

Communicating Risk through History: Tropical Cyclone Hazards

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Motivation

- *Frequent exposure* to cyclone impacts creates a *collective memory* within affected communities; preserving this memory helps to prepare for future events.
- Tropical cyclones rarely impact southeast Queensland; hence, no collective memory of such events is formed, and ***Situational Awareness is limited***. Can we improve it?



Fig. 1. “Cyclone-ready”: Brisbane preparedness for cyclone Alfred (March 2025)

What was done?

A tool to estimate the historical probability of cyclone impact and timing based on:

- 64 years (1961–2024) of cyclone records.
- climatological extent of cyclone weather, proxied by the radius of the outermost closed isobar (ROCI).
- Comparison of current cyclone path with similar past tracks to estimate impact likelihood and timing.

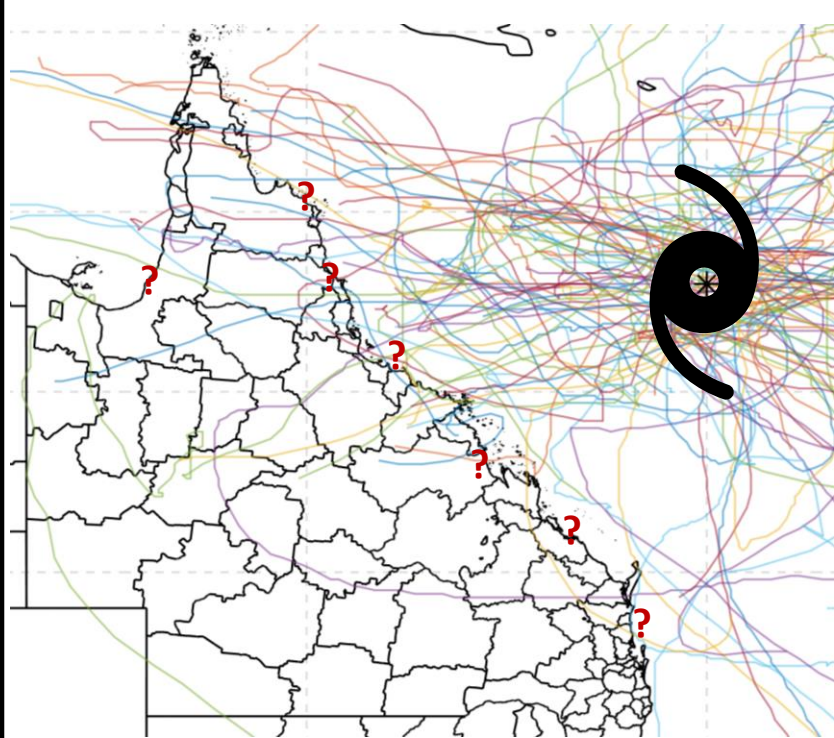


Fig. 2. Tracks of neighbour cyclones

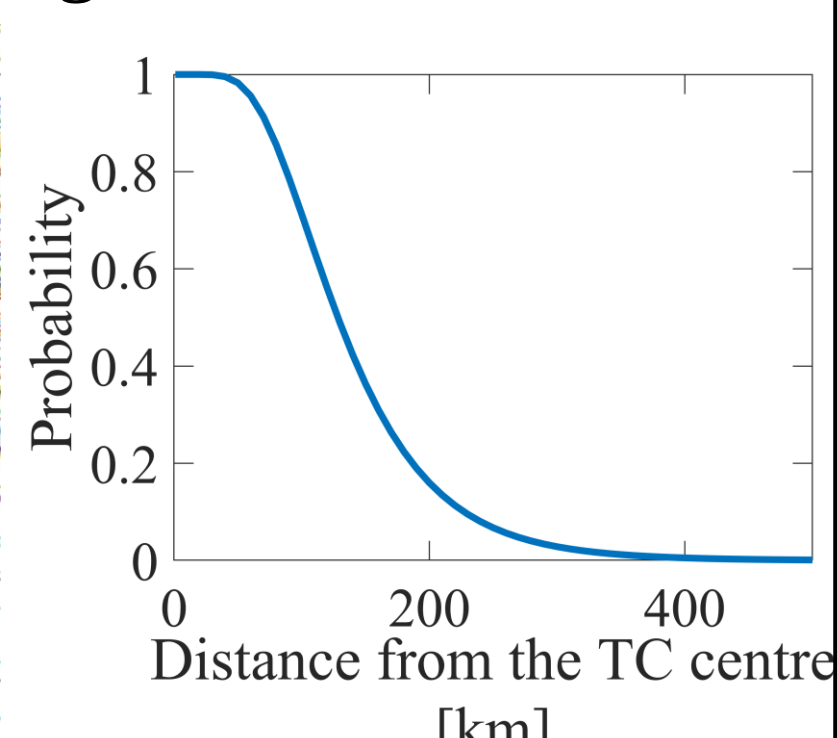


Fig. 3. Probability of being inside the ROCI

Exposure of Queensland to tropical cyclones

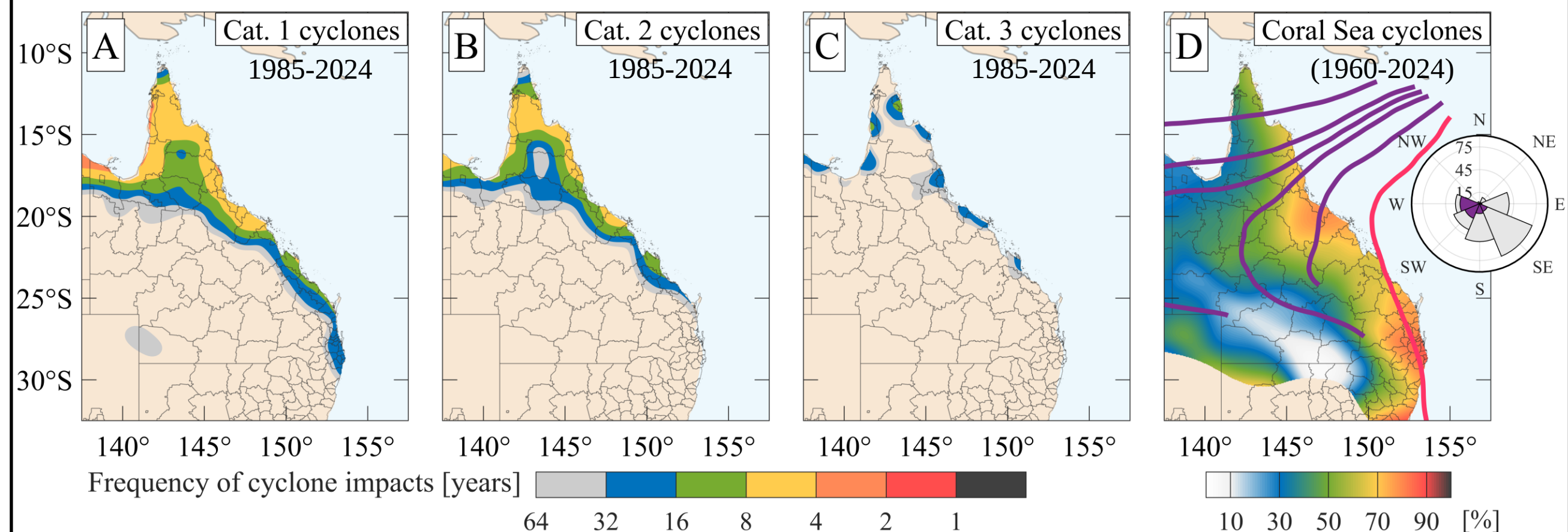


Fig. 4. A–C) How often do cyclones impact QLD? D) Where do cyclones impacting QLD come from? How common are these cyclones?

The rainfall of lows or ex-cyclones may also cause a disaster.

Historical probability of cyclone impact and timing

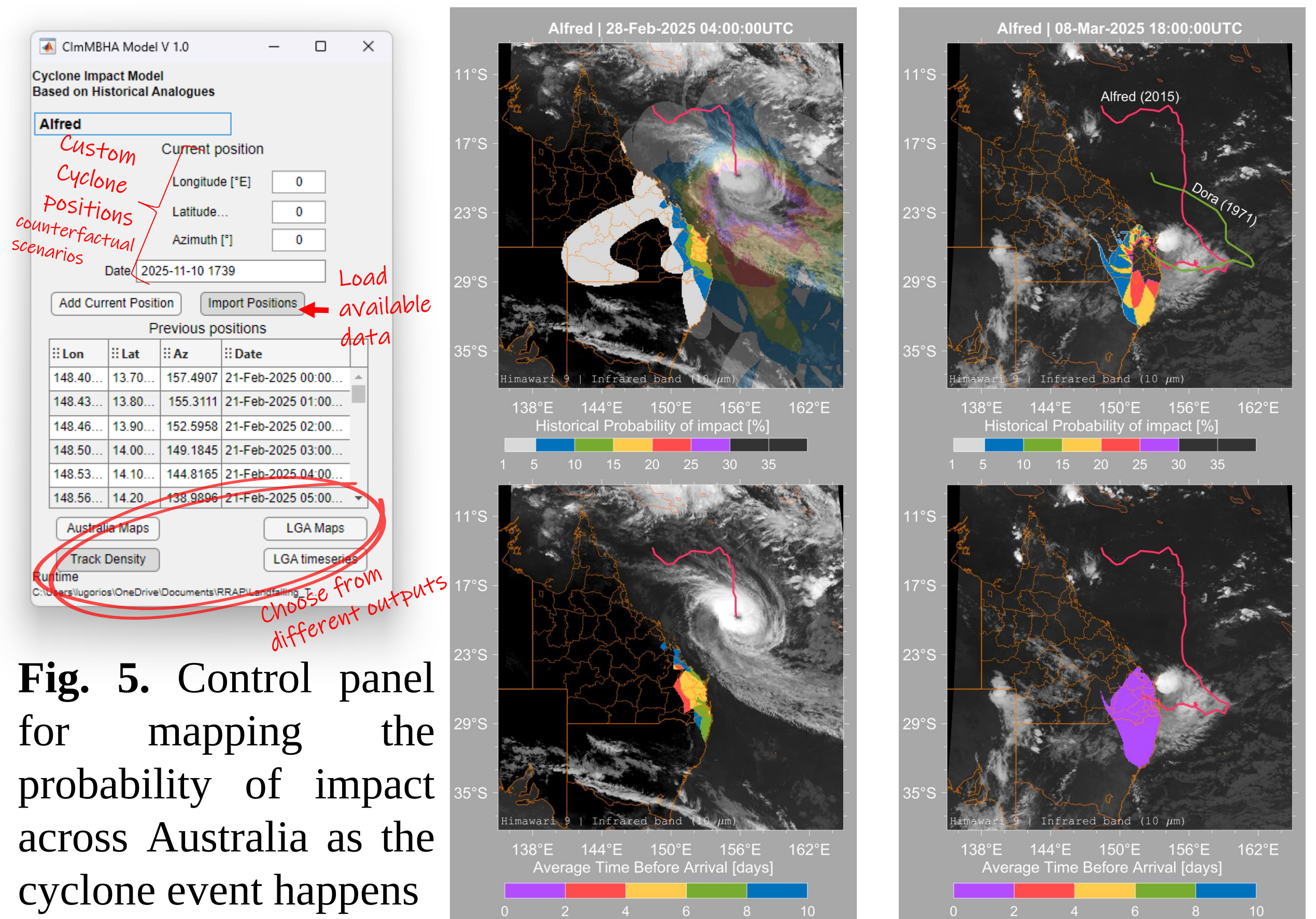


Fig. 5. Control panel for mapping the probability of impact across Australia as the cyclone event happens

Fig. 6. Maps of the historical probability of impact and timing at different stages of Alfred

Link with the past: When Alfred headed toward Brisbane, the tool revealed another similar cyclone, Dora (1971). Surprisingly, Dora caused relatively little damage in Brisbane*. Could it be the case that Dora developed in conditions similar to Alfred?

*Other cyclones with southward tracks caused more damage in SEQ QLD (e.g., Wanda and Zoe, 1974; Daisy, 1972 Gold Coast cyclone, 1954)

Summary, ideas for future development and more applications

- Linking ongoing with past events is an agile form to better prepare potentially impacted communities. An atlas (like aidr.org.au or hardenup.org) of past cyclone impact linked with the developed tool could facilitate the communication task.
- The tool provides a historical baseline when forecasts are highly uncertain.
- Post-event reports from relevant past cyclones can be used to inform BoM briefing packs to State and Local Governments and Disaster Management groups.