

18 September 2023

Storm surge wreaks havoc along the South African coastline

Winter is not yet over in the Western Cape. While residents have been looking forward to a spring season, the province has continued to experience cold, wet and windy conditions from a series of cold fronts moving through the area. **Conductive weather conditions colliding along with a spring tide event resulted in positive storm surge effects experienced along the South African coastline which wreaked havoc to coastal areas over the past weekend (16-17 September 2023).** A combination of the high waves, spring tide, and conducive wind conditions resulted in positive storm surge with its effects experienced along the coast at various locations, as reported in various media platforms including social media. **The South African Weather Service (SAWS) unpacks the science behind the weekend phenomena as follows:**

Tides are long-period waves affected by the gravitational forces of the Sun and the Moon and the Earth's rotation. The timing and peak of tides are, however also influenced by factors like the wind and atmospheric pressure. Spring tide occurs approximately every two weeks during the new and full moon, causing high tides to be slightly higher than usual. Spring tides bring more water much further up onto the coast than normal, possibly resulting in chaotic coastal conditions such as coastal flooding and intensifying nearshore hazards such as rip currents.

Storm surge is often widely confused with high waves. While they do frequently co-occur with waves, it should be noted that there is a distinction between the two phenomena. Storm surge is calculated as the difference between the expected (astronomical) tide and the actual water level (including the effects of weather). Strong onshore winds and waves can further increase water levels at the coast. When these

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waves occur during high tide or spring tide, they can exacerbate the impact on the coastline. Therefore, storm surge can be severe and cause widespread impacts, but can also have little or no impacts when it coincides with a low tide.

The SAWS issued the following impact-based warnings between Wednesday and Friday (13-15 September 2023):

- yellow level 4 warning for damaging waves for the entire Western Cape coastline, valid for Friday until Sunday.
- yellow level 2 warning for winds for the south-west and south coasts of the Western Cape.
- orange level 5 for wind and wave for the Eastern Cape coastline.
- yellow level 4 warning for Storm Surge to affect areas between Still Bay and Gqeberha, valid from Friday afternoon into Saturday.

Figure 1 shows a timeseries of the total water level (blue line) along with the predicted tide (red line) at the point of interest. On 16 September 2023 at 14:00 the total water level reached 1.4 m, this was 0.4 m above the predicted tide thus showing the occurrence of Storm Surge. This high total water level in combination with the meteorological and marine conditions resulted in the severe positive storm surge.

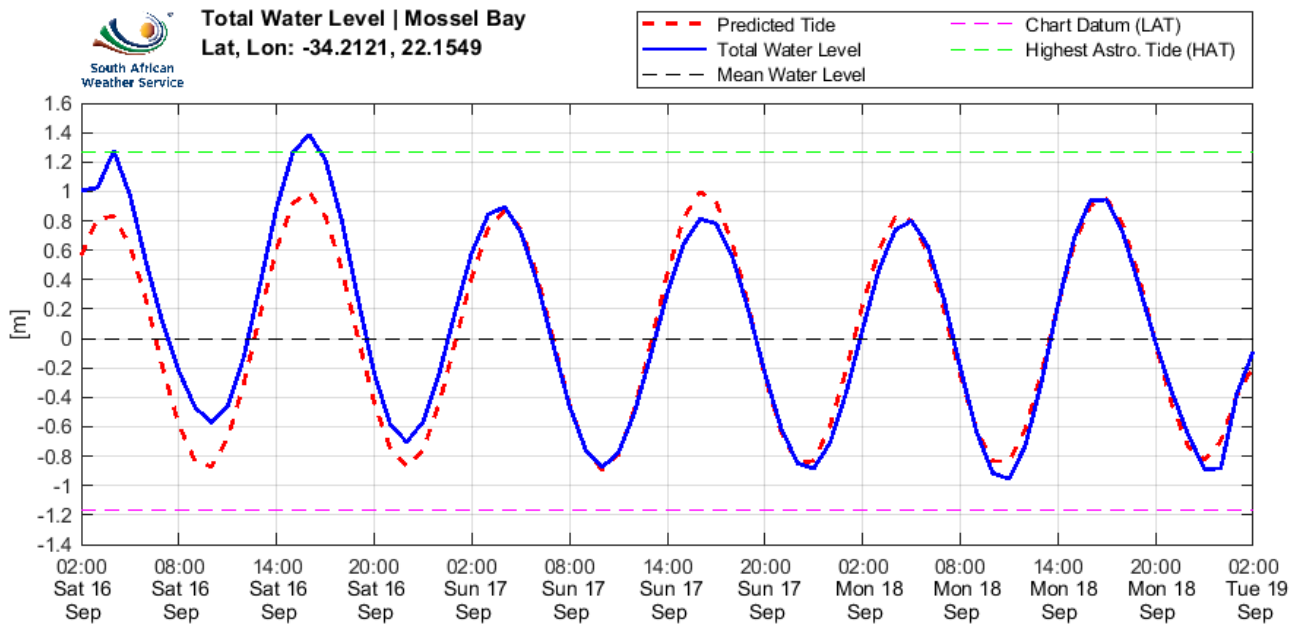


Figure 1: Total water level for the South Coast from 16 September to 19 September.

These conditions have caused havoc to the South African coastline over the past weekend. Storm surge could result in impacts such as flooding of low-lying areas, being swept away from the beach, loss of life,

modification of beaches, coastal inundation, estuary flooding, damage to infrastructure, and disruption to coastal activities. Thus, the public is advised to avoid beach recreational activities when alerted of such phenomenon.

Furthermore, the public are urged and encouraged to regularly follow weather forecasts on television, radio as well as social media platforms. Updated information in this regard will regularly be available at www.weathersa.co.za as well as via the SA Weather Service Twitter account @SAWeatherServic

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