RCOF Review 2017

Pacific Islands Climate Outlook Forum (PICOF)

Status Report (Survey)

Prepared by: Secretariat of the Pacific Regional Environment Programme (SPREP)

Annotated Outline

Specific Climate features of concerned region

The salient features of the seasonal climate of the region (rainy season, dry season), indicating the sources of seasonal predictability (ENSO for example); does a baseline study exist on climate variability in the region and its major forces? Include references to important recent peer-reviewed publications on the subject, along with a brief summary outlining the key messages on the current status of scientific knowledge relevant to seasonal forecasting for the region of interest.

- **El Nino Southern Oscillation (ENSO):** is a major feature of inter-annual (year-to-year) climate variability in the Pacific. ENSO is a natural cycle of the climate system, characterized by distinct patterns of change in winds, surface pressure, surface and sub-surface ocean temperatures, precipitation, cloudiness and convection across the tropical Pacific. Consequently, ENSO has a powerful influence on the climate of the region. All South West Pacific Island Countries are affected by ENSO in some way, although the magnitude and timing of this influence varies between countries. ENSO is associated with large rainfall variations in the Pacific (Figure 3.4). Generally, countries east of about longitude 160ºE and close to the equator experience above-average rainfall during an El Niño, while other countries, those west of longitude 160ºE or more than about 10º from the equator, experience drier than normal conditions.
- **West Pacific Monsoon:** this moves north to mainland Asia during the Northern Hemisphere summer and south to Australia in the Southern Hemisphere summer. The seasonal arrival of the monsoon usually brings a switch from very dry to very wet conditions. It affects countries in the far western Pacific and the Maritime Continent.
- **Intertropical Convergence Zone:** this band of high rainfall stretches across the Pacific just north of the equator and is strongest in the Northern Hemisphere summer. It affects most countries on, or north of, the equator.
- **South Pacific Convergence Zone:** this band of high rainfall stretches approximately from the Solomon Islands to east of the Cook Islands. It is strongest in the Southern Hemisphere summer and affects most countries in the South Pacific.
- **Sub-Tropical and High Latitude Influences:** these include sub-tropical high pressure systems and associated south-east and north-east trade winds, and cold fronts.
- **Madden-Julien Oscillation (MJO):** the MJO is a tropical circulation feature moving west to east along the equator with a frequency of 40–60 days. The MJO brings significant variations in convection and is one of the dominant drivers of intra-seasonal rainfall variations in the tropics. It is most active in December-February, often resulting in short wet and dry periods within a single monsoon season. Active phases of the MJO usually develop in the western Indian Ocean and move eastward into the western Pacific Ocean. In the Pacific Region they can influence the climate variability within a season particularly in Papua New Guinea and the Solomon Islands.

Highlight specific climate sensitive sectors in the region - like agriculture or water resources - mentioning impacts of seasonal climate variations on their activities, along with a brief outline of potential applications of seasonal forecasting products for decision making.

- ENSO is also associated with large year-to-year changes in the risks of drought, flood, tropical cyclones and coral bleaching throughout the region. Consequently, ENSO has significant impacts on agriculture, ecosystems, water resources, emergency management and the health of Pacific Island Countries

The RCOF background

The RCOF details:

- *when/how it started (e.g. preceded by a scoping workshop);*

The Pacific Islands Climate Outlook Forum started as an initiative of the World Meteorological Organization (WMO) Global Framework for Climate Services Project to hold a Regional Climate Outlook Forum in the Pacific. The GFCS Project in the Pacific is funded by the Environment and Climate Canada and is being implemented by the Secretariat of the Pacific Regional Environment Programme (SPREP). The first PICOF was successfully completed on the week of the 12-16 October, 2015 in Suva, Fiji.

With the guidance of the PICs Panel and other partners such as SPC, USP, BoM, NIWA, NOAA, IFRC and a range of other partners. The meeting focused on the water sector with a technical session and a formal session where the Minister from the Government of Fiji, WMO and SPREP officiated the opening. CIMH was invited to the meeting to share lessons from the CARICOF meeting with a total of over 70 participants including students from USP. The PICOF-1 developed and released a Regional Statement on the El Niño and Potential Impacts for the Pacific Islands.

The Second Pacific Islands Climate Outlook Forum (PICOF-2) was hosted by the Fiji Meteorological Service in Nadi, Fiji from 17-18 October, 2016. PICOF-2 focused on the Disaster Risk Reduction (DRR) sector. The Forum was able to improve the understanding of how seasonal climate outlooks are produced, how they are and can be made regionally and nationally relevant, and how they can be tailored to the needs of users from the DRR community. The Forum as produced a Regional Consensus Forecast (November 2016-January 2017) and a Tropical Cyclone Outlook and PICOF-2 Statement on "Impacts and lessons learned from the 2015-2016 El Nino for Climate/DRR and outlook and preparations for the 2016-2017 La Nina.

The Third Pacific Islands Climate Outlook Forum (PICOF-3) is scheduled to be held on 27-29 September 2017, in Apia, Samoa and will focus on the health sector and climate heath related issues in the Pacific.

- *coordinating institution(s) (e.g. RCC/RCC-network, an NMHS, a regional organization)*
  - SPREP, WMO, Fiji Met Service, NIWA, BoM, NOAA
- *sub-region/countries involved;*
  - American Samoa, Australia, Cook Islands, Federated States of Micronesia, Fiji, France, French Polynesia, Kiribati, Marshall Islands, Nauru, New Caledonia, New Zealand, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Tokelau, Tonga, Tuvalu, United Kingdom, United States of America, Vanuatu, Wallis and Futuna.
- *collaborating partner institutions;*
  - SPREP, WMO, Fiji Met Service, SPC, USP, BoM, NIWA, NOAA, CSIRO, APCC, UNDP IFRC
- *typical frequency, target season(s), tentative dates of the session (physical, or online)*
  - PICOF is held annually in the September-October months prior to the SW Pacific Cyclone season and the onset of the wet season.

Note: Information already available in RCOF factsheets[1] published by WMO could be used, unless it needs to be updated.

[1] RCOF Factsheets published by WMO available at : https://library.wmo.int/opac/doc_num.php?explnum_id=3191.

The RCOF process

The RCOF implementation process, including the capacity development activities, the main forum structure, joint sessions with user involvement, sessions focused on specific sector(s), if any.

The PICOF-1 and PICOF-2 structure consisted of learning methods applied during the course of the meeting that included a combination of PowerPoint Presentations, Panel and Plenary Discussions, as well as Group Work that was used to disseminate information and stimulate discussions. The overall intent of the meeting was to provide maximum exposure/scope to the representatives of the Pacific Islands NMHSs, Water and DRR sectors to present their views and/or experiences on how inter-sectoral coordination was conducted during the current El-Nino phase and what could be improved in future, based on lessons learned and information gaps identified.

Below is detailed summary of the main activities and format of PICOF-2:

- Opening and Introduction of the PICOF-2 Session
- Session on "Looking Back and Learning" Presentation of 2015-2016 El Nino
- Regional Overview on the status of the ENSO in 2015-16
- Group discussion on the National Overview of the ENSO in 2015-16
- Session on Lessons Learnt from 2015/16 El Nino and actions (processes) taken by the NMHSs and the NDMO to respond to Tropical Cyclones/ENSO and DRR.
- Group discussions and Mapping of the impacts of the ENSO as observed on the ground
- Session on "Looking Forward and Preparing" Presentation of 2016-2017 La Nina Forecast
- Session on the Presentation on current Tropical Cyclone outlook for 2016/17
- Presentation and discussion on the Consensus Forecast for Pacific Islands (Nov-Jan)
- Discussion on Key Next Steps and PICOF-2 Statement

The current methodology/approach adopted for preparing the seasonal predictions and consensus outlook, including the global/regional/national technical inputs for the process. Indicate whether real-time products from GPC-LRFs are routinely accessed and used.

The methodology used for preparing the seasonal predictions and consensus outlook for PICOF-1 and PICOF-2 included the use of the following Global Climate Models:

- SW Pacific: POAMA, SCOPIC, and Multi-model ensembles (eight models)
- North Pacific: Pacific ENSO Applications Climate (**PEAC**) Center Ensembles

Evaluation of the previous season's consensus outlook:

- *how is outlook skill evaluated, with which skill measures (verification metrics if any), and for what period, with what resulting skill score(s);*
    - The accuracy of the consensus outlook was also evaluated by performing a comparative analysis of the seasonal forecast versus the actual climatological observations. Model verification skill scores of temperature and rainfall seasonal outlooks (e.g. SCOPIC model), tropical cyclone forecasts (BoM, NOAA and NIWA) and ENSO forecasts (IRI, NASA, GFS, ECMWF models) were presented and discussed.

- *how (or whether) is outlook skill communicated to users*

- Evaluation and skill scores of the seasonal consensus outlook is communicated to users during the PICOF through discussions and presentations. Both PICOF-1 and PICOF-2 included presentations and general discussion on the forecasts and impacts of the previous season's climate. In particular, the 2014-2015 El Nino was discussed at PICOF-1 and 2015-2016 El Nino was discussed at PICOF-2.

Further value addition and dissemination of outlooks to stakeholders at national scale, e.g., through National Climate Outlook Forums (NCOFs), or similar activities

- National Climate Outlook Forums (NCOFs) such as recent ones held in Papua New Guinea (2015), Kiribati and Vanuatu (2016) and upcoming scheduled NCOFs in Fiji, Samoa, and Tonga (2017) provide further dissemination of climate outlooks to stakeholders at a national scale.

Information updates between RCOF events, e.g., through a Climate Watch, monthly updates of forecasts etc., including through the operations of Regional Climate Centres (RCCs) and its dissemination to stakeholders. Provision of climatological information together with the outlook (for context and information)

- National Climate Outlook Forums, Online Climate Outlook Forums as well as the WMO RAV Regional Climate Centre and Pacific Climate Change Centre in Samoa will provide climate information updates between PICOF events.

Capacity needs

What are the main capacity needs of the major stakeholders observed to date, of the NMHSs? RCC? Users?

1.) The main capacity needs of the major stakeholders (Water and Disaster Risk Reduction Sector) and the NHMSs include information and communication processes. Particularly, how climate information is collated, analyzed and disseminated. The following outlines the discussion between NHMSs and NDMOs at PICOF-2.

<u>Information</u>

- National process needs to be in place for getting the information and coming up with consensus statement when models are in disagreement about the timing of an event
- Difficult to synthesize the information for smaller NMHSs
  - Additional Met and DRR training to improve uptake of scientific and technical knowledge
  - Need of a complete weather/climate glossary for climate terms
  - Need to explain diagrams : i.e., gauge with El Niño diagram
  - Use of physical gauge (poster)
- Useful to have a template for El Nino or La Nina official declarations
- Climate information development
  - National climate forum needs to update and inform stakeholders early
  - Translate scientific information and statements to simple languages and vernacular languages if possible.
- Use of information for decision-making
  - Information easy to understand and act upon (Less talk more action)
  - Suggest actions (Make it practical)
  - Connecting impact information from Community outer Island etc.

<u>Communication</u>

- Informing high level government early through preparation of communications paper , once decision is made it allows for flow of funding

- Timing of PICOF important – used in NCOF and needs to be in line with national government budgeting and planning processes
- NDMO's job is to inform people on what to do
    - Linking the hazard to key messages for different sectors e.g. Water rationing for crop management, disease prediction – role of DMO to coordinate

How are these needs being addressed through the RCOF process? How could they be further addressed?

- PICOF addresses the capacity needs of the national sectors (Water and DRR and NMHSs by generating an improved understanding of how seasonal climate outlooks are produced, how they and can be made regionally and nationally relevant, and how they can be tailored to the needs of users from the Water sector and DRR community. The discussion and contribution by the NMHSs and Water and DRR representatives was beneficial and informative in addressing the capacity needs of these stakeholders

User involvement

How user needs are reflected in the forum, and after the forum

- User needs are reflected in the forum by holding open discussion sessions so user can provide their needs to NMHSs as well as regional partners. User needs are captured during the PICOFs and documented in PICOF report. This report is then disseminated to all participants, NMHSs and relevant partners so user needs can be addressed and products and services improved.

Indicate the main (regional) users involved in RCOF

- NMHSs
- National Sectors (Water, DRR, Health, Agriculture, Tourism, Energy, Fisheries)
- Development Partners (NOAA, BoM, NIWA, SPC, SPREP, WMO, USP, CSIRO, APCC, UNDP)

How is the forum used as a mechanism to collect user feedback? What are the main messages from feedback to date? What changes/plans have been made to address these (e.g., development of tailored products, forecasts of sector-specific variables)?

- Regional forums such as the PICOF are very useful for sharing information, best practices, and lessons learnt. This should continue and be linked to the functions of the Pacific Islands Regional Climate Centre (RCC), when this becomes established. Pre-PICOF training was trialled in PICOF-1, and it is suggested that this is re-established.

- Close working relationships between NMHSs and NDMOs are critical to effective warning of climate hazards leading to early preparedness. All countries throughout the region should continue to strengthen these relationships, as well as with other sectors through such mechanisms as cluster group meetings and NCOFs.

How are seasonal outlooks evaluated from user perspectives, and challenges met by them in the process of applying the information into decision making process identified, and how is this input addressed through the RCOF process?

- Indices of the strength of El Niño and La Niña are very useful for monitoring the status of ENSO. All NMHSs in the region should continue to closely monitor these indices, but it is also very important to continue to monitor regional, national and local rainfall patterns, cloudiness, sea surface and sub-surface temperatures, air temperatures, humidity, and sea level. Impact-based indicators such as food production, freshwater availability, fish catch, and human and animal disease outbreaks

should also be well monitored, with the data stored in national impacts databases. In addition to the production of national seasonal climate outlooks which are well communicated to NDMOs and other sectors, there is a need for simplified products and messaging, especially for rural and remote communities. NMHSs should continue to develop climate products tailored for specific users, relevant to their needs, and incorporating where possible elements based on traditional knowledge.

- Regional forecasts (for example the Tropical Cyclone outlook) should continue to be well communicated to all NMHSs in the region prior to general release, to ensure consistent responses are provided to local media enquiries.

SWOT analysis

Describe the main Strengths (indicate key benefits realized, with some examples of success stories based on user feedback), Weaknesses, Opportunities and Threats (SWOT) pertinent to the RCOF, both on regional and national scales.

- The SWOT Analysis will be conducted after the completion of PICOF-3 in October or November 2017.

Sustainability of RCOF

Role of a Regional Climate Centre (RCC)/RCC-Network functioning in the concerned region in the RCOF process

Recognition of the role of RCOF by the countries in the region

- It was recommended by countries that NMHS's continue to have RCOFs annual as well as national climate outlook forum's(NCOF) to discuss the seasonal outlook (cyclone, precipitation and temperature) and use El Nino and La Nina events as a way to strengthen relationships with stakeholders, increase awareness, build capacity and work with the local media.

- It was suggested that RCOFs be scheduled in advance of country NCOFs so that RCOF products and information can be utilised at the national level and this will provide a linkage between the RCOFs and NCOFS.

Coordination mechanisms established (such as, a network of focal points, management group) to plan, organize the sessions, discuss challenges and find solutions (such as on-line sessions)

- Currently the COSPPac project funded by the Australian Bureau of Meteorology hold an Online Climate Outlook Forum (OCOF) monthly and provides a regular opportunity for Pacific Island Meteorology Services to discuss the status of El Nino Southern Oscillation and to share their seasonal climate outlooks.

Existing funding mechanisms, need for mobilizing resources to sustain the RCOF; List some of the major projects implemented with support to the RCOF sessions. Suggest approaches for long-term sustainability with minimal dependence on external resources.

- The RESPAC project implemented by the UNDP in Fiji provided 120,000 USD to SPREP in 2016 for PICOF-2, PICOF-3 and PICOF-4.

- The WMO Global Framework for Climate Services Project funded by Environment and Climate Canada provided funding in 2015 to hold PICOF-1 and cost-savings were also used to partially fund PICOF-2.

Way forward

The future efforts in science (including key research questions and needs), operation, user engagement, sustainability.

Use of objective regional seasonal forecasts in preparing the outlook, and suggestions for the development of global standards for RCOF operational practices

- The establishment of the WMO RA-V Pacific Island Regional Climate Centre Network (PI-RCC Network) will encourage future PICOFs. Also, science providers in the region are continually working on ways to improve seasonal forecast skill, plus are looking at sub-seasonal forecast skill as well. Finally, representatives from the region (SPREP and NIWA) will attend the RCOF workshop in Ecuador in September 2017 to share their experiences and learn from other regions.

- The Pacific region is developing a methodology on how to generate an effective consensus climate forecast (dynamical and statistical) that can be used for the region.

Possibility to expand the RCOF product portfolio (such as monitoring information for the recent and current seasons, sub-seasonal information including onset date, rainfall distribution, etc., variables other than rainfall and temperature, impact-based outlooks, etc.)

- Products and information from RCOFs should be used during in-country NCOFs