

La Niña Developing More than Likely

There is an increased likelihood of La Niña developing this Spring (September-October-November) and Summer (December-January-February) this year. This is due in part to the continued cooling in the tropical Pacific Ocean and the confidence majority of the global climate models are displaying towards more cooling in the Summer period. Furthermore, we are reliably informed that there is a 70% chance developing of La Niña towards the end of this year which is triple the normal likelihood. La Niña events tends to increase the chances of above normal rainfall across much of the country except for the New Guinea Islands region and the Autonomous region of Bougainville.

Other climate drivers such as the Indian Ocean Dipole (IOD) and Madden-Julian Oscillation (MJO) have been very active in the recent times. The MJO has been active since late September and as it progresses eastwards towards the Maritime continent, it encourages enhanced rainfall over PNG; the last few days of wet weather experienced in the country were the result of this eastward propagating waves.

In short, the country is in the transition period and hence much of the country will continue to receive low rainfall until the wet season proper commences in November. With an increased chances of La Niña event likely towards the end of the year and together with the onset of the wet season proper, there is an increased likelihood for the country to receive above normal rainfall across the country which may lead to floods and landslips in worst cases. This may also cause serious delays in road infrastructure works and other associated inconveniences so appropriate authorities must take heed of this information and start planning ahead to avoid disappointments.

Sea Surface Temperature (SST) Anomaly (BOM)

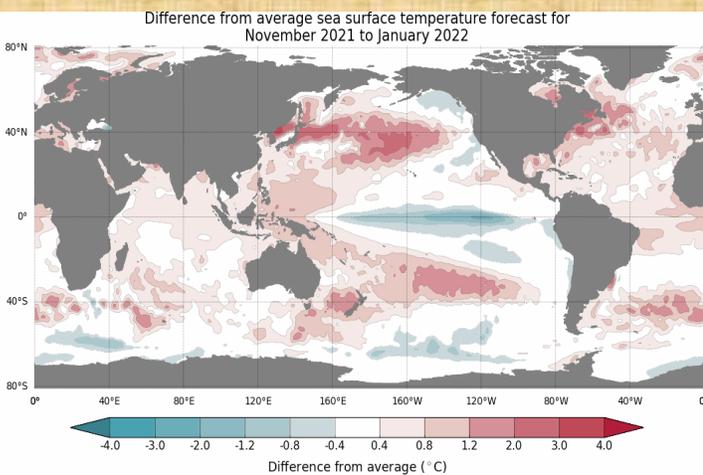


Figure 1: SST anomaly for NDJ 2022

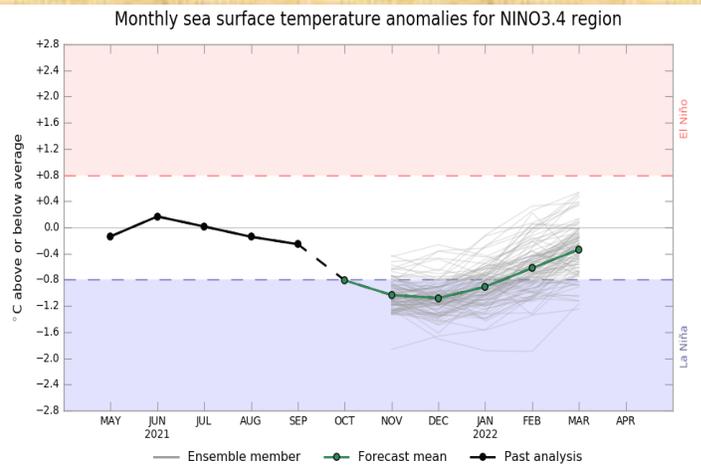


Figure 2: Monthly SST anomaly for NINO3.4 region

Figure 1 and 2 above shows the forecasted sea surface temperature (SST) anomalies for the Pacific Ocean for the periods Nov-Dec-Jan (NDJ) and Monthly SST anomaly for NINO3.4 region respectively. The SST in the far western equatorial Pacific shows warmer than average condition, including parts of the Maritime Continent and PNG whilst the SST anomalies in the equatorial eastern Pacific shows weak negative SST anomalies. The monthly SST anomaly for NINO3.4 region indicates an ENSO neutral condition with a possibility of heading into a weak La Niña come November-December-January 2022.

El Niño in the Pacific is related to the east-west movement of warm water (SST) in the Tropics. When warm SST anomalies are closer to Australia, PNG receives above normal rainfall (La Niña) and when cooler SST anomalies are present closer to Australia, PNG receives below normal rainfall (El Niño). In a neutral (Non-ENSO) year, PNG receives normal rainfall.

Papua New Guinea Satellite Rainfall Monitoring

Background

Provided below are experimental products from the Australian Bureau of Meteorology under the Space-based weather and climate extremes monitoring demonstration project (SEMDP). In the absence of our usual NIWA satellite rainfall monitoring maps, we will be using this products as capable replacements with the view to improving and validating them over time.

Figure A shows the space-based rainfall estimate for the 30-day total till 10 Oct 2021 while Figure B shows the 30-day total rainfall anomaly till 10 Oct 2021. Figure C, on the other hand, shows the 3-month Standardized Precipitation Index (SPI) ending September 2021.

It's encouraging to note that for the past 30 days till 10 September 2021, despite the dry season, much of the country continue to receive above average rainfall. Interestingly, Kiunga in the Western Province received its highest rainfall of 500mm for the month of September which is well captured in the satellite rainfall monitoring as reflected in Figure A.

However, when we compare this observed rainfall for the past 30 days till 10 Sep 2021 against the long-term average (Figure B), the extent of the dryness across the country becomes self-evident. This image shows very clearly that for the past month, much of the New Guinea Islands and north-eastern part of the country have been experiencing drier conditions whilst the southern parts of the country have been receiving above average rainfall (Figure B).

The Standardized Precipitation Index (SPI) is an index commonly employed to characterize drought. It compares how different the observed rainfall is to the average for that period by measuring the number of standard deviations it is away from the mean. Typically, values below -1.5 are considered 'severely dry' and those below -2 are considered 'extremely dry', whilst values above $+2$ are indicative of 'extremely wet' conditions.

With the above explanation in mind, it is fair to say that East New Britain, southern end of New Ireland and parts of West Sepik are experiencing drought-like conditions whilst bul of the country are either in drought-watch or out of drought as depicted in Figure C below.

The actual rainfall received from our in-situ stations located at Momote in Manus and Wewak and Vanimo shows clear signs of deficient rainfall received in support of the satellite observation. Momote recorded its 44th lowest rainfall for September whilst Wewak and Vanimo recorded 22nd and 34th lowest rainfall respectively.

30-day total rainfall till 10 October 2021 (23:59 UTC)

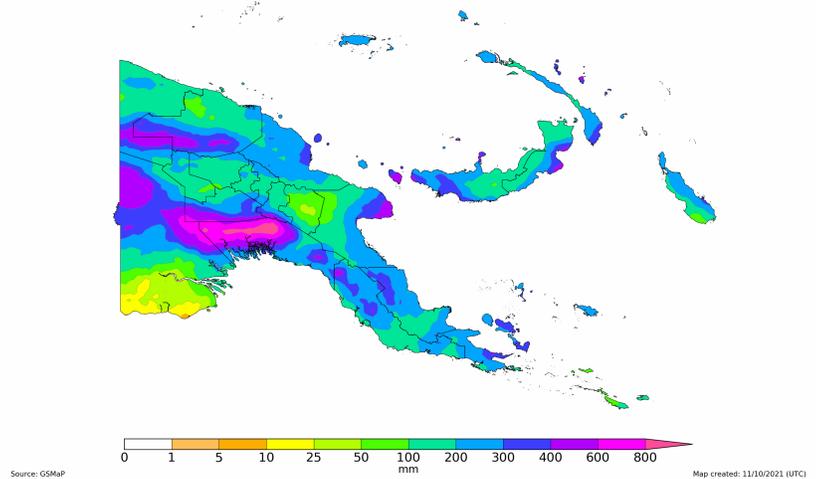


Figure A

30-day total rainfall % of mean till 10 October 2021 (23:59 UTC)

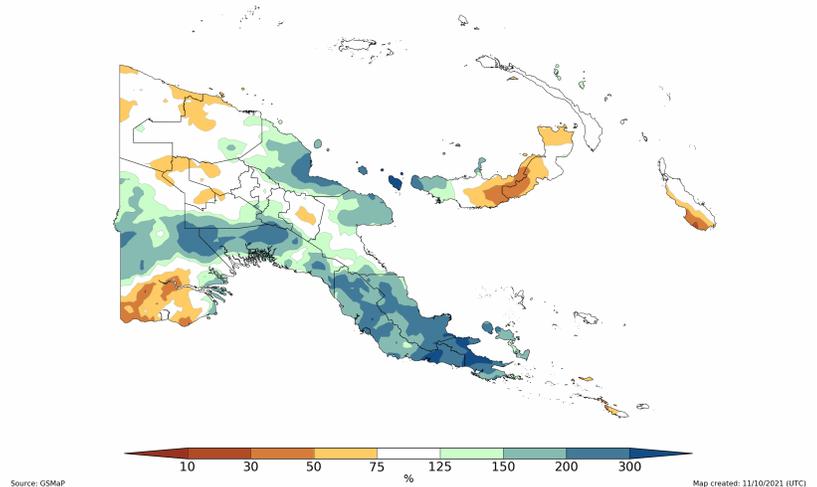


Figure B

3-month SPI ending September 2021

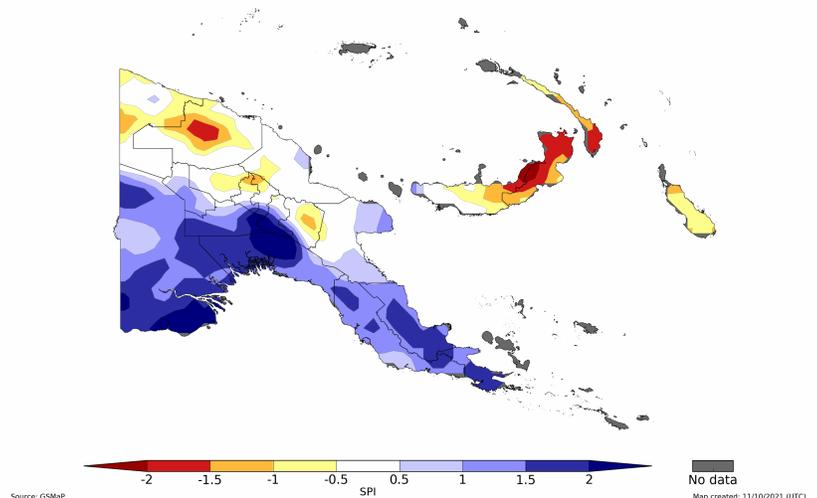


Figure C

Country Situation

The monthly rainfall for the country is as shown in Table 1 below.

The highest rainfall for the month of September was recorded at Momote (268.8 mm) which was the 44th highest rainfall ever received for the month of September and the lowest rainfall recorded at Port Moresby (69.0mm). Despite the dry season, it is promising to see much of the country continue to receive very good rains. At the moment, there is no sign of drought-like situation in the country as per the observed rainfall across the country.

Relieve indeed for Port Moresby residents as they have been under water stress situation since the beginning of the dry season.

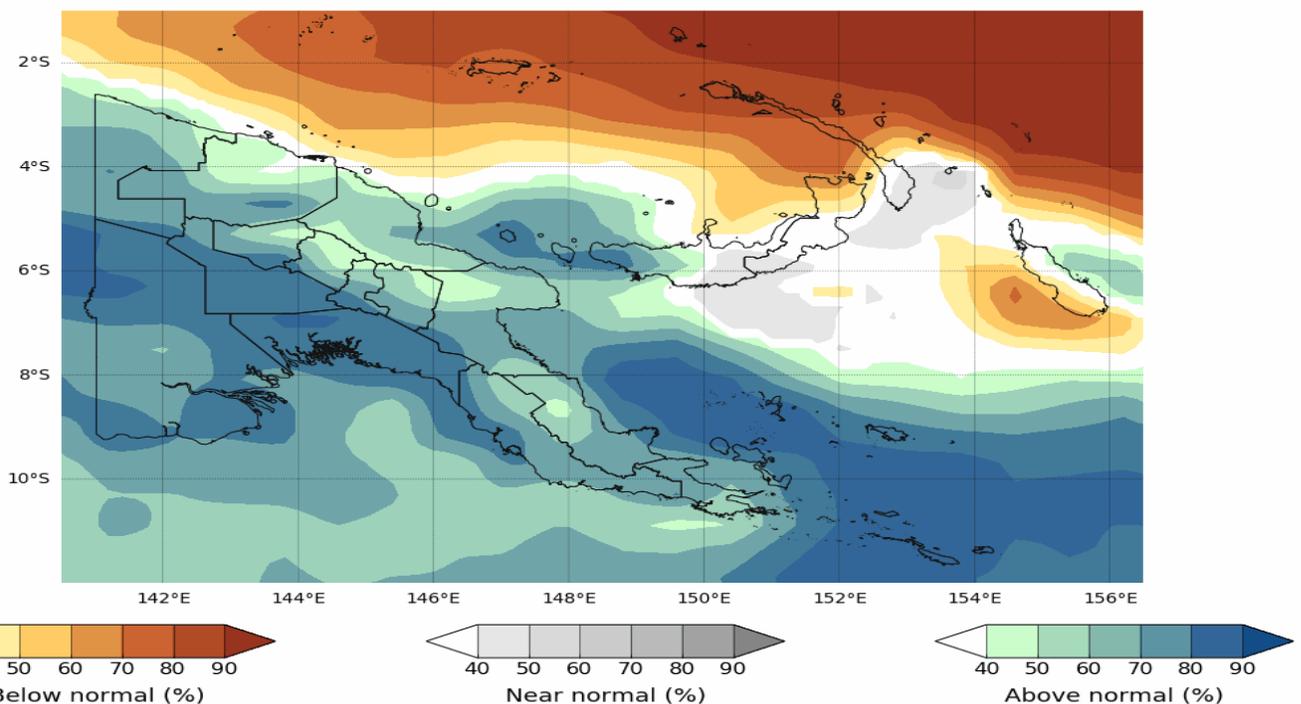
Note:

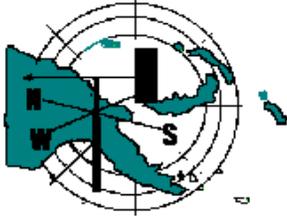
The tercile rainfall probability forecast for Sep-Oct-Nov 2021 from ACCESS-S1 model is as depicted in figure below.

Station	Jul	Aug	Sep
Madang	-	-	-
Momote	202.8	355.2	268.8
Kavieng	140.6	239.8	-
Nadzab	162.8	-	-
Gurney	-	-	-
Goroka	28.0	-	-
Misima	396.8	355.2	-
Port Moresby	15.2	10.8	69.0
Wewak	319.8	133.0	185.6
Vanimo	206.8	203.6	118.6

Rainfall Outlook (Nov-Jan 2022)

Tercile rainfall probabilities for November 2021 to January 2022





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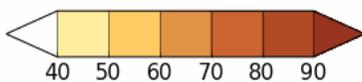
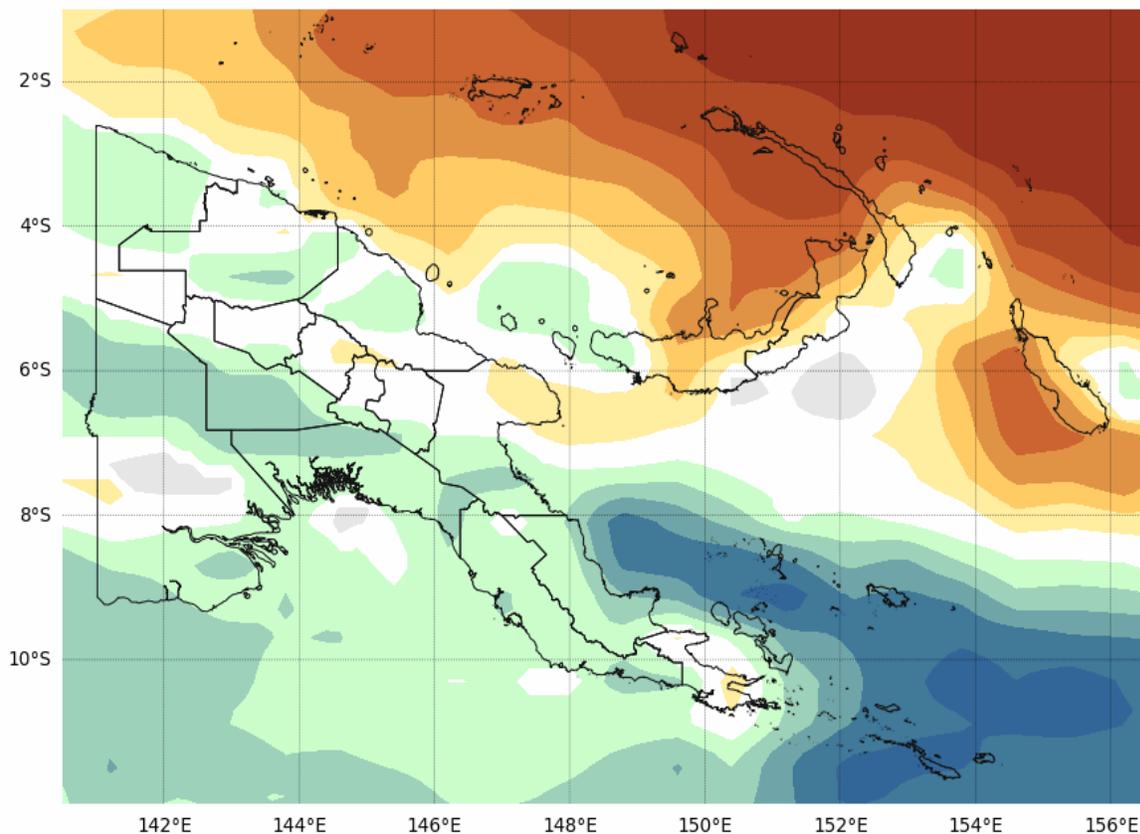
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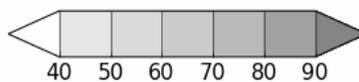
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EXTENDED RAINFALL OUTLOOK (DJF2022)

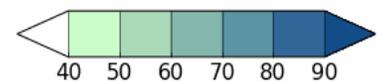
Tercile rainfall probabilities for
December 2021 to February 2022



Below normal (%)



Near normal (%)



Above normal (%)