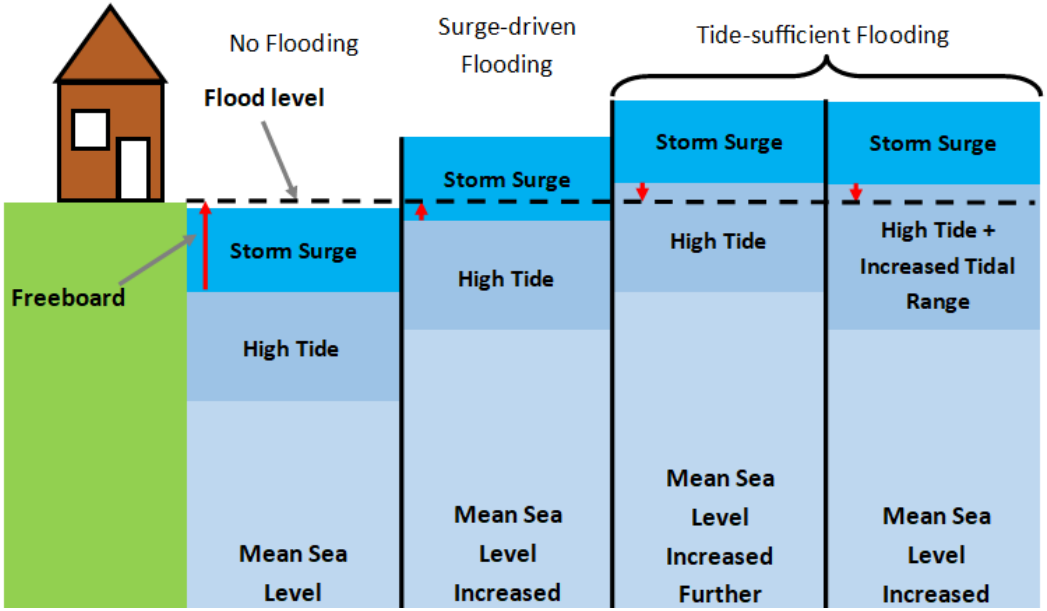
The tide is high: new insights on coastal flood hazards

Ben Hague, Bureau of Meteorology. ben.hague@bom.gov.au



Increases in the heights of tides lead to higher numbers of flood days as it reduces the storm surge that is needed for flooding to occur (above). This can be due to:

- Increases in mean sea level, and/or;
- Increases in tidal range (e.g., Hague et al. 2023).

Rates of tide-sufficient coastal floods have increased much faster than surge-driven coastal floods over recent years (Hague et al. 2022; right).

References:
Hague et al. (2022), Australian Coastal Flooding Trends and Forcing Factors. Earth's Future, 10(2). https://doi.org/10.1029/2021EF002483

Hague et al. (2023), The effect of tidal range and mean sea-level changes on coastal flood hazards at Lakes Entrance, south-east Australia. JSHESS, https://doi.org/10.1071/ES22036

Tidal range is the typical height difference between high and low tides over some time period.

Storm surges are the meteorological component of water levels, due to transient weather, ocean and climate phenomena.

Coastal flood days (below) are when tide gauge observations exceed a pre-determined flood threshold. These are classified as *tide-sufficient* if the sum of tide and mean sea level components of water levels also exceed the flood threshold. Conversely, *surge-driven* flooding is when a positive storm surge is required to cause flooding, in addition to tide and mean sea level components.