

Improving Tropical Cyclone Forecasts

The JIP aims to improve the estimation of risk of wind and wave impacts in the 10-day forecast window for the Australian region using computer model guidance.

Participants:



Principle service provider:

Australian Bureau of Meteorology (BoM)

What is the problem:

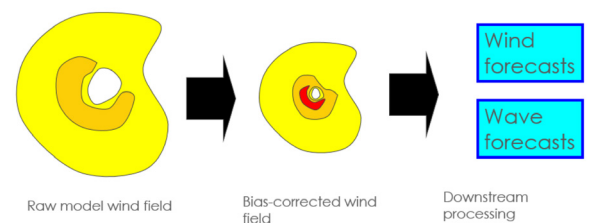
Tropical cyclone forecasts have traditionally focused on describing the most likely track and intensity in a 3-5 day forecast horizon. However, industry's operational response often requires much longer lead time and can be dependent not only on the most likely outcome but also the 'worst case' scenario. Industry practice may result in Operators taking unnecessary actions for tropical systems that pose no threat, so called 'false positives', which results in increased health and safety exposure.

What is the solution:

A two fold approach has been undertaken for the Western Australian region. First, the deterministic computer model guidance is improved by running at a higher resolution, having parameters specifically tuned to improve tropical cyclone forecast skill, and building a wave forecast model to utilize the outputs from the wind forecast model.

Secondly, multiple (51) computer models runs that are generated twice per day have been re-calibrated to ensure there is no wind intensity or size biases in the forecast. Based on these wind forecasts multiple (51) wave model forecasts are produced.

Ensemble Bias Correction



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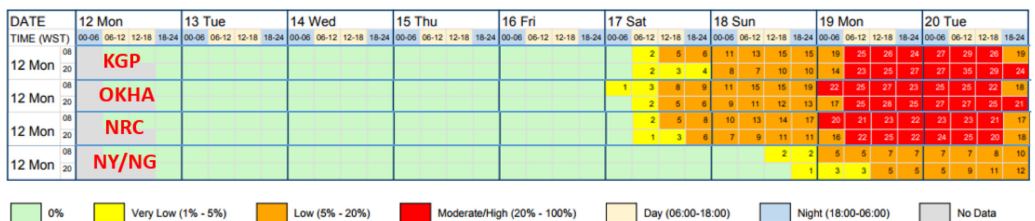
What is the solution:

Each operator is now able to establish the risk of wind and wave thresholds being exceeded at nominated facility locations at 6 hourly time steps out to 10 days ahead.

Progress to date:

The high resolution deterministic wind and wave models have been developed and implemented in operational mode, and have shown a moderate improvement in forecast skill.

A calibration strategy has been developed and implemented to correct forecast errors in the multiple (51) computer wind models, and the outputs have been used to drive the wave model. The operational products have been in place for two Australian tropical cyclone seasons and operators have utilized the outputs to inform response decision making during events. An example of the BoM 'risk' product, showing the risk of gales as a system approaches, is shown below.



Next steps:

Operators and forecasters are gaining experience of using the new 'risk' products with positive impacts on the safety and efficiency of operations. For example, Woodside was able to avoid discontinuing operations for STC Marcus in March 2018 because there was demonstrated to be no risk of impact at its facilities, whilst under previous response procedures, the facilities would have been shut-in and FPSOs disconnected, with the associated risk to personnel in disconnecting and reconnecting the FPSOs.

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