

The Kiribati Meteorological Services' Report on Spring tides 20th to 23rd January 2015

Background

On the 18th of January, The Kiribati Meteorological Services, under the Office of Te Beretitenti, issued an advisory forecasted on the expected extreme spring tide from the 20th -23rd January 2015, with heights of 2.85m, 2.91m, 2.89m, and 2.80m respectively based on BoM Tidal Calendar 2015 for Tarawa.

The Pacific streamline analysis showed a low pressure system in the northern Pacific Ocean (enclosed in green – Annex 1).

On Tuesday 20th January, the swell forecast was included in the advisory issued. Radio Kiribati (AM frequency 1440kHz) assisted in disseminating the advisory to the general public.

It is confirmed that the coinciding of the Spring tide with waves from the north easterly swells caused lots of destructions or damages to some low laying sites along the coasts in the Kiribati islands as well as some other islands in the pacific including the Marshall islands.

The cause of the Difference between the Prediction and the Actual Sea level readings:

Forecast and Observation

The South Pacific Guidance product from SWFDDP MetConnect along with Wave models, forecasted large waves from North Easterly swells to affect the Pacific region including Kiribati island groups on the 20th – 24th January, 2015 (Annex 2).

The predicted tide levels on the 20th to the 23rd January 2015 were all falling within sea level risk of 2.80 meters and above (Annex 3).

However, the observed tide levels from the real time display, obtained from the Tidal gauge at Betio port, confirmed that the tide level during the high tide from the 20th – 23rd January was higher than the predicted values (see figure 1). Heights of greater than 2.90m were recorded.



Figure 1: Top- Predicted Sea level versus Observed plot

Fluctuations in tidal residuals were observed on the 22nd January, 2015. This showed the overtopping impact of swell waves with the normal tide levels (Fig. 2 – enclosed in red).

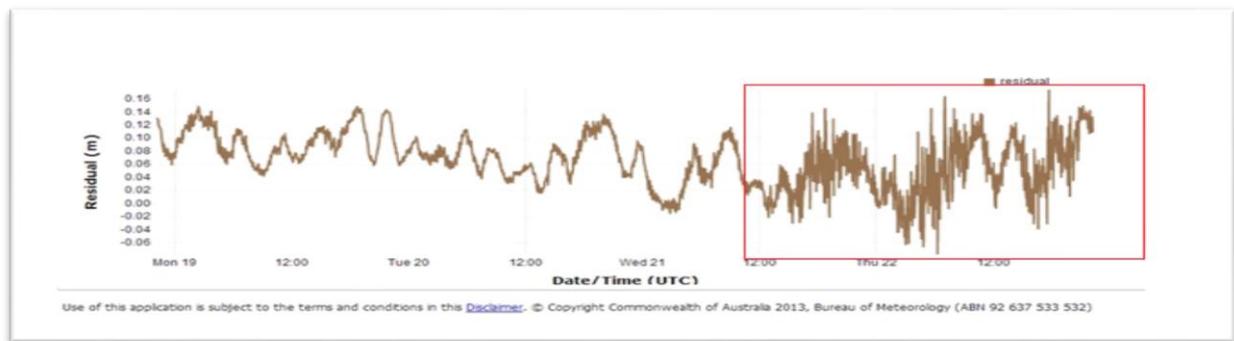


Figure 2: tidal residuals of tide heights during the period 19-22 Jan, 2015 showing the observed overtopping of waves (enclosed in red).

Observed impact:



Figure 3: The main hospital in Betio that was affected



Figure 4: The sea wall that was damaged by the wave



Figure 5: One of the uproot tree that affected during height tide

From the spring tide in January this year, it was seen that there were major impacts to properties close to the shore around Tarawa. The images above were some of the Met collections after the high tides on the 21st and 22nd January 2015.

Figure 3 was the main hospital in Betio where the waves smashed the seawall behind these buildings and made its way into the building. The figure does show the aftermath and as can be seen that new sand was there in front of the buildings.

Figure 4 showed the pieces of concrete sand bags from the sea wall being crushed by the waves.

Figure 5 showed a house affected by the waves came from the lagoon side. Trees were falling and cobble was being brought in by the waves to these areas.

The most affected site after spring tides were observed is the lagoon site from Betio to Teoraereke (Northwest of Tarawa). Apart from that, it was also reported that there were also observed impacts in the outer islands and few islands in the Pacific such as the Republic of the Marshall Islands. The Kiribati Meteorological Services was able to receive reports from Marakei, Butaritari, and South Tabiteuea which was reported over radio Kiribati.

ANNEX 2

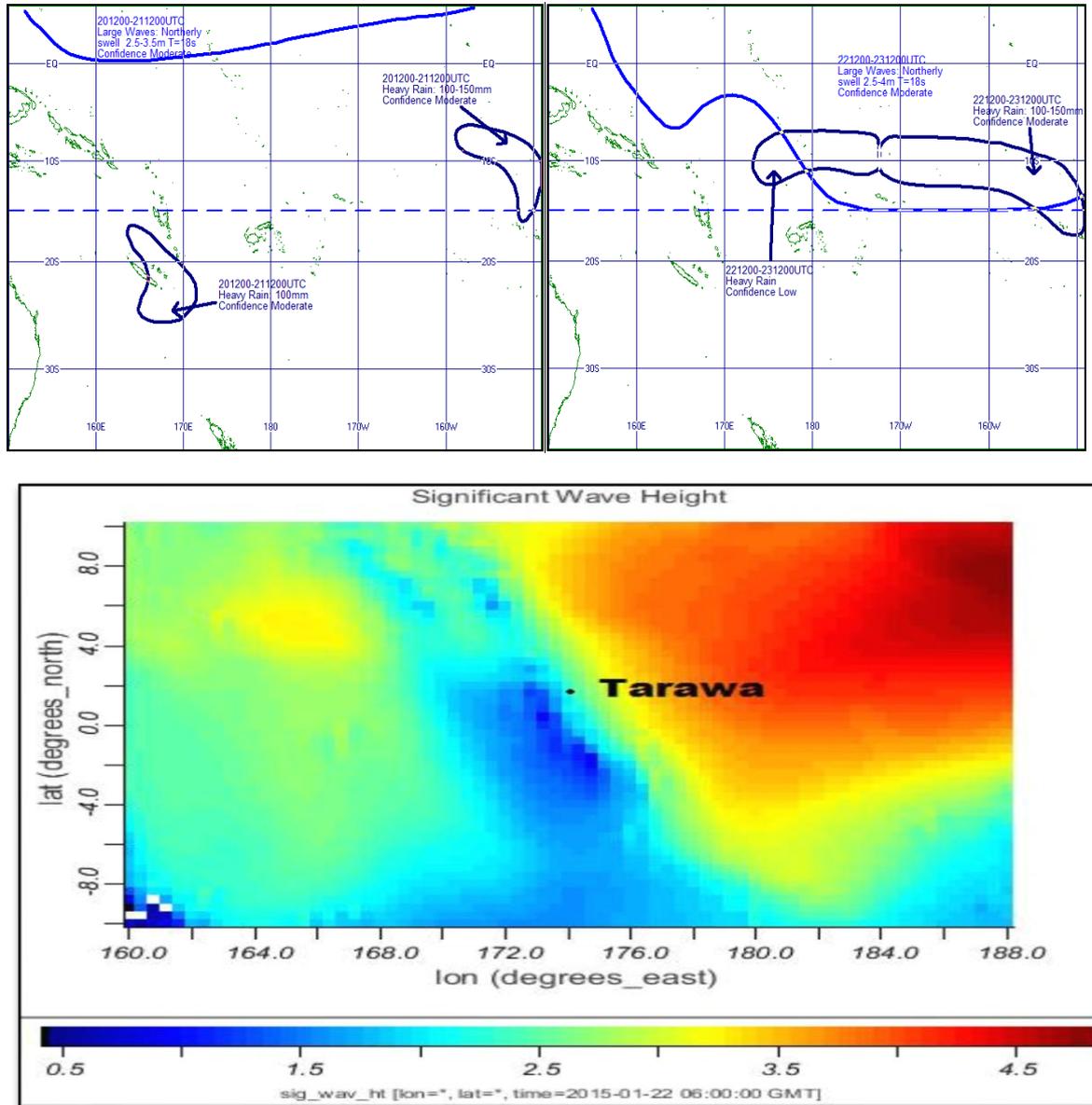


Figure 2: left – streamline showing the front (enclosed in green) of a low pressure system in the north. Right – Model output forecasting the expected impact date and time of the swell.

ANNEX 3



GOVERNMENT OF KIRIBATI
KIRIBATI METEOROLOGICAL SERVICE
OFFICE OF TE BERETITENTI
P.O BOX 486, BETIO, TARAWA
 Telephone Number: (686) 26511, 26459, 25444 Fax Number: (686) 26089
 E-mail: kms@met.gov.ki

**SUMMARY OF PREDICTED 2015 SPRING TIDES IN TARAWA FALLING WITHIN
SEA LEVEL RISK BASED ON HISTORICAL OBSERVATIONS USING BOM TIDAL
CALENDAR**

MONTH	DATE	TIME	HEIGHT (M)	MOON PHASE
JANUARY	20 th	1636	2.85	
	21 st	1717	2.91	NEW MOON
	22 nd	1759	2.89	
	23 rd	1840	2.80	
FEBRUARY	18 th	1623	2.87	
	19 th	1703	2.94	NEW MOON
	20 th	1743	2.92	
MARCH	21 st	1821	2.81	
	19 th	1604	2.82	
	20 th	1644	2.87	NEW MOON
	21 st	0505	2.81	
	21 st	1723	2.84	
APRIL	22 nd	0543	2.80	
	19 th	0444	2.80	NEW MOON
AUGUST	1 st	0455	2.82	1 DAY AFTER FULL MOON
	2 nd	0536	2.84	
	29 th	0357	2.80	
	30 th	0437	2.89	FULL MOON
	31 st	0517	2.90	
SEPTEMBER	1 st	0557	2.83	
	27 th	0336	2.80	
	28 th	0416	2.88	FULL MOON
	28 th	1639	2.86	
	29 th	0456	2.87	
	29 th	1717	2.88	
OCTOBER	30 th	1756	2.82	
	26 th	1539	2.81	
	27 th	1617	2.90	
	28 th	1657	2.90	FULL MOON
NOVEMBER	29 th	1736	2.84	
	25 th	1602	2.84	
	26 th	1643	2.85	FULL MOON
	27 th	1722	2.81	

Note: From past observations, with spring tides with heights of 2.80 meters or more (obtained through the BoM tide calendar), overtopping and inundation of sea water can be observed in low lying coastal sites along Tarawa. They worsen when associated with windy or gusty conditions.

The causes of spring tides are different from those of storm surges. Storm surges are more related to storm events. Impacts from sea during storm surges can be observed although tide level is less than 2.80 meters.

KMS does not guarantee the accuracy and reliability of the analysis and accepts no liability for any losses incurred through the use of this summary information
 (Kiribati Meteorological Service, Betio, Tarawa. 686 25444)