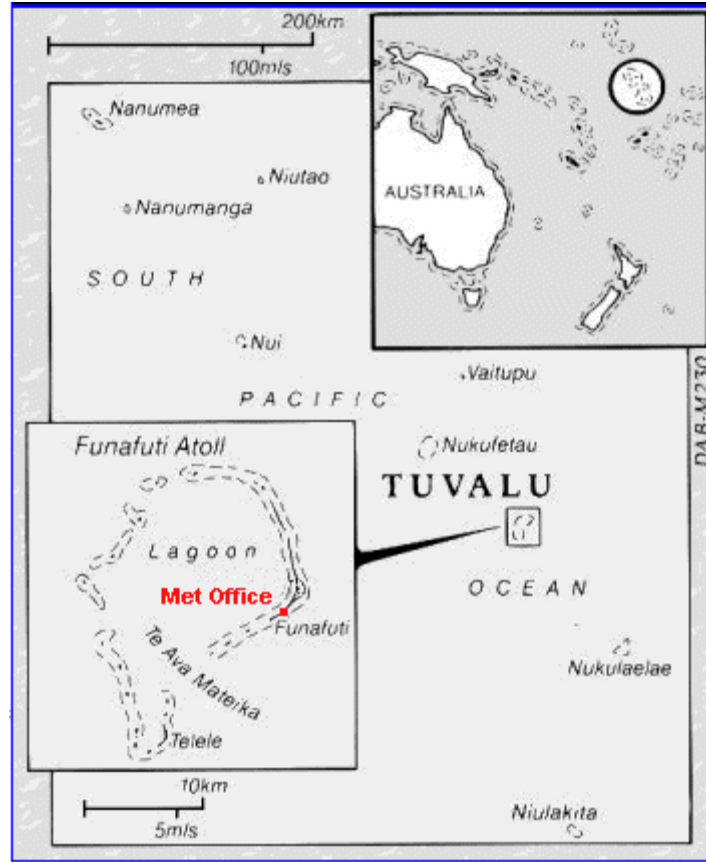
Funafuti Meteorological Observatory



Funafuti Atoll viewed from the air



Location Map of Tuvalu and Funafuti



Tuvalu Meteorological Service (TMS)

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1.0 Introduction

1.1 Background

The Tuvalu meteorological programme began in 1951 under the auspices of the South Pacific Air Transport Council (SPATC). The Council established observing stations in Tuvalu and other Pacific nations in order to supplement the meteorological reporting network in the region. An upper air station was subsequently established on Funafuti in 1960 by the Met Office when the former Gilbert and Ellice Islands were territories of the UK. Following dissolution of SPATC in 1979, Meteorological Service of New Zealand Ltd (Met Service) assumed full support of the programme under an MOU with the Government of Tuvalu. Direct management support continued until early 1989 when the Officer in Charge post was localized. At this stage, some funding for the programme was transferred to the Ministry of Foreign Affairs and Trade (MFAT)/NZ AID but the majority of funding, approximately 80% continues to be supplied and/or managed by Met Service.

Today, the Government of Tuvalu is fully responsible for the operation of meteorological programme in the country, with external collaborating partners such as the Met Office and Met Service providing technical support for the operation of the Funafuti GUAN station.

1.2 Benefits of the Programme

The purpose behind the meteorological programme in Tuvalu continues essentially as it did in the early days, with information from this data sparse area of the tropical western Pacific being necessary for accurate production of weather forecasts, seasonal and interannual climate forecasting (ENSO predictions), and understanding changes in climate and sea level for Tuvalu and its neighbouring Pacific Islands. Tuvalu lies across a known development region for tropical cyclones and ENSO activity. It provides crucial data to global weather, climate modelling and forecasting centres. It also provides the key data used for tropical cyclone and ENSO forecasting. They are also used to calibrate meteorological satellites. Despite modern technology, the value of such data cannot be under estimated. A further and vital purpose for data from this part of the region is associated with attempts to determine the validity of various climate change scenarios. Much has been written on global warming and sea level rise, with the latest reports of the United Nations Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report (IPCC AR4) projecting El Niño like conditions and likely increase in the intensity of extreme events such as tropical cyclones for the Southern Pacific in the 21st century (IPCC, 2007). Given the extent and uncertainties of available climate change scenarios, the most logical step Tuvalu can take at present is to continue an accurate and reliable weather and climate monitoring role. Moreover, the IPCC AR4 concludes managing and adapting to extreme weather and climate events is the most logical first step towards building local adaptive capacity of small islands like Tuvalu to anthropogenic climate change. Such a role is essential in the provision of policy advice to the ongoing debate on climate change and sea level rise, but also to assist in quantifying future changes which may take place (Mimura et al., 2007).

2.0 COMPONENTS OF THE TUVALU METEOROLOGICAL PROGRAMME

The TMS operates two meteorological (including climatological), observing programmes.

2.1 Surface Programme

The surface observation programme is made up of hourly, three hourly, six hourly and/or daily observations of various weather elements. The needs, priorities and systems utilised in the preparation of these reports are formulated and governed under the auspices of the Global Observing System (GOS), managed by WMO members and collaborating partners. The key components of GOS are the World Weather Watch (WWW), Global Climate Observing System (GCOS) and the newly launched Global Earth Observing Systems of Systems (GEOSS). Data generated under GOS is passed immediately to weather forecasting centres around the Pacific region and the world, via the Global Telecommunication System (GTS). The usefulness of GOS data rapidly diminishes the greater the length of time involved in getting data to forecasting centres. GCOS data is mainly summarized monthly.

2.2 Upper Air Programme

Originally, the upper air observation programme in Funafuti was split into radar and radiosonde observations. Although flown together from the same weather balloon, the information obtained for each observation is quite different.

- The radar observation provides essential wind speed and direction data to provide input only into the regular global computer models in the UK, US, France, Brazil, China, Japan, South Korea, Australia and other forecasting centres, but they are also used for local and regional aviation forecasts and general weather services and information at Regional Specialized Meteorological Centres (RSMCs) in Nadi, Wellington, Brisbane, Melbourne and Honolulu. This enables more accurate forecasts to be prepared for Tuvalu and the region.
- Radiosonde observations provide information in addition to the radar – temperature, relative humidity and air pressure data. They are received at the ground station in Funafuti and quickly analysed to give a profile of weather conditions on the ground. They are also used to calculate a profile of the “condition” or “status” of the atmosphere relative to both the surrounding region and the “normal” or standard atmosphere. Such comparisons form the basis of analysis and weather forecasting techniques in global computer and manual models. In 1996, the radar was shut down and replaced by a Vaisala DigiCora MW15, allowing both PTU and winds to be measured using a single system. Originally, winds were calculated using the Omega navigation system, but when this system was shut down worldwide in 1997, the DigiCora was upgraded to fly RS80-15G GPS radiosondes. A further major upgrade of the Funafuti digicora was carried out

in 2006 to allow the use of RS92-SGP radiosondes. While both observing programmes are primarily for weather forecasting purposes, they also contribute to significant atmospheric (climate/ENSO) research programmes from time to time. For example, Tuvalu played a major role in a Pacific wide climate research experiment (Nauru 99) in 1999.

2.3 Other Programmes

The TMS also hosts other scientific and research programmes within Tuvalu such as;

- South Pacific Sea Level and Climate Monitoring Project (SEAFRAME Tide gauges), an AusAID funded project, managed by the Australian Bureau of Meteorology (BOM) (<http://www.ga.gov.au/geodesy/slm/spslcmp/>)
- University of Hawaii Tide Gauge, operated by the University of Hawaii. The project is funded through the University but some maintenance and daily monitoring is provided by TMS staff.
- The Australian Bureau of Meteorology Pacific Islands - Climate Prediction Project (PI-CPP), implemented by BOM staff in collaboration with TMS staff (<http://www.bom.gov.au/climate/pi-cpp/>)

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