PAPUA NEW GUINEA (PNG) COUNTRY REPORT

9th Asia/Oceania Meteorological Satellite Users' Conference

Jarkarta, Indonesia, 06 – 11 October 2018

Prepared by

ANTHONY. KALAI

OPERATIONAL METEOROLOGIST

PNG NATIONAL WEATHER SERVICE (PNGNWS) FORECASTING & WARNING DIVISION

PH: +675 324 4583

FAX: +675 325 5544

Mobile: +675 79366671

EMAIL: asolok@gmail.com

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

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

- In February 2016, the WMO/JMA Project for the Installation of a HimawariCast Receivng and Processing System was implemented in Papua New Guinea (PNG).
- Towards the end of that same year, a two-men expert team from JMA visited the PNG National Weather Service (PNGNWS) to provide brief training on the HimawariCast Receiving System.
- Because of the HimawariCast Receiving System, PNGNWS has been able to have access to near-real-time satellite data that has steadily improved our early warning systems to better observe, detect, monitor and track severe convective systems, particularly.
- Since the inception of this system, PNGNWS has had no major issues with the reception of the multispectral and high temporal resolution satellite data.
- The SATAID application, which is part and parcel of the receiving system, has been very useful as an operational and analysis tool to support our meteorological forecasters to do satellite cloud imagery analysis. In addition, it has enabled our forecasters to overlay satellite imagery with other data received by the HimawariCast service.

- The version of the SATAID application that PNGNWS is currently using does not have the RGB functions, which allow for the display of new RGB recipes and colour interpretations for all RGB recipes.
- The PNGNWS needs assistance to have the RGB functions configured to our SATAID application.
- RGB products will make it possible for the PNGNWS to easily detect fog/low level cloud, forest fire and volcanic ash.
- In the near future, when the RGB functions are incorporated into our SATAID application, the PNGNWS would like to actively assist the Darwin VAAC and the Rabaul Volcanological Observatory (RVO) in terms of volcanic ash detection and monitoring.

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

- Satellite data and product requirements:

  The 10-min multi-spectral data for identifying severe convective systems such as heavy rainfall.

- Training needs:
  - Satellite image analysis and interpretation
  - RGB Image analysis
  - Use of the SATAID software
  - On-the-job training with the NMHSs that are very experienced and knowledgeable with the HimawariCast Receiving system
- Technical infrastructure issues to access and process/visualize satellite data:

  At the moment, PNGNWS does not have any technical infrastructure issues.

Appendix

a. Background

1. Country overview:
   - Geography:
     - Location: Oceania, Group of islands including the eastern half of the island of New Guinea between the Coral Sea and the South Pacific Ocean, east of Indonesia.
     - Area: 462,840 km² (178,703 sq. mi.)
     - Terrain: Mostly mountains with coastal lowlands and rolling foothills. The majority of the people live in fertile highlands valleys that were unknown to the outside world until the 1930s, but that supported agriculture some 10,000 years ago, possibly before agriculture was developed elsewhere.
     - Highest point: Mount Wilhelm 4 509 m
   - Population:
     - The current population of PNG is about 8 million.
   - Climate:
     - The climate is tropical with high temperatures, humidity and rainfall.

2. Major historical hydrometeorological disasters:
   - Floods – February 2016:
     - At least six people in PNG were reported to have died as a result of landslides and flooding caused by heavy rains. 200 homes were destroyed, and bridges were swept away in Oro and West New Britain provinces. Disaster authorities and humanitarian organisations scrambled to assess the extent of the damage so distribution of relief supplies could begin.
     - In Jiwaka Province, the Wagi valley was flooded and numerous landslides occurred because of heavy rains. It was estimated that five thousand households were affected by flooding or landslides. One of the biggest concerns remained food security. Crops that could take nine months to mature were washed away by heavy rain. In the dry season, communities planted close to rivers in the hopes of speeding up the drought recovery, but these much needed crops were swept away by the heavy rain.

- Drought – 2015 to 2016:
  - PNG was impacted by the El Niño climatic phenomenon from mid-2015 to 2016, causing the affected areas to experience less than average rainfall and a series of frost events. The prolonged anomalous weather pattern resulted in water shortages and crop damage in a number of localities, particularly in the Highland provinces.
  - In 2015, the European Commission made over €1 260 000 available to enable its partners to provide relief and build resilience amongst the most vulnerable communities.
  - Overall, a total of 75 000 individuals benefited from this aid, which included health and nutrition support, as well as access to clean water and the provision of water and hygiene kits. Farmers also benefited from training on drought resilient agricultural methods.
  - As the dry spell continued into mid-2016, affecting the food security of close to 1.5 million people nationwide, a further €2 million was released to support a food assistance initiative by the World Food Programme (WFP). The aid focused on meeting urgent food needs of 180 000 people in drought-affected areas.

- Tropical Cyclone Ita - April 2014:
  - Tropical Cyclone Ita was initially identified over Solomon Islands as a category three tropical depression in early April 2014, increasing in intensity before moving west to the shores of PNG.
  - It caused extensive damage to property, displaced many villagers and disrupted livelihoods.
  - Assessments conducted by the National and Provincial Disaster Centres reported 12,346 directly affected people.
  - The number of houses destroyed was extensive, rising to 1,285, with 3,442 food gardens also being hit.
  - Water and food supplies were contaminated or damaged by the storm and 67 classrooms had to be closed.

3. Major national economic sectors relying on PNGNWS:
    - Agriculture
    - Transportation (Air, Land & Sea)
    - Mining
    - Construction
    - Tourism

b. Short Description of PNGNWS Activities

1. All of the activities of the Office of PNGNWS are directed ultimately at the following national goals:
   - Reduction of the social and economic impact of natural disasters,
   - Economic development and prosperity of primary, secondary and tertiary industry,
   - Safety of life and property,
   - National security,
   - Preservation and enhancement of the quality of the environment,
   - Community health, recreation and quality of life,
   - Efficient planning, management and operation of government and community affairs,
   - Provision for the needs of future generations,
   - Advancement of knowledge and understanding of our part of the world,
   - Fulfilment of Papua New Guinea's international obligations; and
   - Promotion of Papua New Guinea's interests to the world.

2. There are four departments within the organization. Below are the departments that make up the NWS:
   - Forecasting & Warning Services;
   - Climatology and Agro-meteorology Services;
   - Observation and Support Services; and
   - Quality Assurance.

c. Current Observational System Overview

1. Surface observations
2. Upper-air observations

d. Access, Processing and Application of Satellite Data and Products

1. List of satellites/instruments currently used operationally for NWP, nowcasting and other applications:
   - Available Satellite Images (IR, Microwave, VIS)
   - Available Numerical Models (BOM, 12k, 70 levels)
   - Near real time observations from satellites – Himawari 8
   - EMWIN (Microwave prod.)
   - Real time observations from Observations network
   - SMART MET (Finish Met. Service) – Operational in 2014, Weather Forecasting and Risk Mapping Tools – Uses GFS data
   - SCOPIC – Statistical Model Climate Predictions (BOM)
   - RIMES WRF (9km) rainfall and temperature forecasts up to 10 days

2. Current capabilities of access, processing and archiving of satellite data and products:
   - HimawariCast Receiving System
3. Current satellite data applications:
   - Key application areas:
     - Weather analysis, forecasting (nowcasting) and warnings
     - Severe weather short-range forecasting
     - Forecast verification
   - Satellite-based products:
     - Cloud imagery products
     - Cloud characteristics products (Identifcation of cloud types, cloud top temperature and pressure level)

e. Satellite Data to address Regional Challenges

The occurrences of flood is a nationwide issue in Papua New Guinea. Because of PNGNWS having full access of the HimawariCast Service, we are significantly improving on our country's preparedness in the face of rapidly developing weather systems such as severe convective systems, which directly result in flood events.