The Bureau of Meteorology

Harnessing ACCESS-City Ensemble for Operational Hazard Preparedness

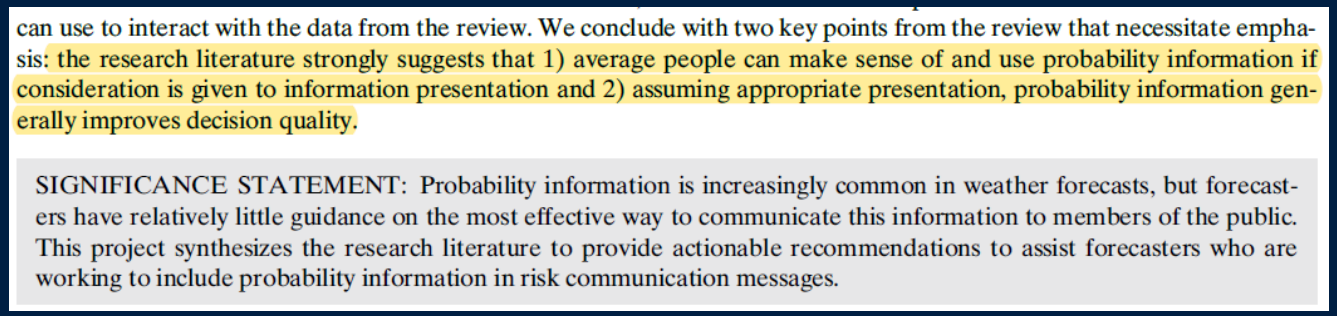
Alex Melitsis

Decision Support Meteorologist - Tasmania
Bureau of Meteorology

ACCESS-C Ensemble - A powerful tool

- ACCESS-CE is one of the most powerful tools we have
  - Will often resolve extreme weather where other models don't
  - Particularly useful when weather has a strong orographic influence

- Used for briefing and conveying hazardous weather **intensity**, **timing**, and **extent:**
  - **Probabilities:** Percentage of members exceeding a threshold
  - **Scenarios:** Most Likely and Realistic Higher Possible

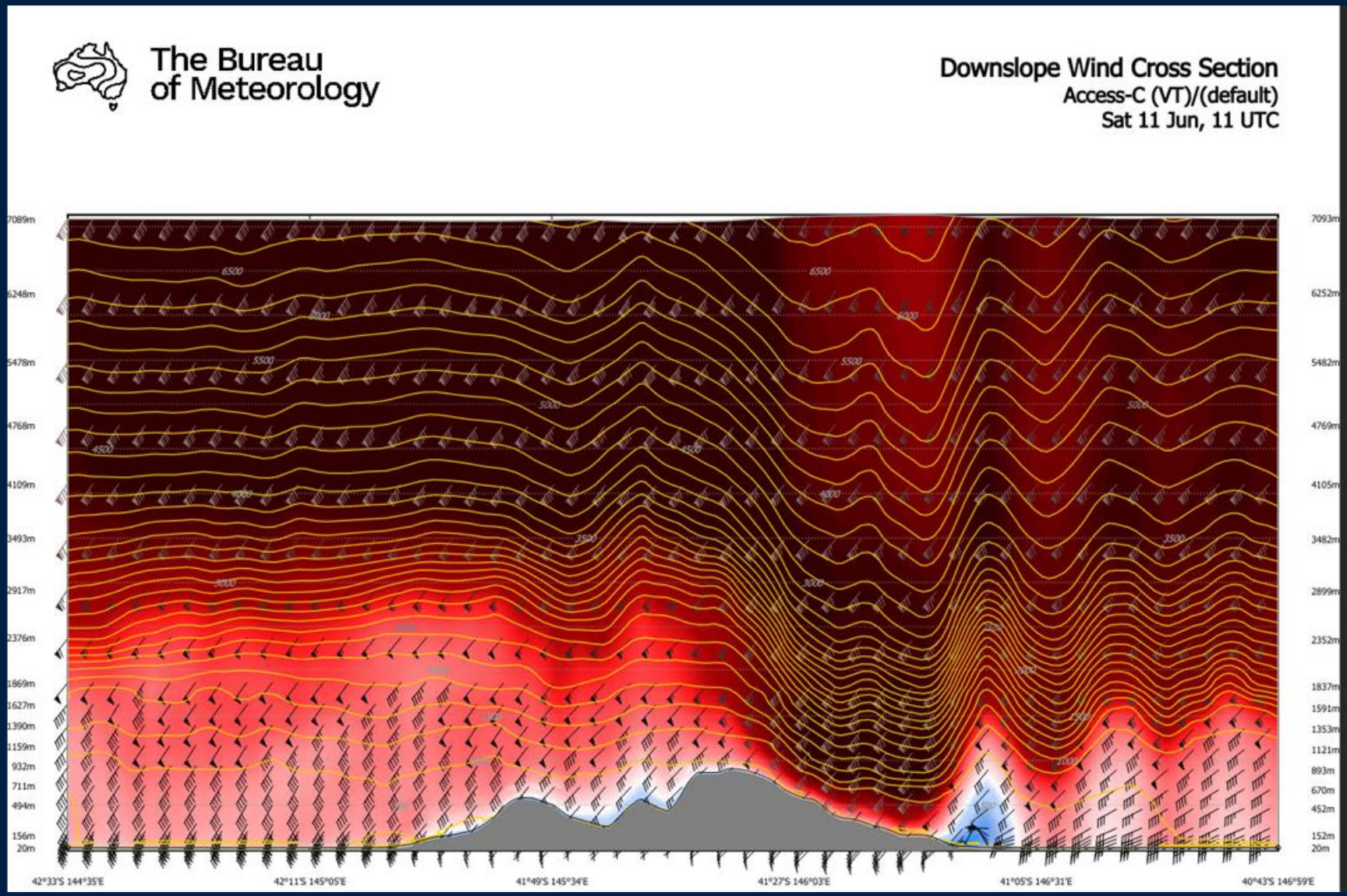


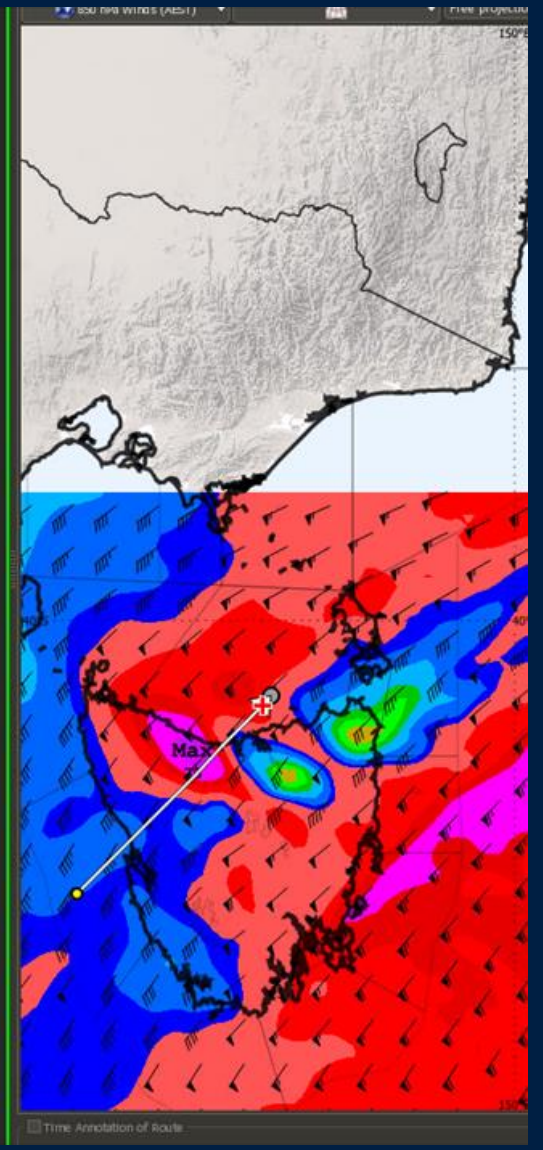
can use to interact with the data from the review. We conclude with two key points from the review that necessitate emphasis: the research literature strongly suggests that 1) average people can make sense of and use probability information if consideration is given to information presentation and 2) assuming appropriate presentation, probability information generally improves decision quality.

SIGNIFICANCE STATEMENT: Probability information is increasingly common in weather forecasts, but forecasters have relatively little guidance on the most effective way to communicate this information to members of the public. This project synthesizes the research literature to provide actionable recommendations to assist forecasters who are working to include probability information in risk communication messages.

Ripberger, J and Coauthors, 2022, Communicating Probability Information in Weather Forecasting, *Wea. Climate Soc.* **14**, 481-498, https://doi.org/10.1175/WCAS-D-21-0034.1

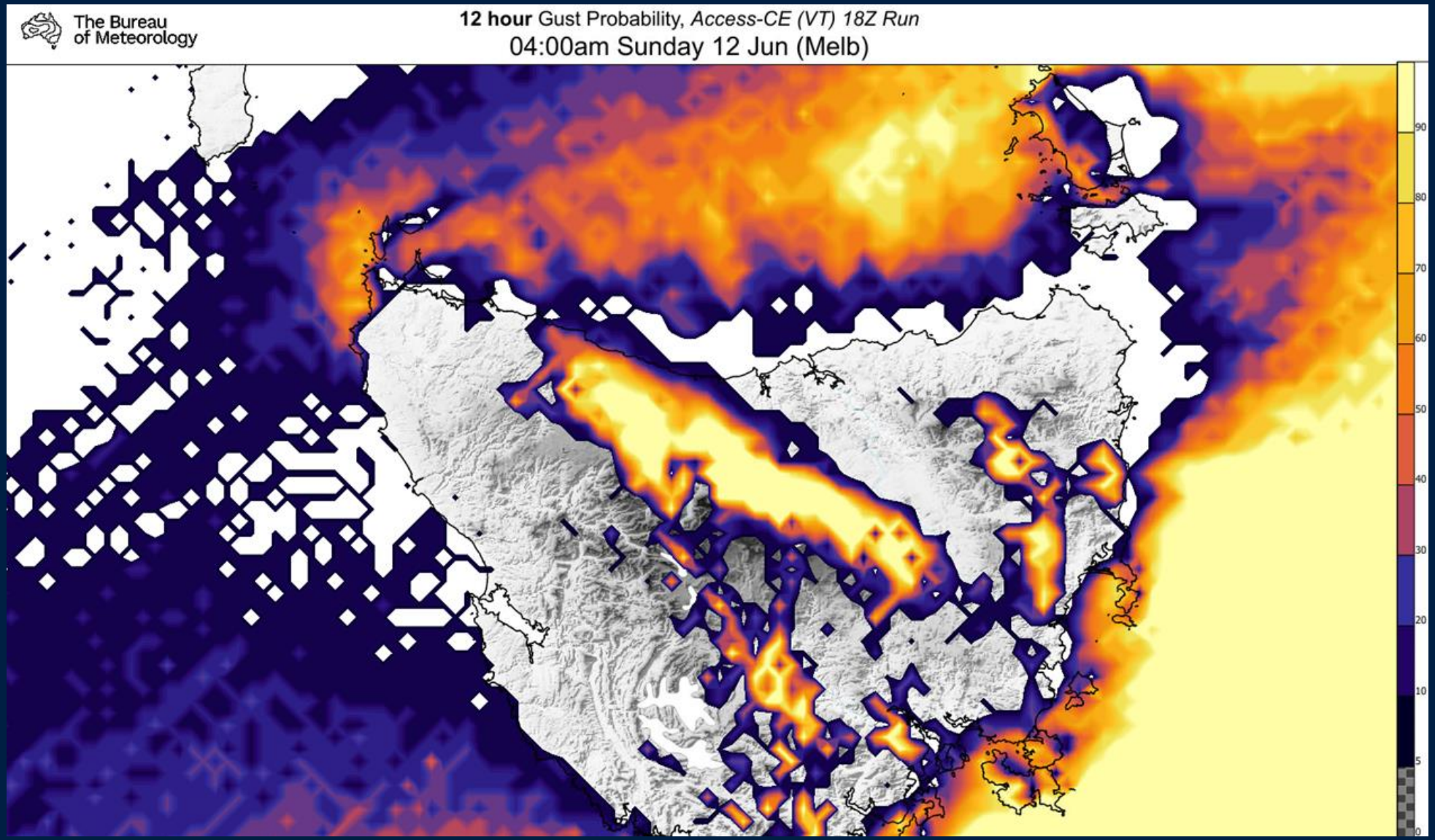
Operational Example – NW Tas Destructive Winds June 2022





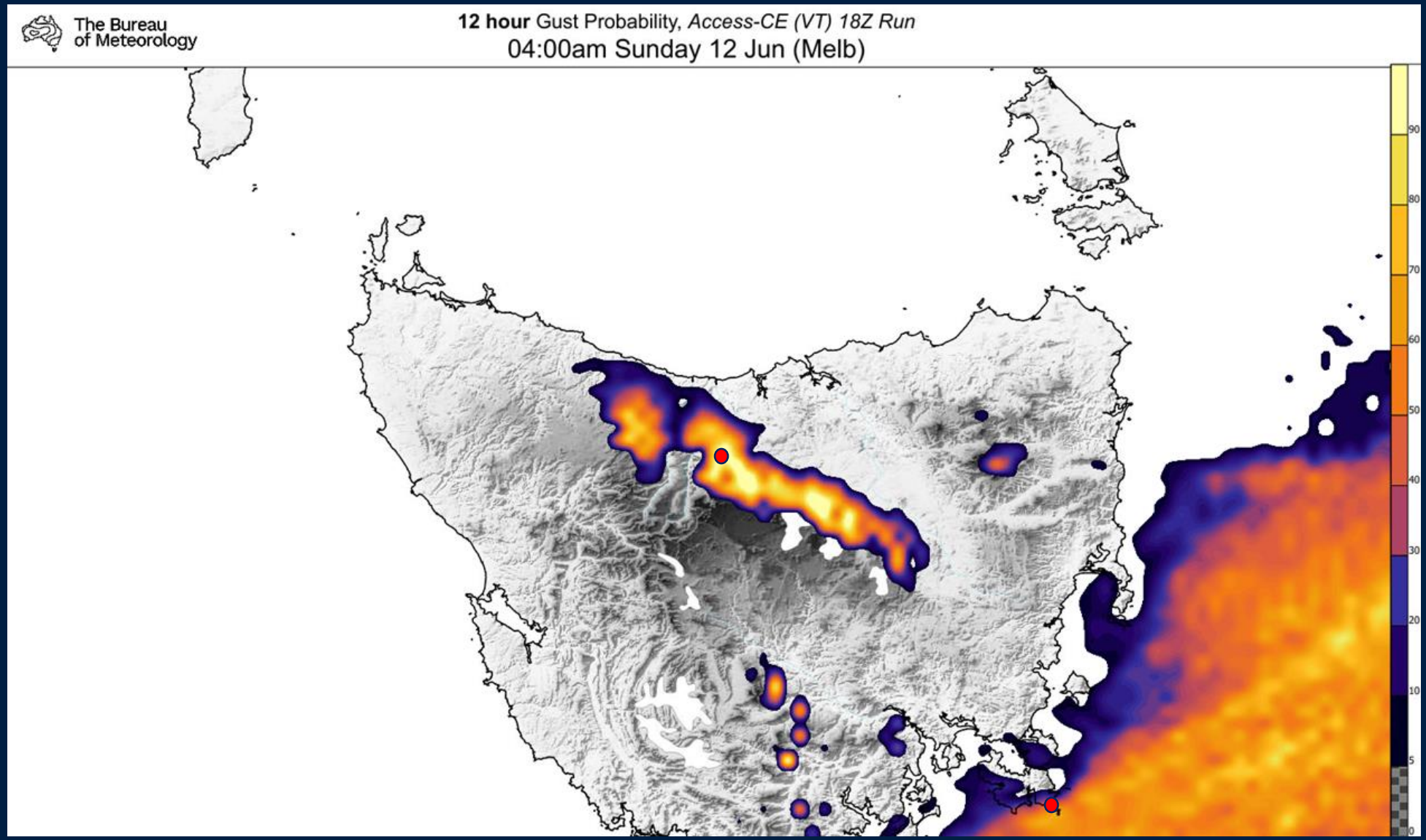
ACCESS-C Vertical Cross Section – Wind bards, isentropes (yellow contours), wind speed (colour field)

Operational Example – NW Tas Destructive Winds June 2022



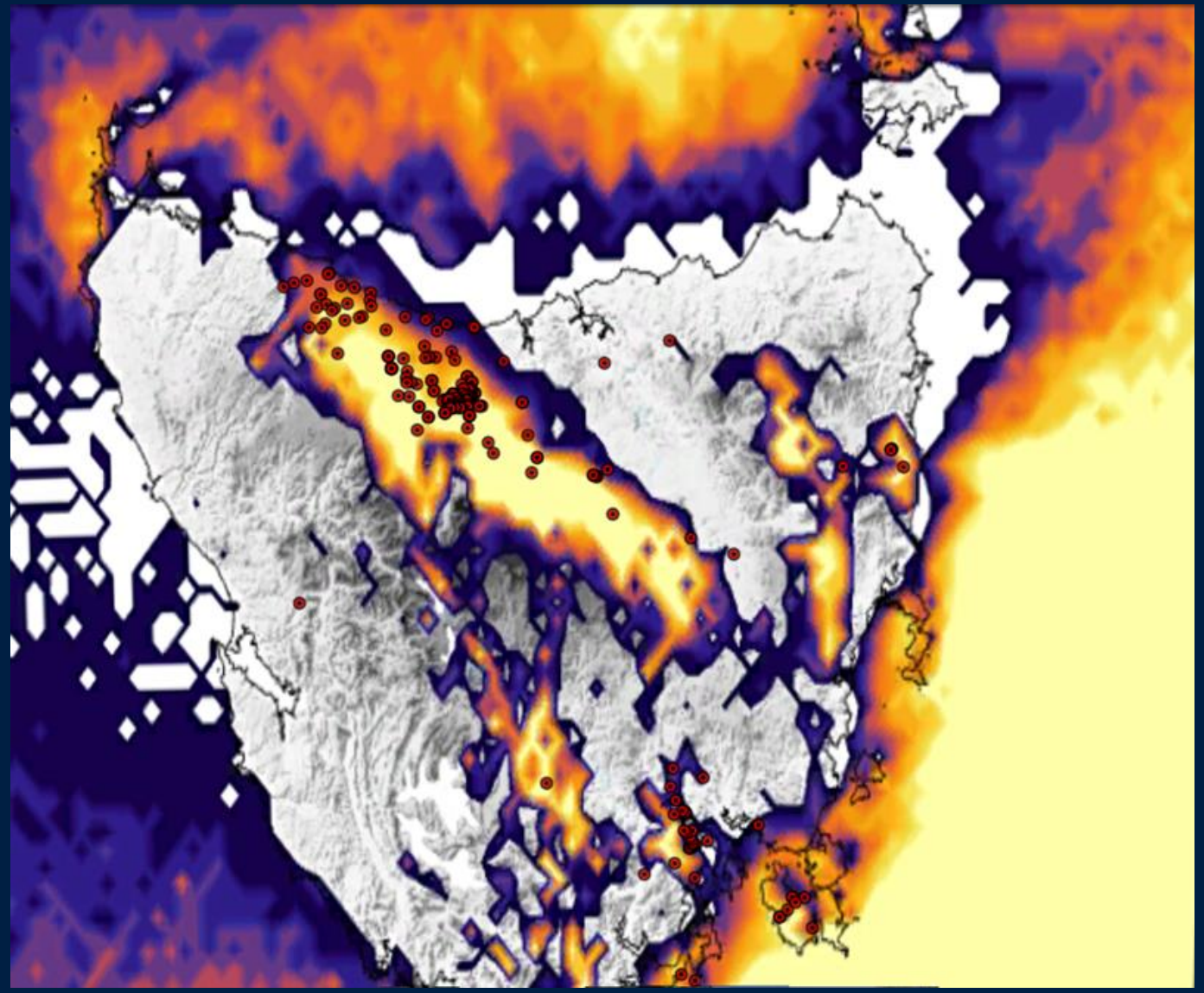
Percentage of ENS members with gusts exceeding 100 km/h during the 12 hours to 04:00

Operational Example – NW Tas Destructive Winds June 2022

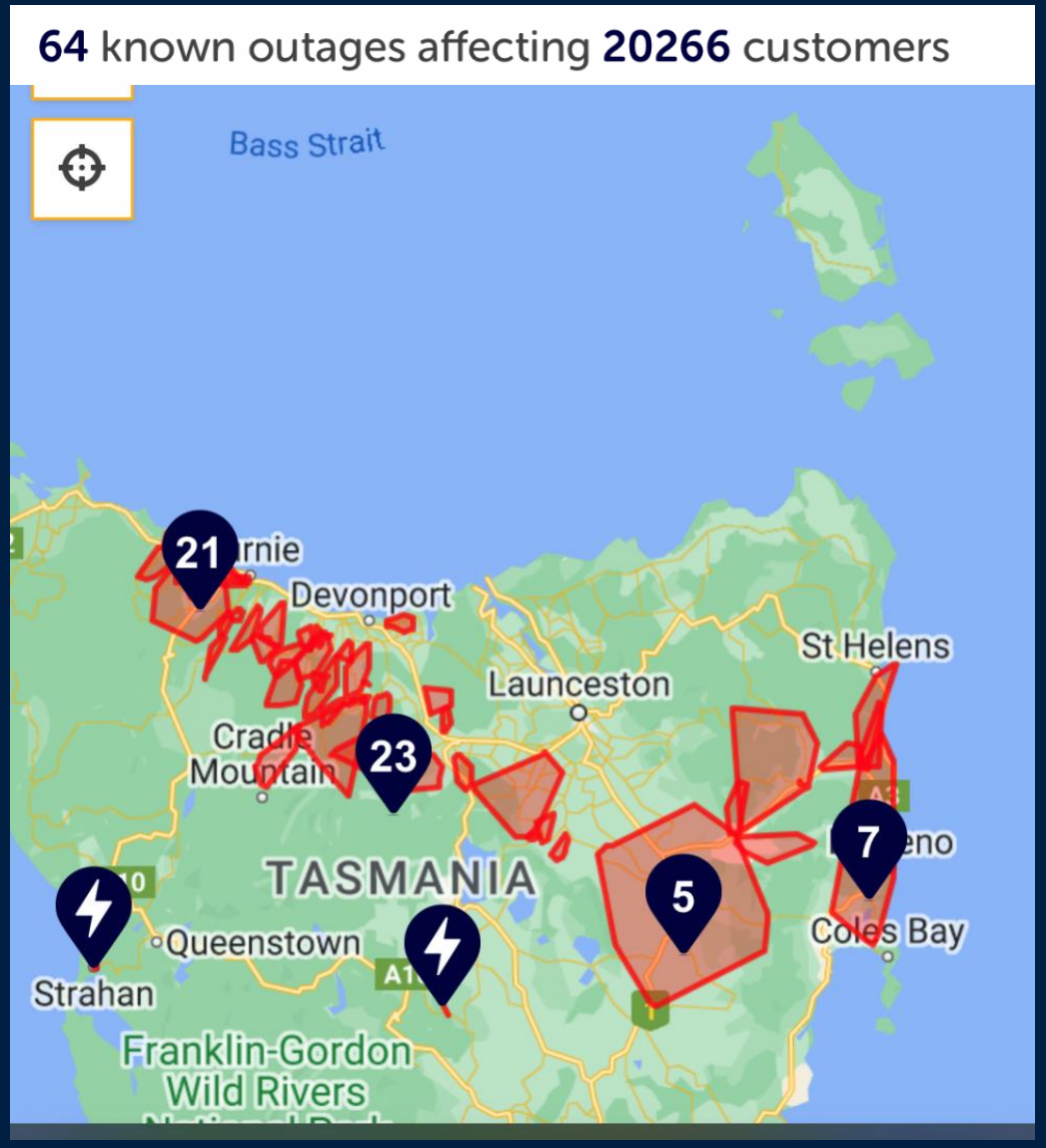


Percentage of ENS members with gusts exceeding 125 km/h during the 12 hours to 04:00

Operational Example – NW Tas Destructive Winds June 2022

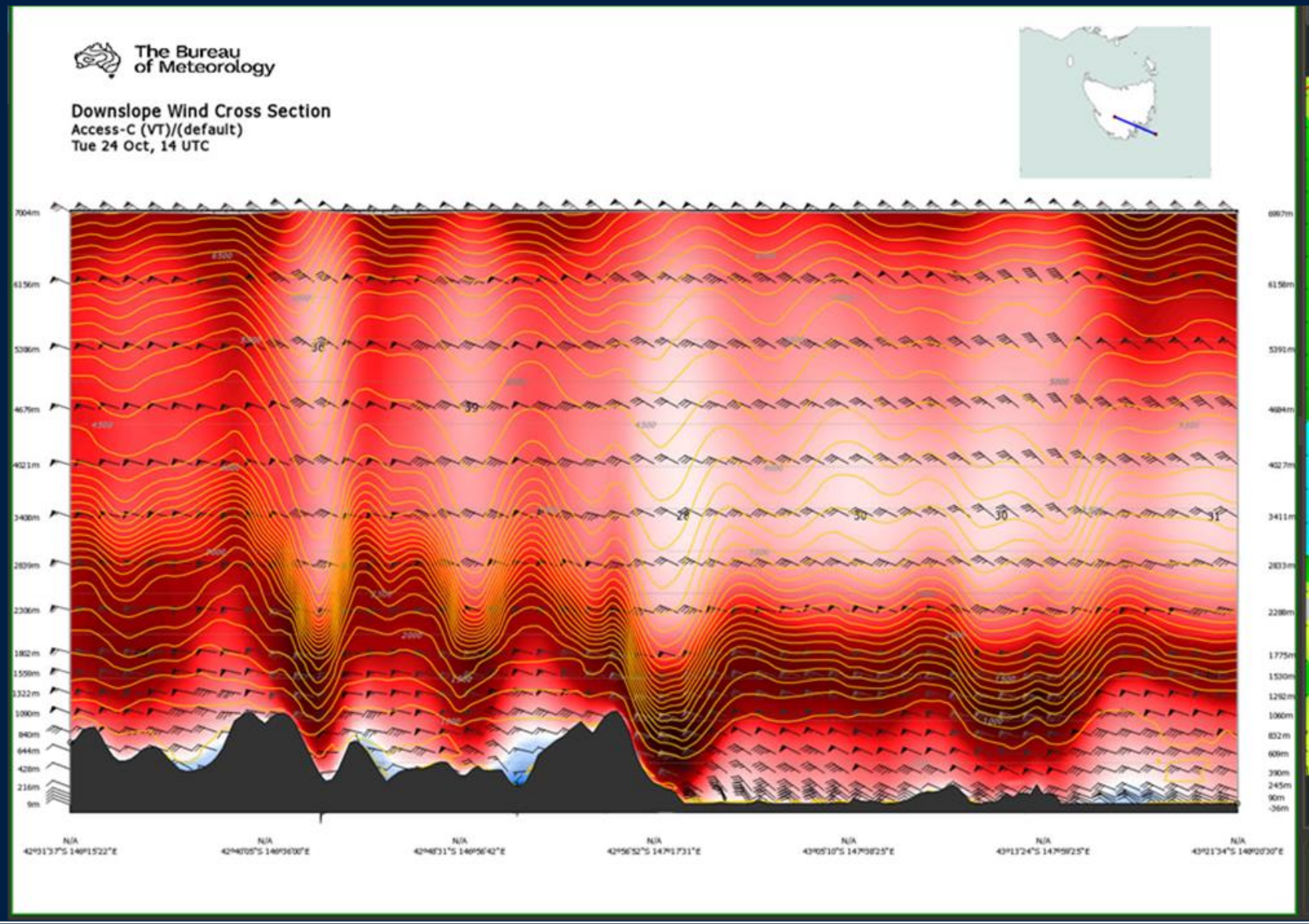


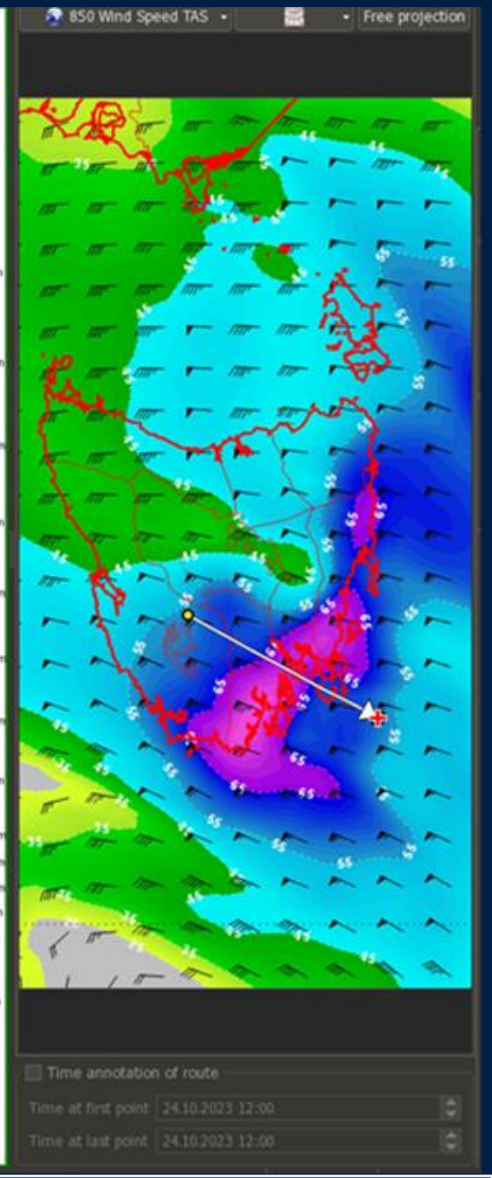
Prob Gusts > 100 km/h with SES Incident Responses



Power outages

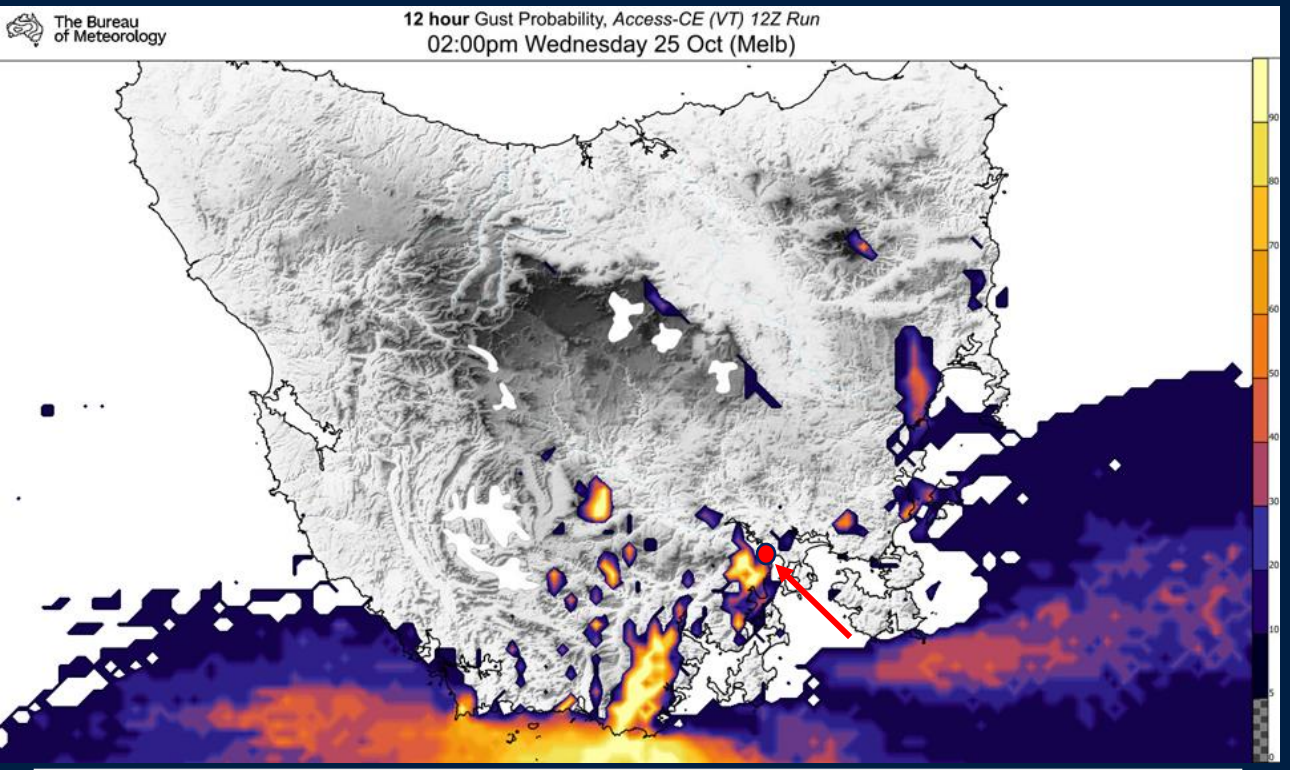
Operational Example – Hobart Destructive – October 2023



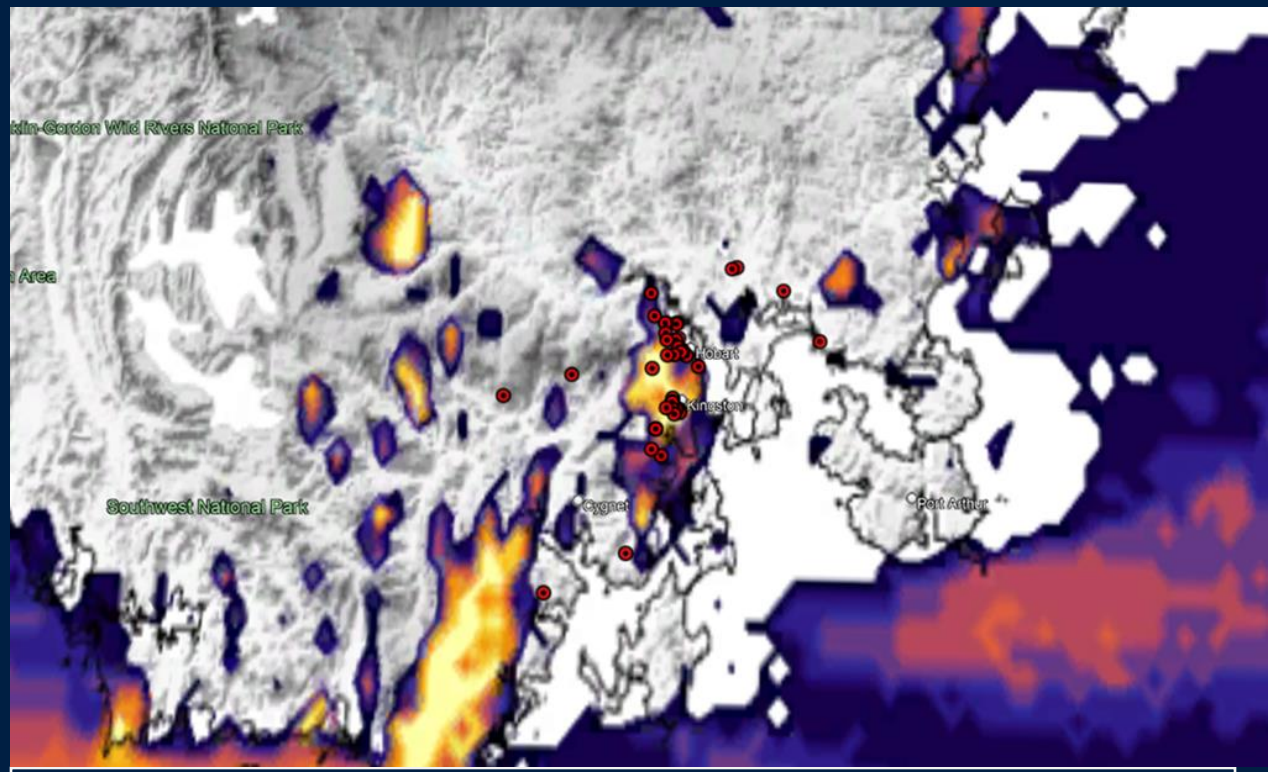


ACCESS-C Vertical Cross Section – Wind bards, isentropes (yellow contours), wind speed (colour field)

Operational Example – Hobart Destructive – October 2023

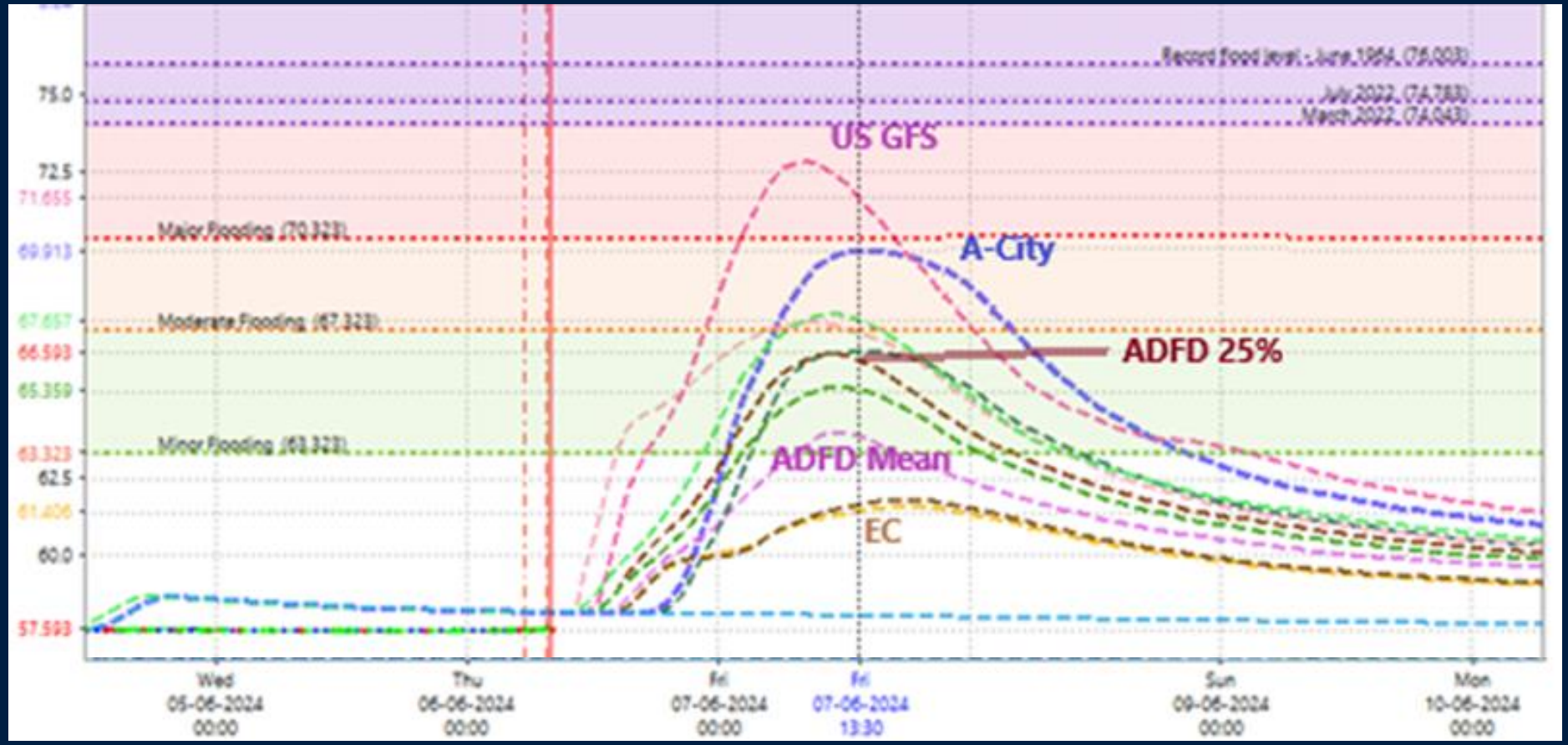


Percentage of ENS members with gusts exceeding 125 km/h



40 SES incidents, 8000 power outages

Operational Example – NSW Flooding June 2024



Forecast hydrograph for the Nepean River at Menangle Weir

Operational Example – NSW Flooding June 2024

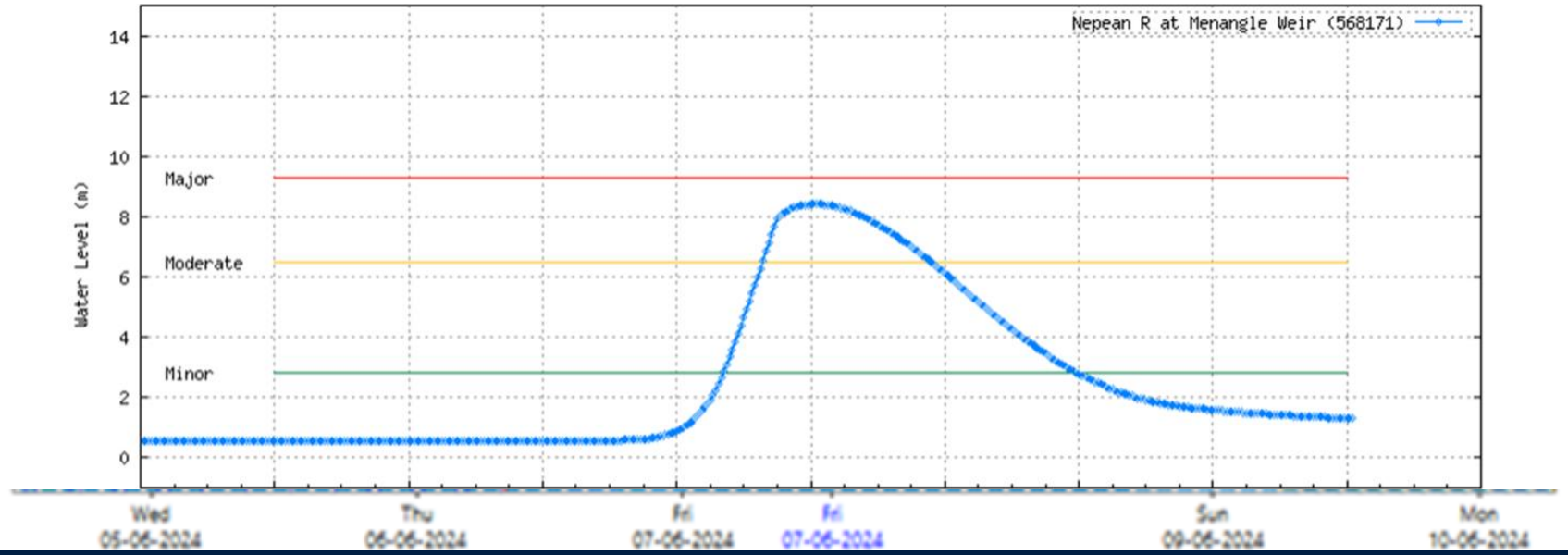
Latest River Heights for Nepean R at Menangle Weir

Issued at 12:46 pm EST Sunday 9 June 2024

ⓘ About river height plots | About this Plot

Station details: Station Number: 568171 Name: Nepean R at Menangle Weir
Flood levels: Minor: 2.80 Moderate: 6.50 Major: 9.30

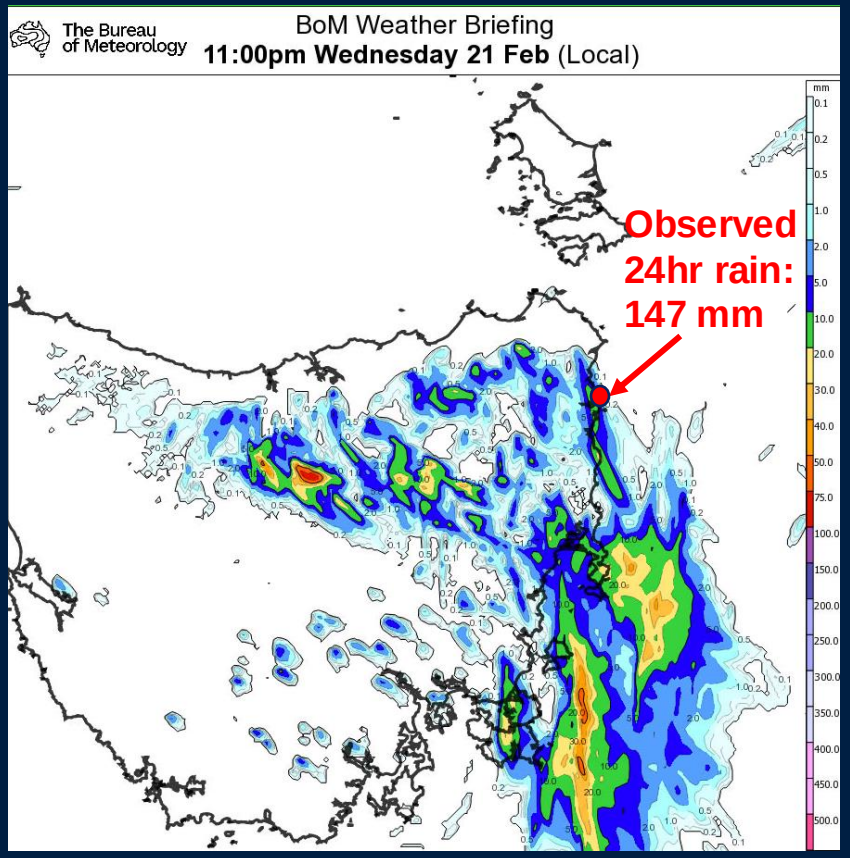
Data from the previous 4 days.



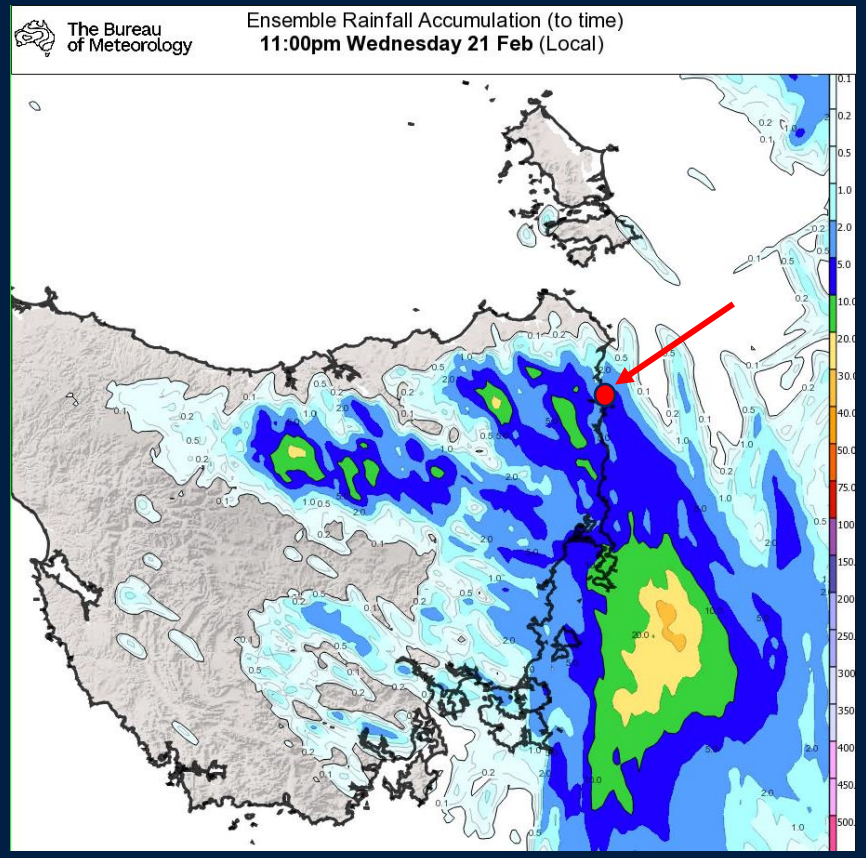
Observed hydrograph for the Nepean River at Menangle Weir

Model Challenges – St Helens (NE Tas) Intense Storm

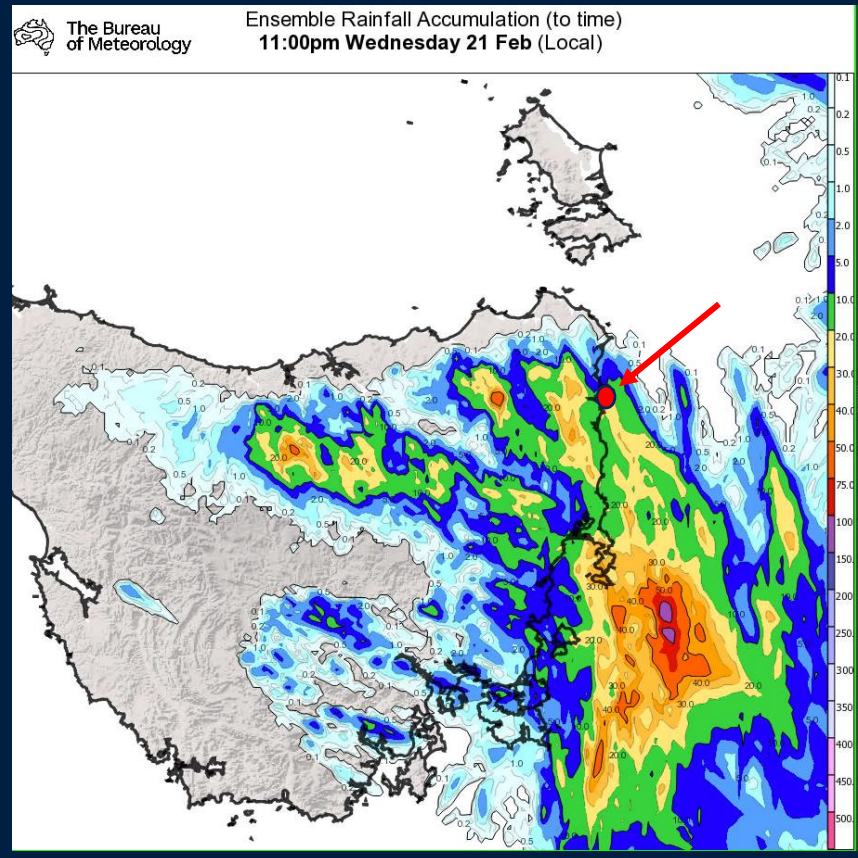
Model 24-hour rainfall during 21st Feb 2024 (using 00Z runs from the previous day)



ACCESS-C Det



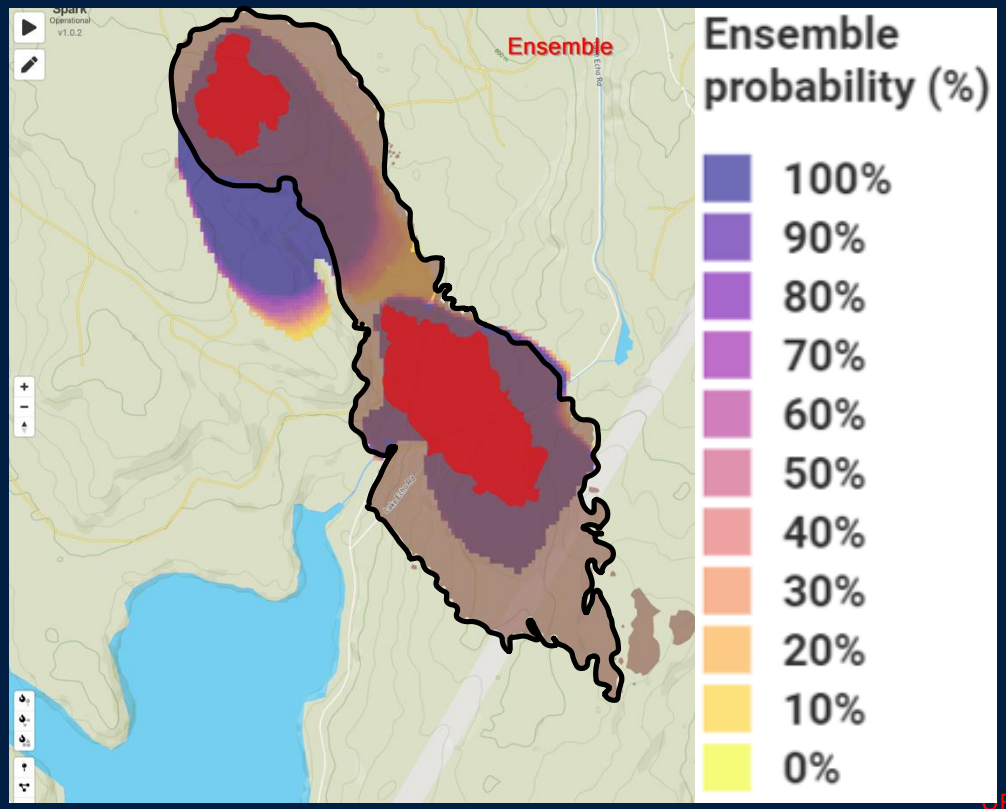
ACCESS-C Ens **Mean**



ACCESS-C Ens **90th Percentile**

Possible future initiatives

- Improved dispersion and more realistic probabilities.
- Longer lead time – 3 or 4 days (maybe only for the morning run)
- Make ACCESS-City/Aus Ensemble data publicly available



22nd Feb 2024:
Ensemble of SPRAK fire spreads using A-CE members

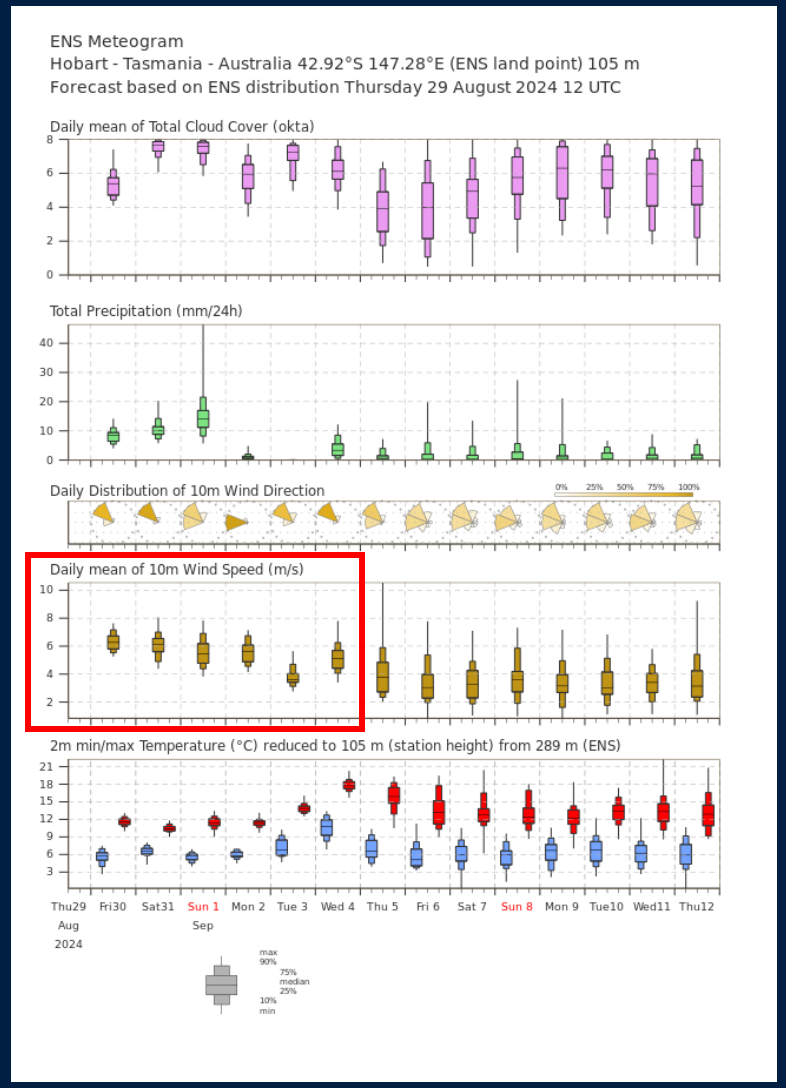
RED is 4pm boundaries from SIG heli. BROWN is a 7.30pm linescan.

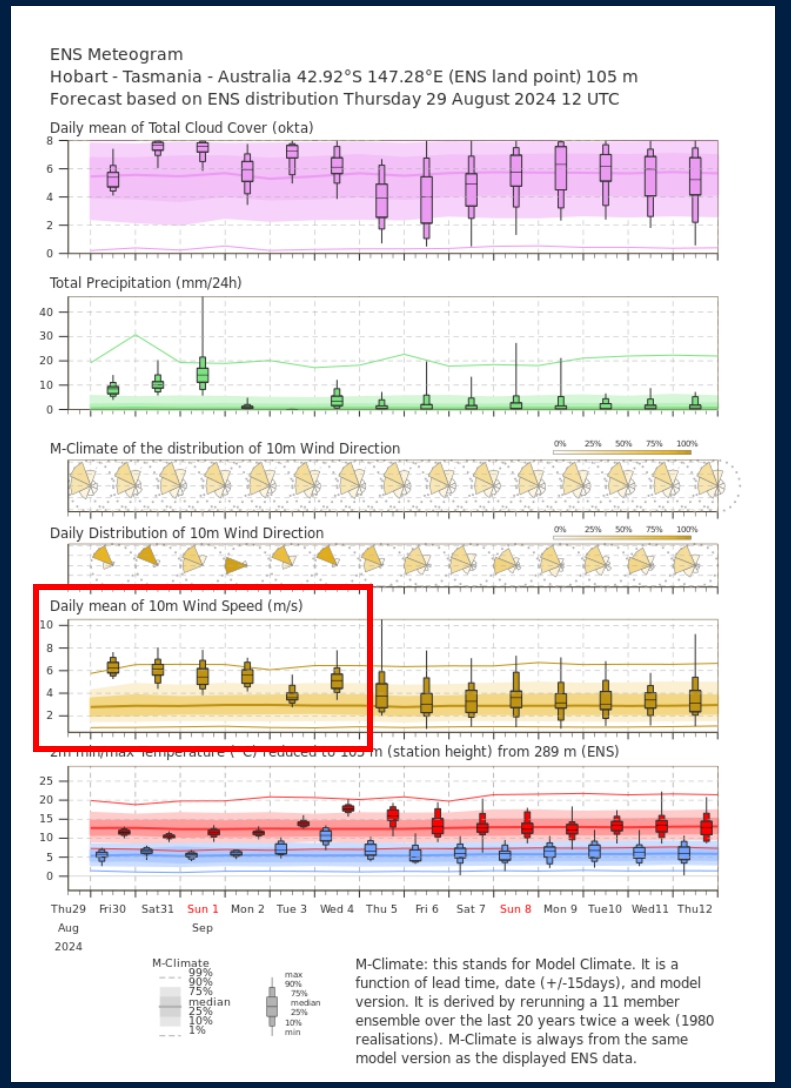
Noting:
- the location for ensemble extract is about 5km west
- Active suppression on the southern flank
- SPARK Spotting disabled

Possible future initiatives – Model climatologies

- Use BARRA to create various Annual Exceedance Probabilities, climate percentiles etc

- Compare the ACCESS-City/Aus Ensemble to model climatologies:
  - Probability of exceeding AEPs
  - Extreme Forecast Indices





The Bureau of Meteorology

Thanks