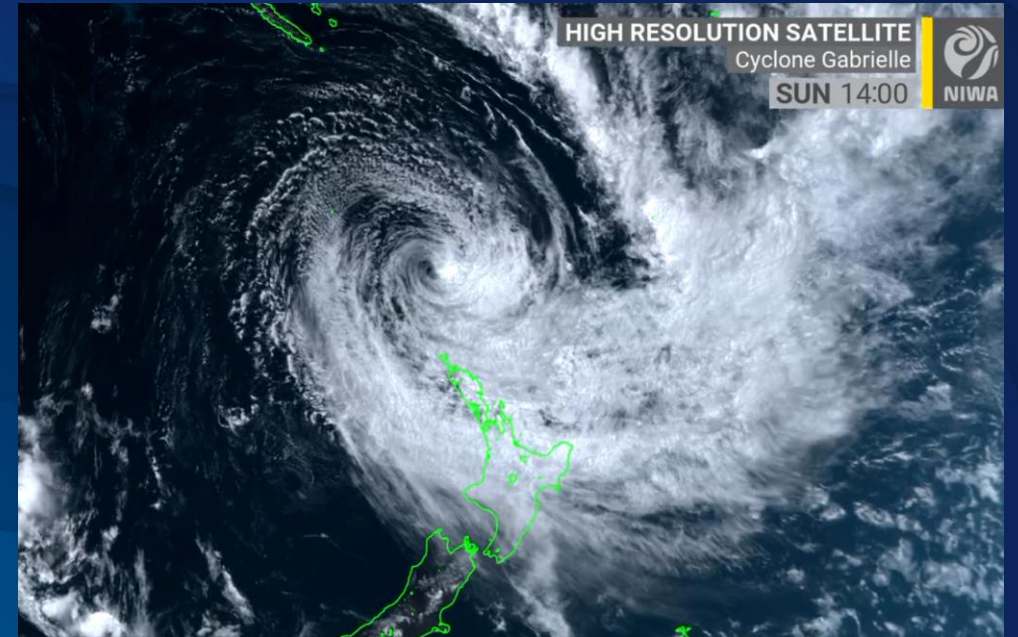


Mapping Flood Hazards – Cyclone Gabrielle

Fish Hook Summit 2023 - Haumaru te Taiao
Wednesday 12 July 2023

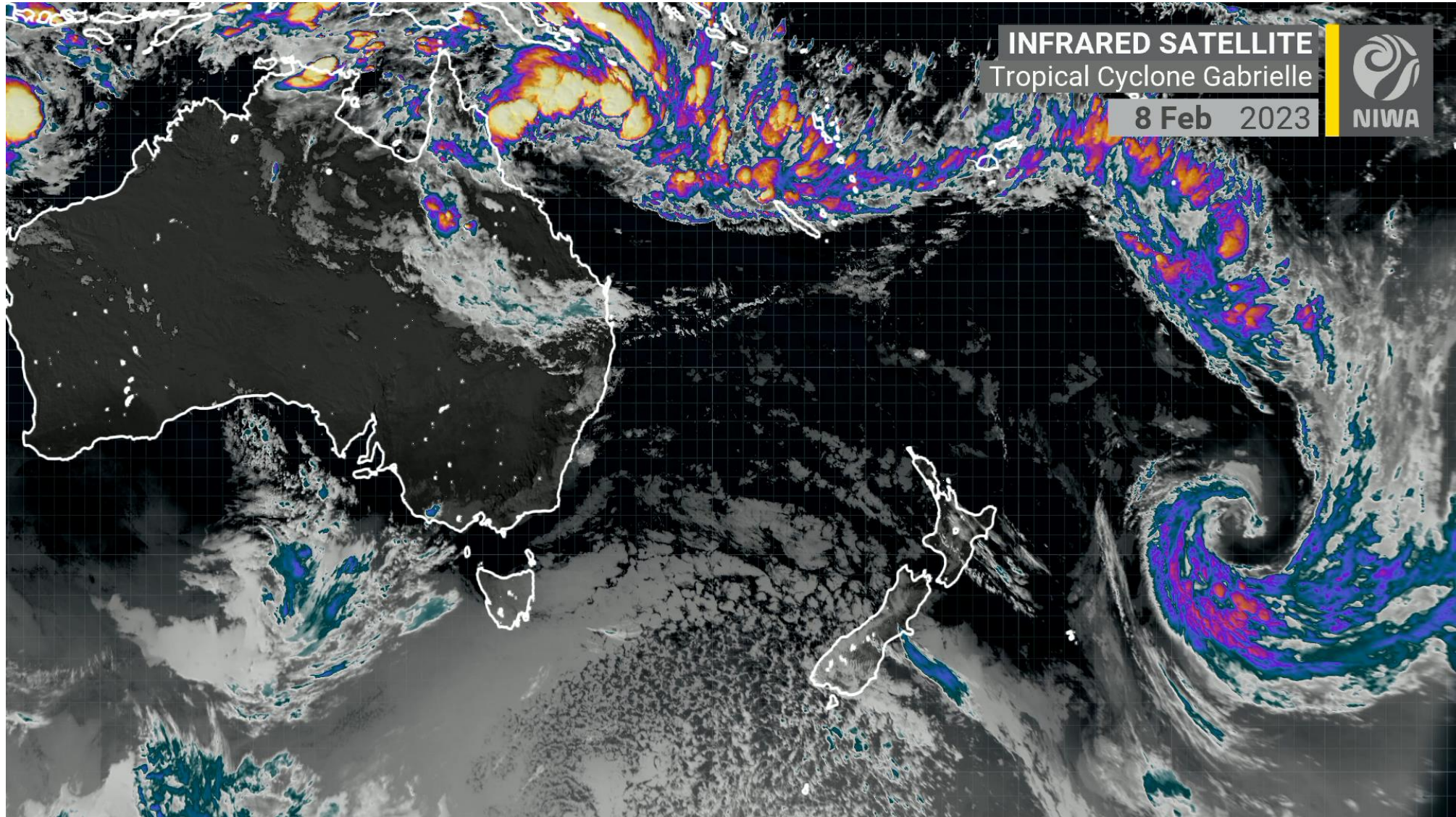
Emily Lane
Principal Scientist – Natural Hazards and Hydrodynamics

Climate, Freshwater & Ocean Science



NIWA

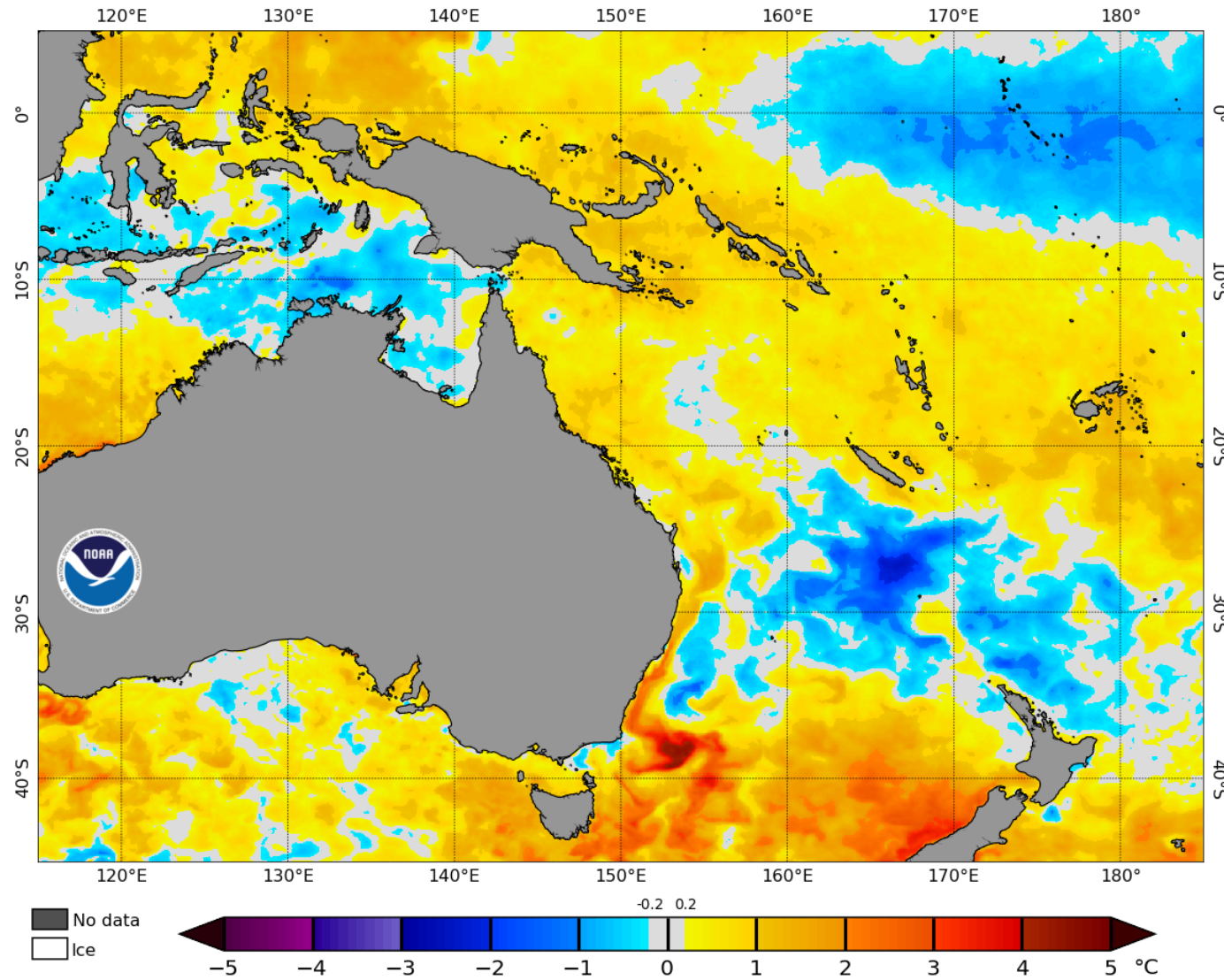
Taihoru Nukurangi



Gabrielle and sea temperatures

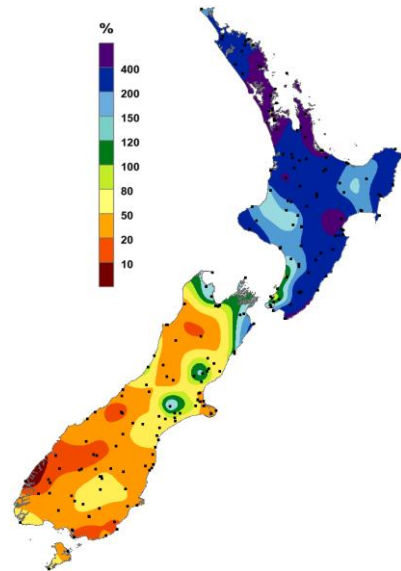
NOAA Coral Reef Watch Daily 5km SST Anomalies (v3.1) 15 Feb 2023

15th February

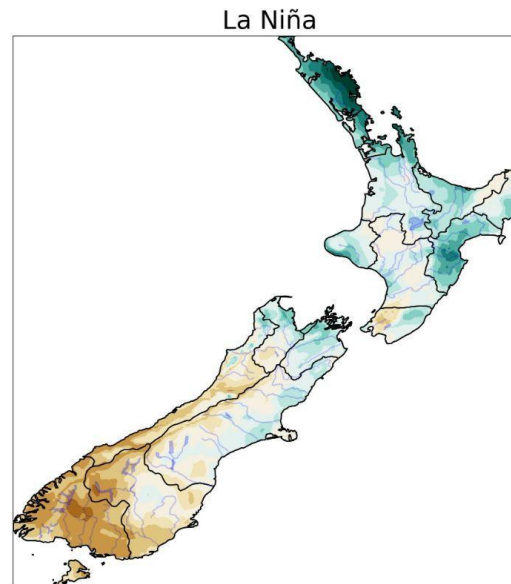


And La Niña ...

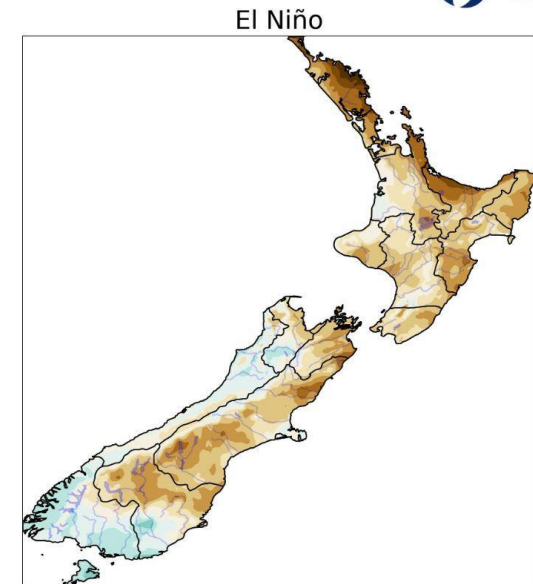
Summer rainfall during La Niña & El Niño



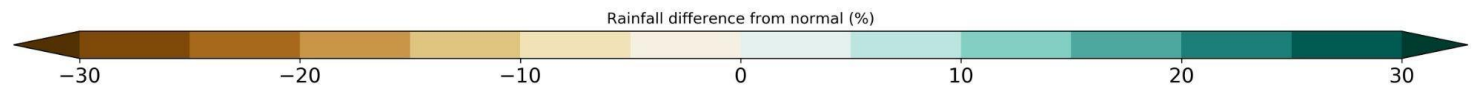
2023 Summer rainfall Anomaly



Summer La Niña years:
1973-74, 1975-76, 1988-89, 1998-99, 1999-00, 2000-01, 2007-08,
2008-09, 2010-11, 2011-12, 2020-21, 2021-22



Summer El Niño years:
1972-73, 1977-78, 1982-83, 1986-87, 1991-92, 1992-93, 1994-95,
1997-98, 2004-05, 2009-10, 2015-16

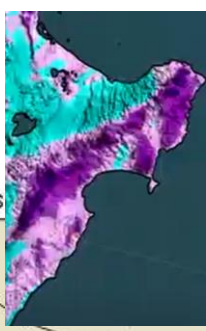


Data: NIWA Virtual Climate Station Network (VCSN). Anomalies are calculated with reference to a 1991-2020 climatology. Summer refers to the meteorological season which runs from December-February.

“In connection with La Niña, warmer than average seas in the Southwest Pacific are expected to fuel frequent low-pressure systems, some of which will drop down into New Zealand, bringing the risk for occasional heavy rain and flooding, similar to what was experienced last summer” – NIWA seasonal climate outlook December to February

How much rain fell during Gabrielle?

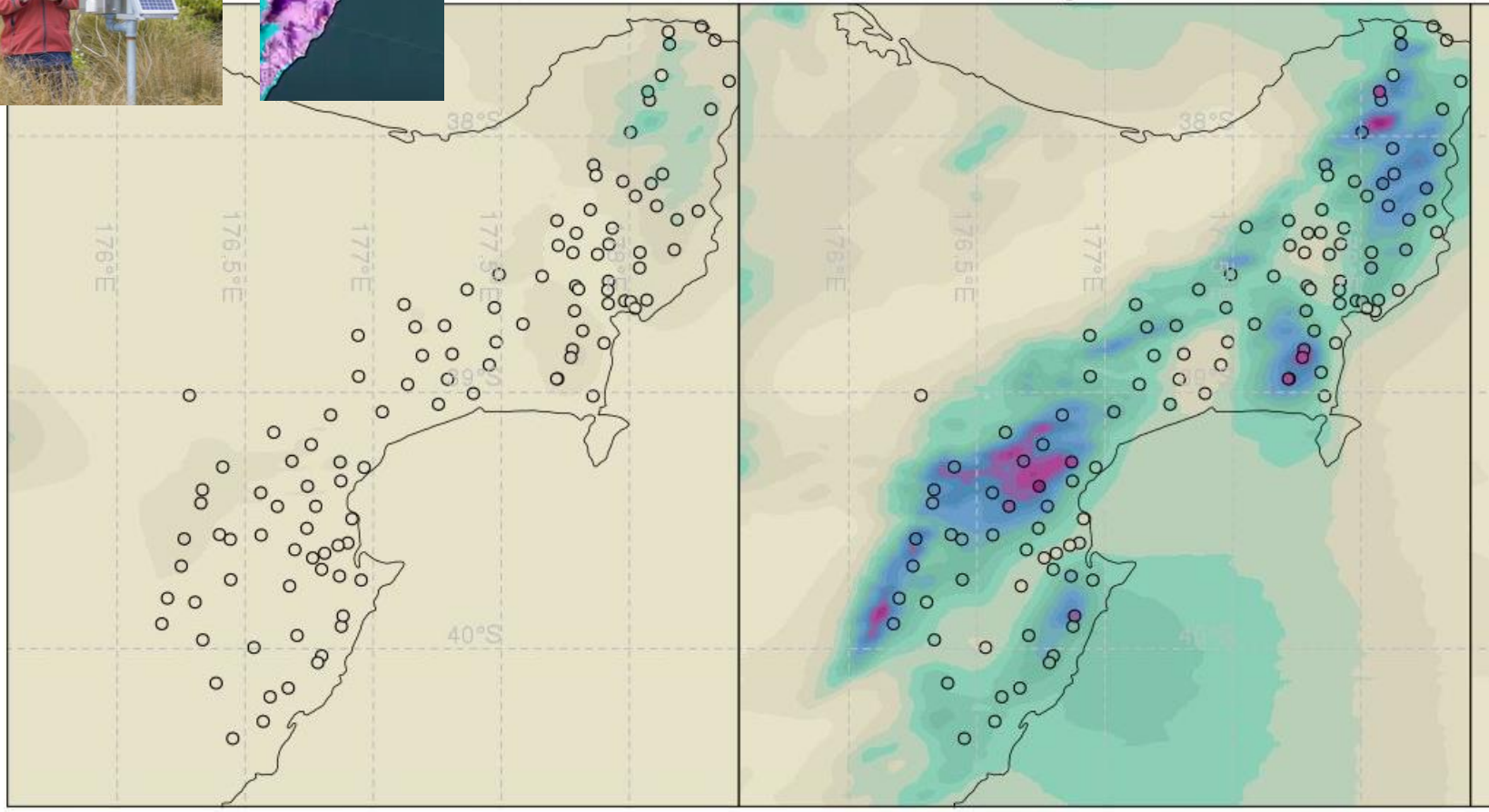




...rs ...th Feb, 2023

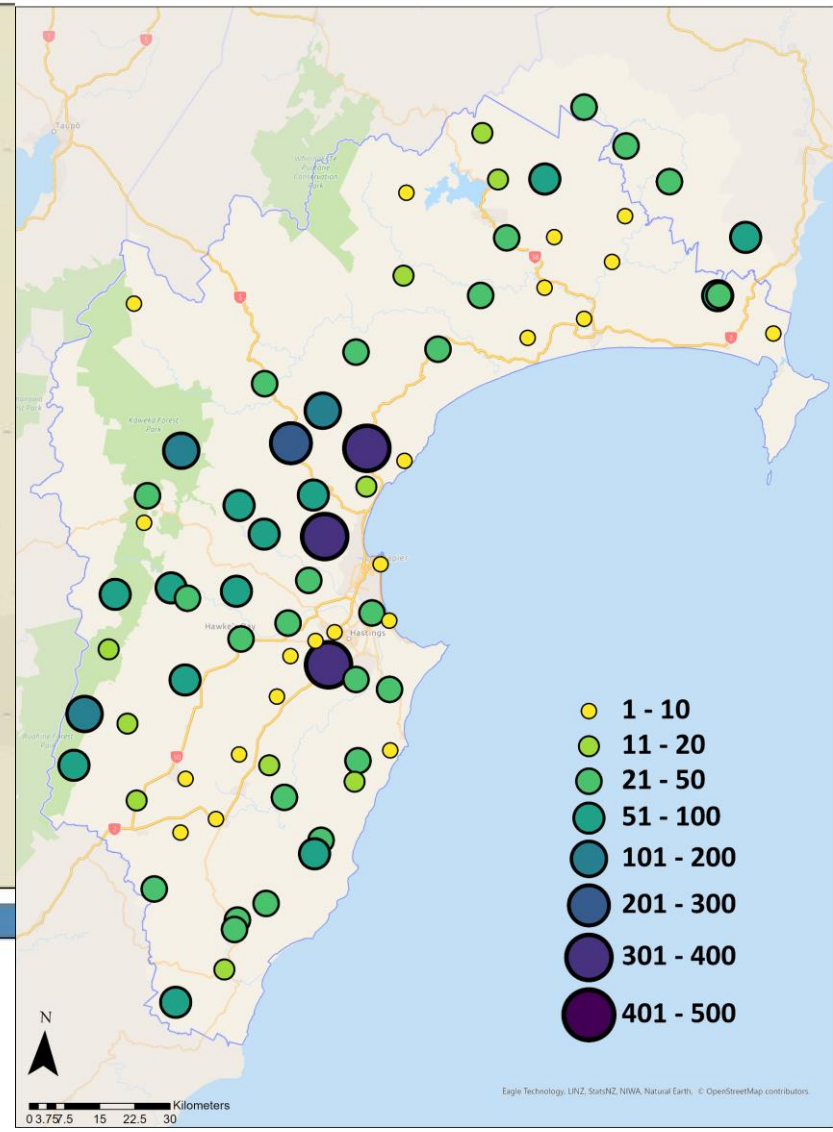
VCSN+CSM with GDC and HBDC Observations

24 hours ending 9am 14th Feb, 2023

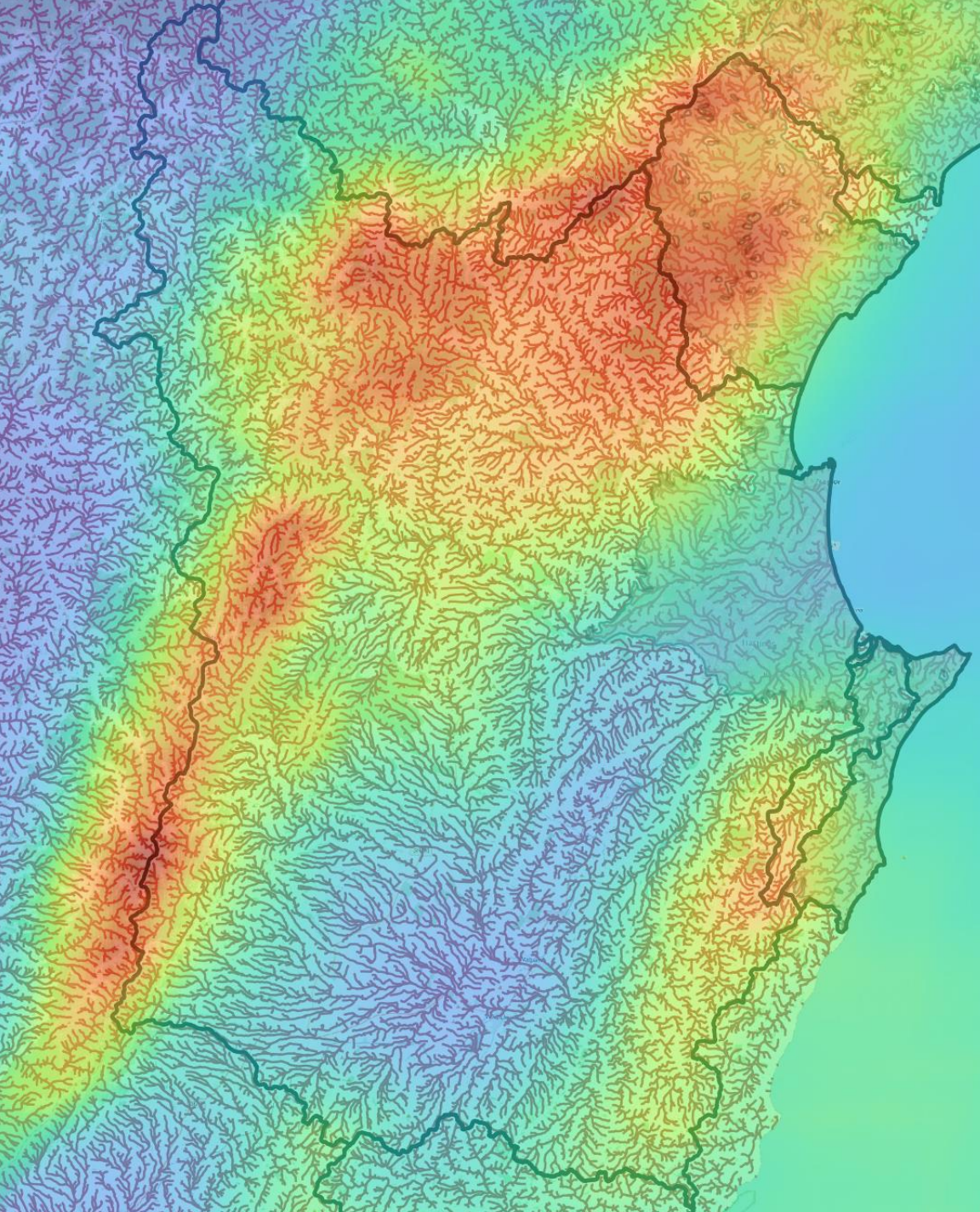
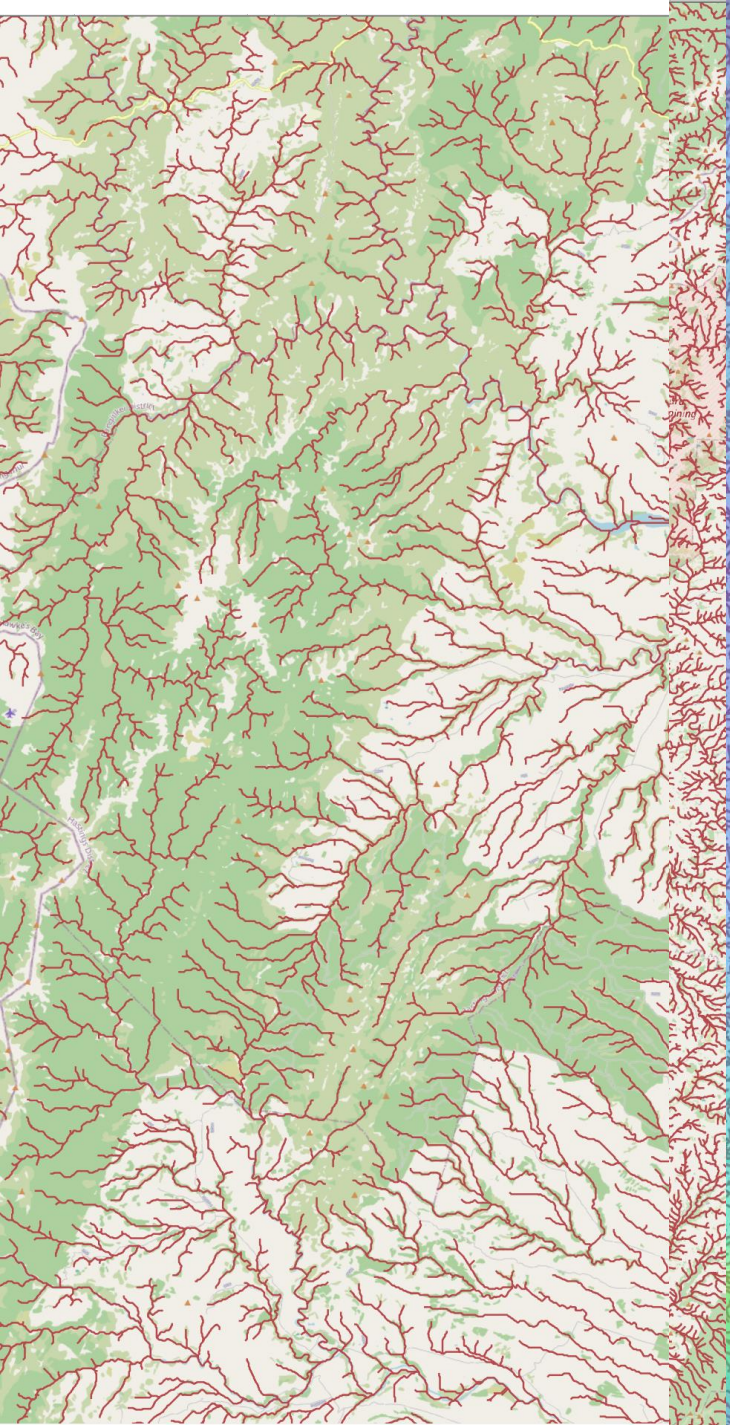


24 hour rainfall depth (mm)

24 hour return periods

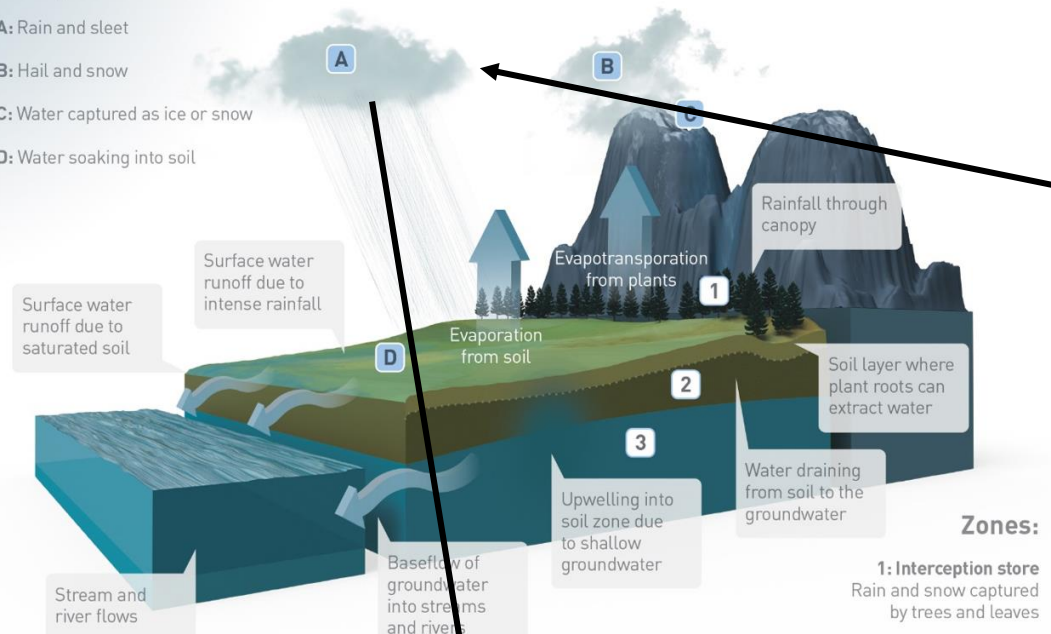


- 1 - 10
- 11 - 20
- 21 - 50
- 51 - 100
- 101 - 200
- 201 - 300
- 301 - 400
- 401 - 500



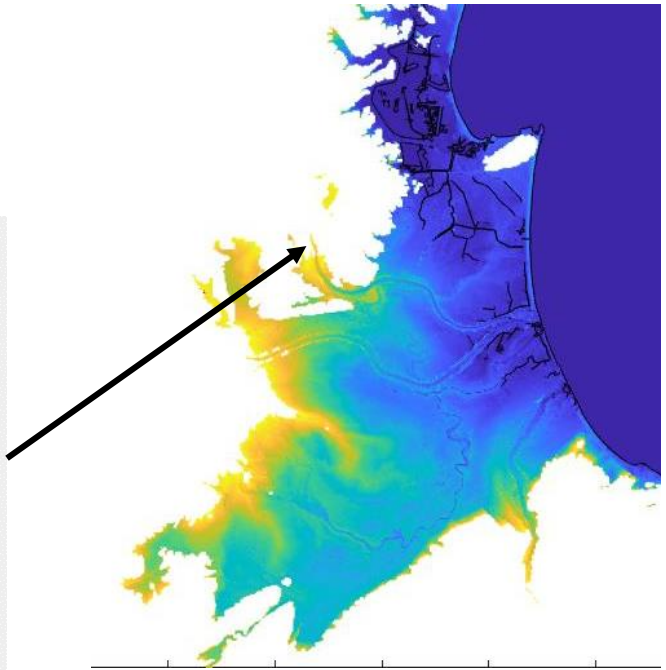
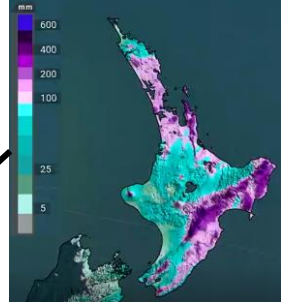
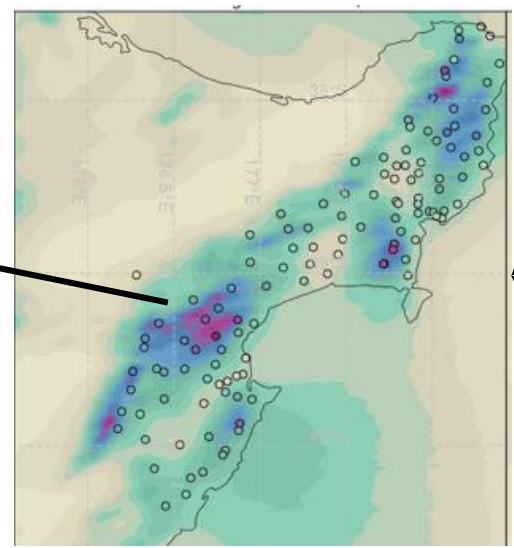
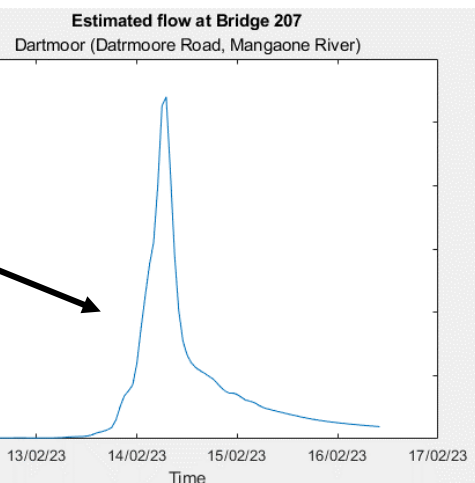
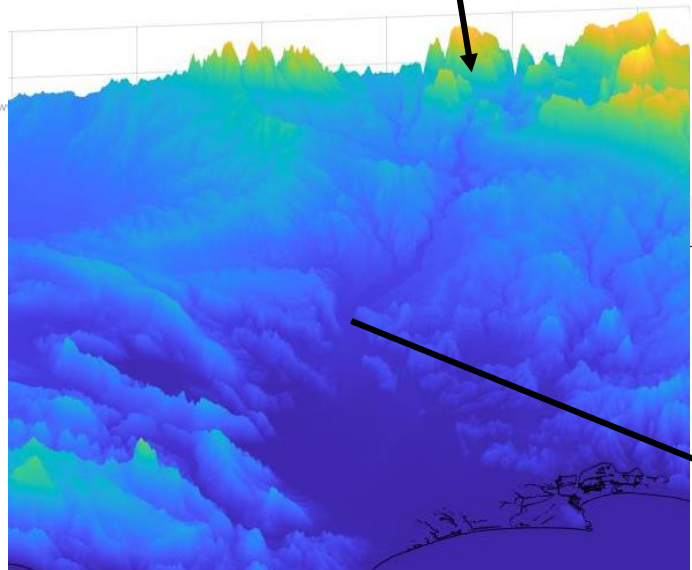
Precipitation:

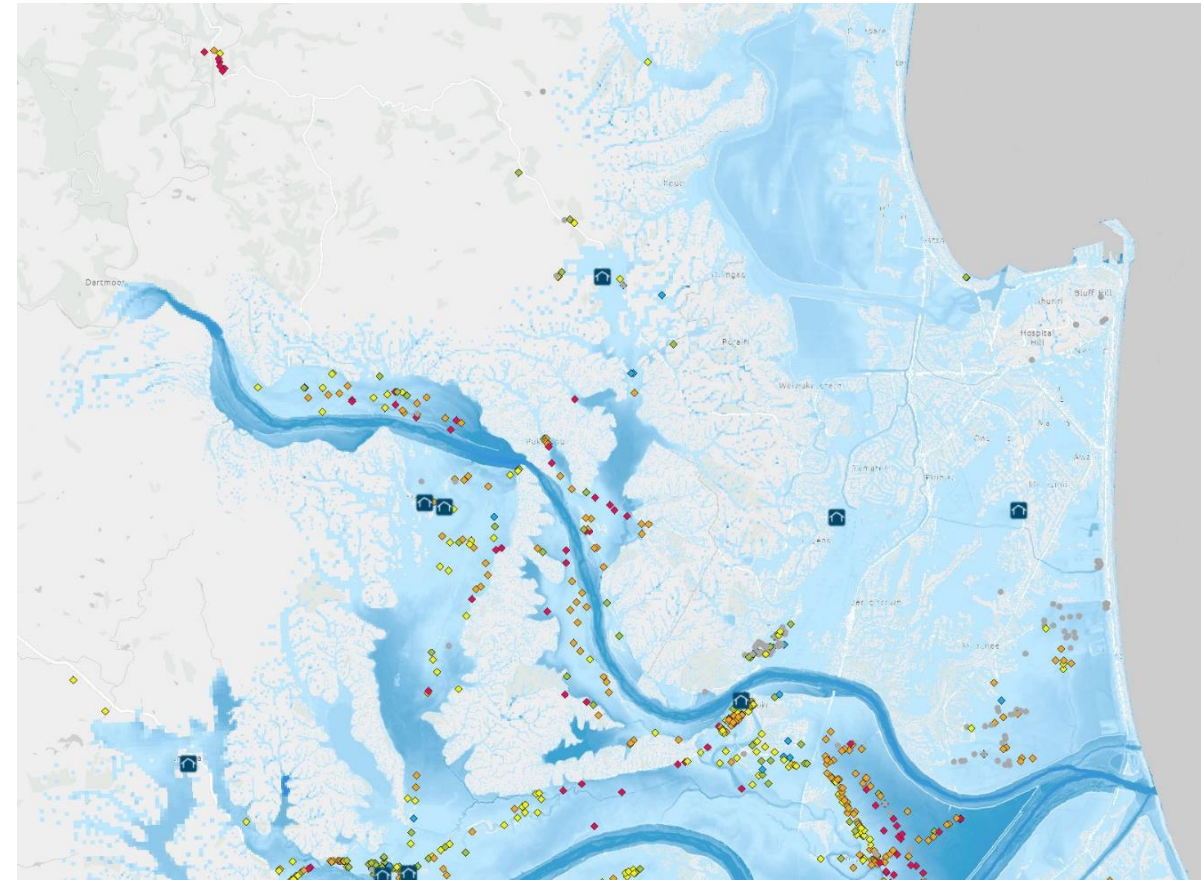
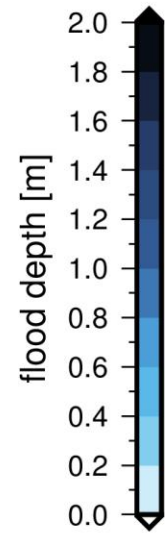
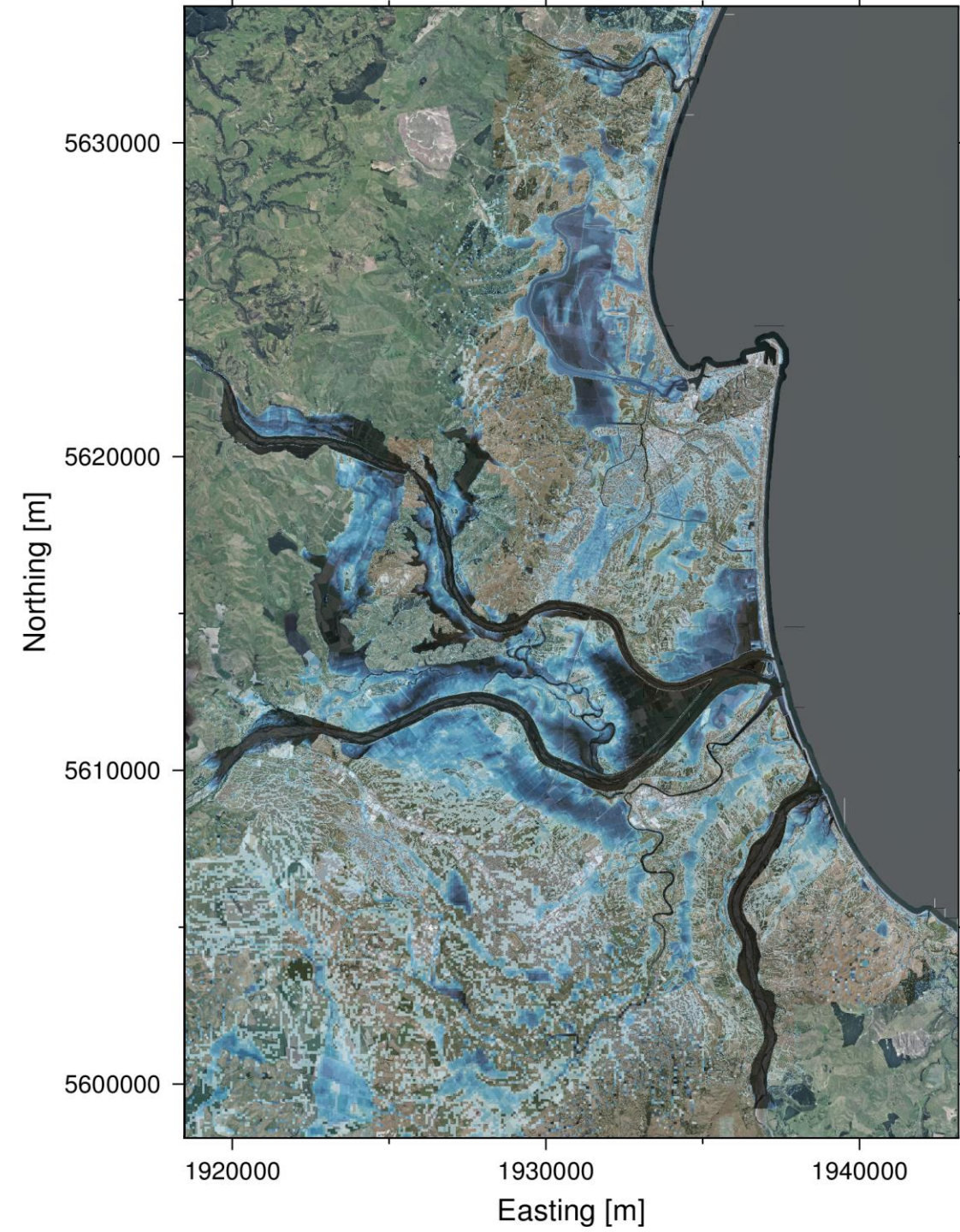
- A: Rain and sleet
- B: Hail and snow
- C: Water captured as ice or snow
- D: Water soaking into soil



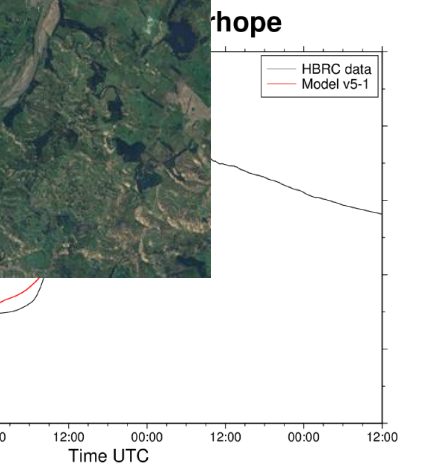
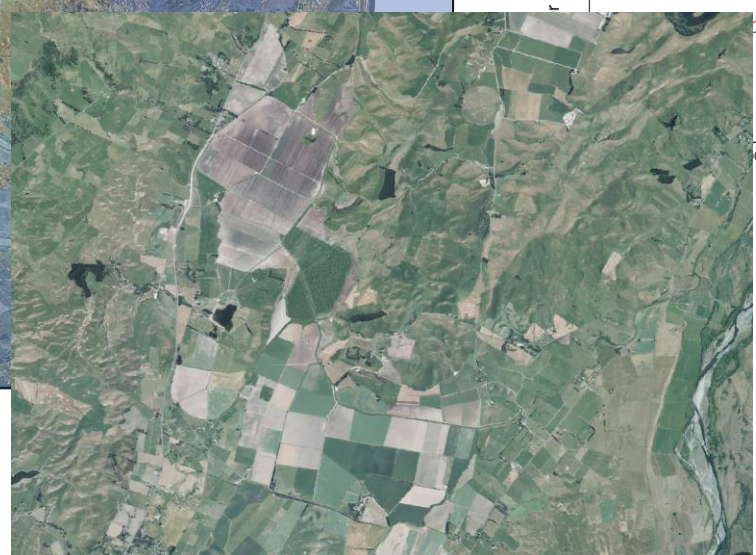
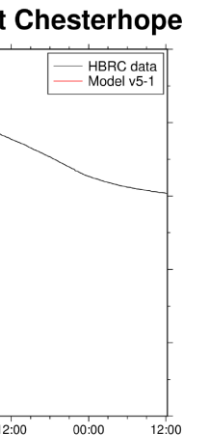
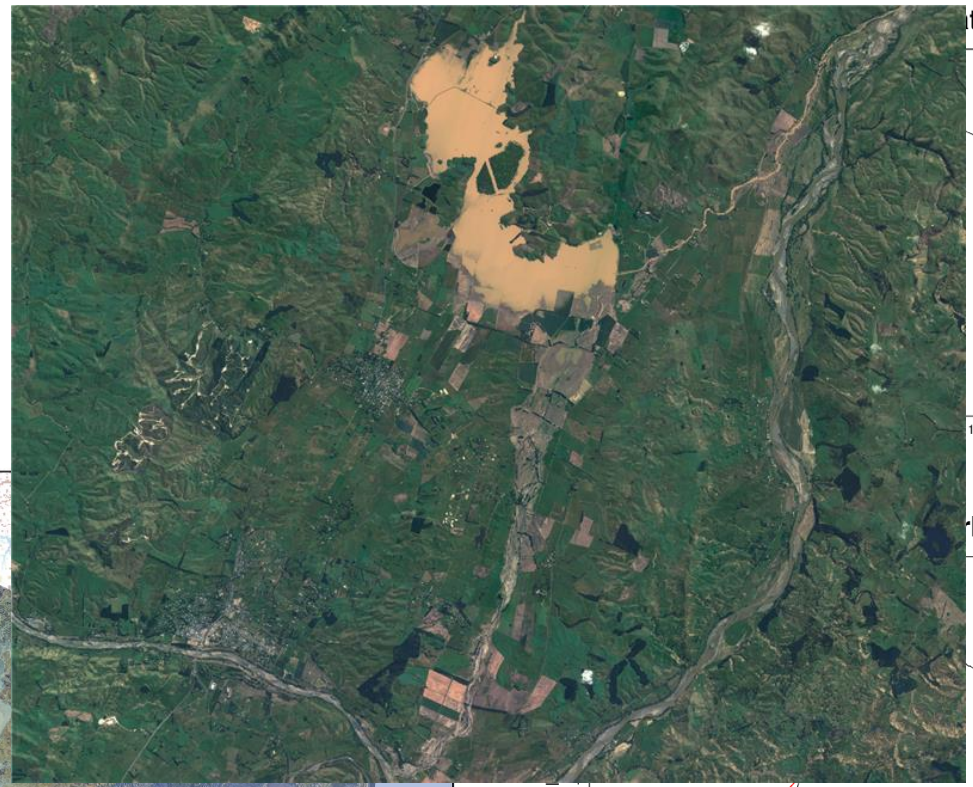
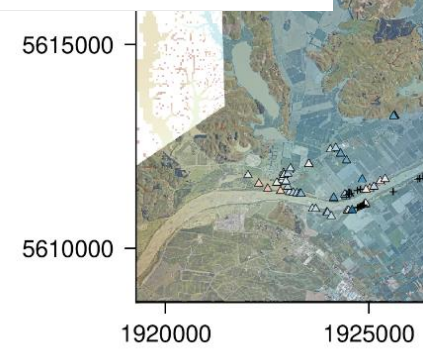
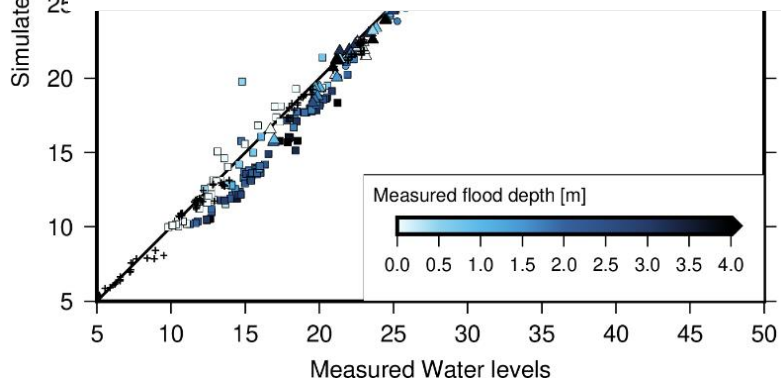
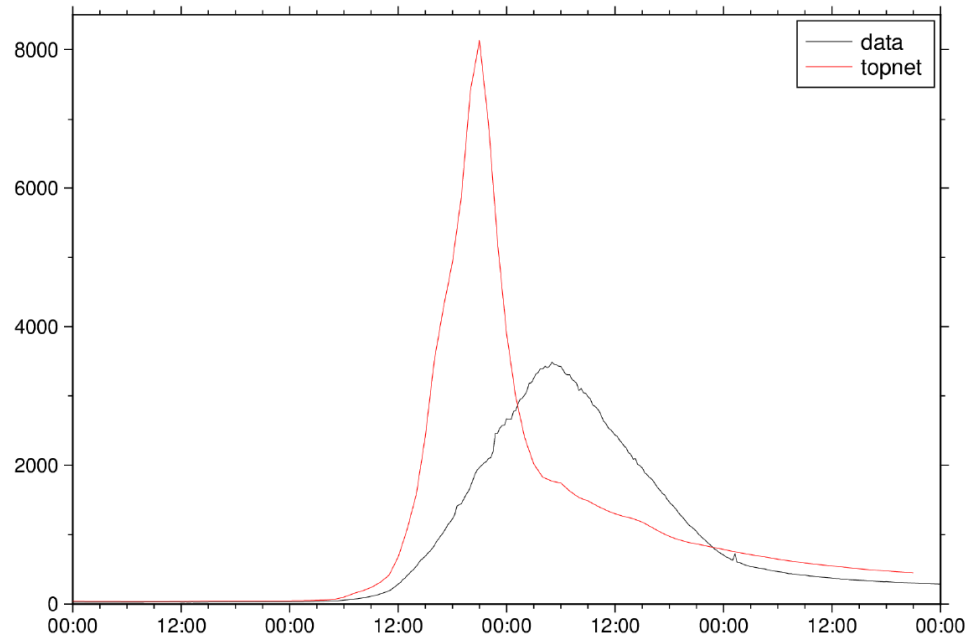
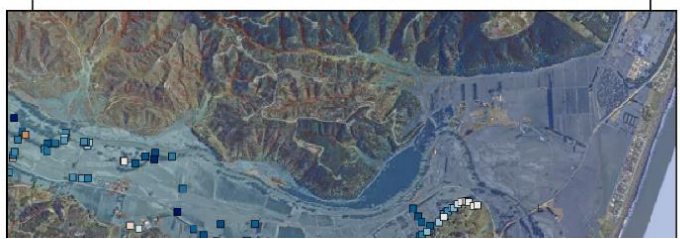
Zones:

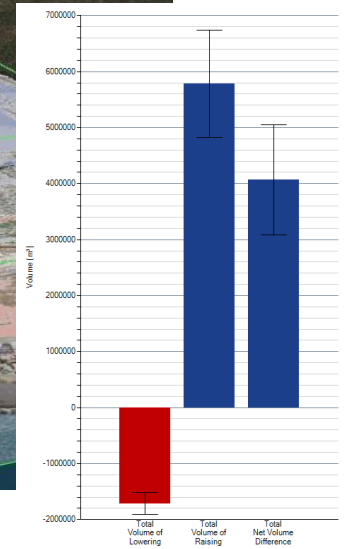
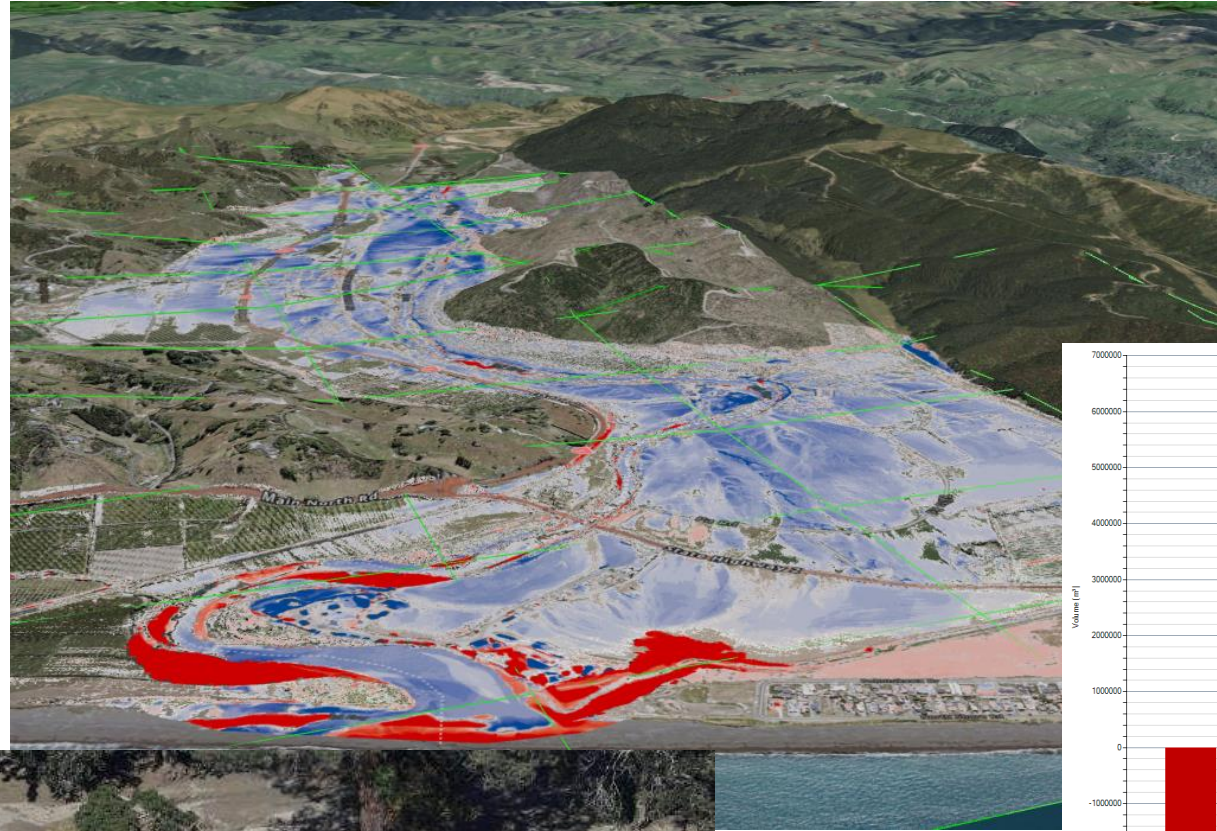
- 1: Interception store**
Rain and snow captured by trees and leaves
- 2: Soil store**
Water stored in the soil
- 3: Saturated zone**
Groundwater stores





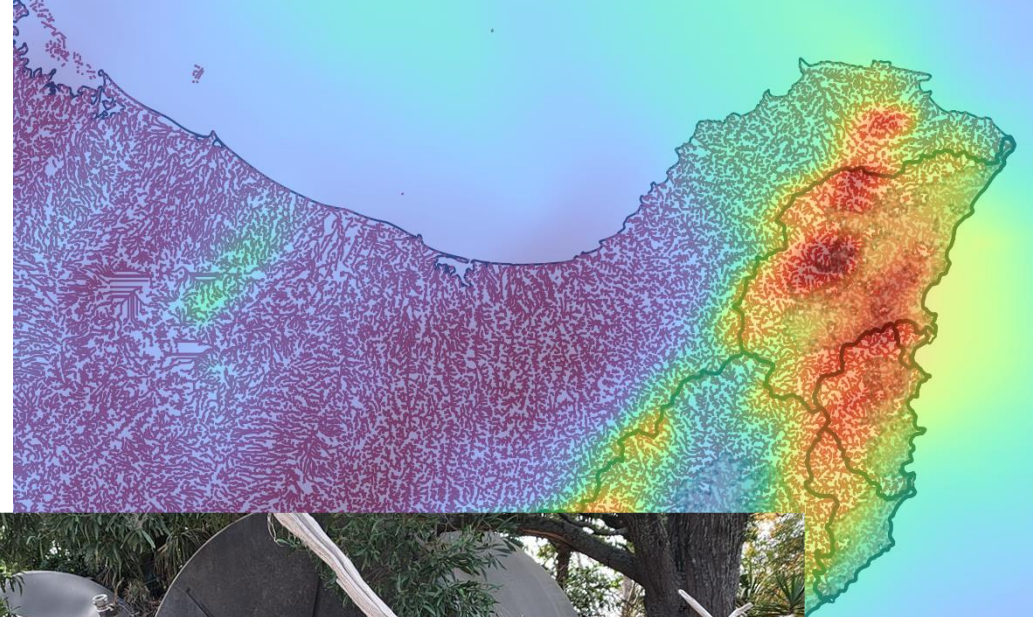






Next Steps

- Calculate and validate flood maps for other locations in Te Matau a Maui and Tairāwhiti for Cyclone Gabrielle
- What does this tell us about the flood hazard in the future?
- Sediment?
- Look at different scenarios
- Stopbank breaches
- Cyclone tracks
- Climate Change
- Stopbank configurations



Patai?

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