Tonga Country Report

Tonga Meteorological Services

Ph. (676)35355 email: metstaff@met.gov.to

Joint Meeting of RA II WIGOS Project and RA V TT-SU

Jakarta, Indonesia / 11 October 2018

BMKG Headquarter

Outline

I. Abstract (updates on status and plan of satellite data access, processing, application and training)

II. Satellite data and product requirements, training needs and infrastructure

Appendix

a. Background

b. Short description of NMHS activities

c. Current observational system overview

d. Access, processing and application of satellite data and products

e. Satellite data to address regional challenges

Abstract (updates on status and plan of satellite data access, processing, application and training)

- The Himawari Cast project had been successfully implemented in Tonga. The himawari dish and system had been set up with necessary training in both technical functionality of the system and SATAID software. As of today, the Himawari Cast system is functioning well. The access to the GSMAP (Global Satellite Mapping of Precipitation) had been successfully been implemented with necessary training. The access to download the JMA data for cloud drift and height is now currently working as well.

Satellite data and product requirements, training needs and infrastructure

- Satellite data and product requirements
  -5-min multi-spectral imagery for tropical cyclone forecasting
- Training needs
  - interpreting RGBs
  - SATAID software use.
  - on different channel available
- Satellite data request

  - Receive specific satellite products via Himawari Cast (e.g. Himawari-8 Sandwich, enhanced colorized IR imagery)

Appendix

Background

I. Country overview

I. Geography

Geographic coordinates: : 20°S 175°W

Consists of 169 islands, 36 of them inhabited,

- **Area:**
  total: 747 km^2
  land: 717 km^2
  water: 30 km^2
- **Coastline:** 419 km (260 mi)
- **Maritime claims:**
  continental shelf: 200 m depth
  exclusive economic zone: 200 nmi (370.4 km; 230.2 mi)
  territorial sea: 12 nmi (22.2 km; 13.8 mi)
- **Terrain:** most islands have limestone base formed from uplifted coral formation; others have limestone overlying volcanic base
- **Elevation extremes:**
  lowest point: Pacific Ocean 0 m (0 ft)
  highest point: Kao Island 1,033 m (3,389 ft)

- Population: 109,008
- Climate:

The climate of Tonga is characterized by the contrast between a wet season (Nov-Apr) and a dry season (May-OCT). About 60-70% of the rain falls during the wet season. Rainfall in Tonga is mainly caused from processes from tropical cyclones and the movement of the South Pacific Convergence Zone (SPCZ).
Avg. annual temp: 23-28C
Avg. humidity: 75%
Highest temp. on record: 35C (11th Feb 1979)
Lowest emp. on record : 8.7C (8th Sept 1994)

I. Major historical hydrometeorological disasters

I. Disaster type and distribution

- Tropical Cyclone Gita, Cat. 4(12 Feb 2018) directly affecting 80% of population.

I. Life and economic loss

As of 15 February at 7.00 UTC, in Tonga one person died, 33 people were injured, 4 500 people were moved into 108 evacuation centres. Total economic value of damage of T$356.1 million (US$164.1 million) which is equivalent to 37.8 percent of the nominal gross domestic product (GDP) of Tonga.

iii. Major national economic sectors relying on NMHSs

1) Agriculture, Forestry and Fisheries
2) Tourism
3) Transportation and Public Utility
4) Other government/non-government agency and PrivateSector.

Short Description of NMHS Activities

Mission Statement: Providing meteorological and maritime radio services in support of economic development, safety, security and general well-being of citizens and visitors to the Kingdom of Tonga.

The Tonga Meteorological Services provide:

- climate services
- avaiation services
- products for farmers and martitime use.
- Tsunami Watch
- TC Watch
- Marine & Public Weather Forecast

Current Observational System Overview

- Surface observations (6 stations), Nuku'alofa, Fua'amotu, Ha'apai, Vava'u, Niuafo'ou, Niuatoputapu.
- AWS currently installing
- 1 Tide Gauge (Queen Salote Wharf, Nuku'alofa)
- Other observation platforms such as wind speed/direction report from commercial ships.

Access, Processing and Application of Satellite Data and Products

I. List of satellites/instruments currently used operationally for NWP, nowcasting and other applications

- Himawari Cast, GSMaP

I. Current capabilities of access, processing and archiving of satellite data and products

- Access data from Himawari cast
- Access satellite products via internet.
- Archive satellite data in a NAS (Network-attached Storage)

I. Current satellite data applications

Key application areas: **Southern Hermisphere (South Pacific Areas)**

II. Satellite-based products: **ASCAT, SATAID**

Satellite Data to address Regional Challenges

With the implementation of the new Himawari Cast system, the Tonga Meteorological Services can now access to more satellite imagery resources. Previously the access to satellite data was restricted by internet bandwidth. Internet costs had been a challenge for many years but the new Himawari cast system had resolved this issue.

There is hope that for future development, the himawari cast can also push through numerical model data (GSM, GFS and others).