



This research is informing emergency warnings for storms, fires, floods and cyclones. Photo: cksydney, Flickr

- Key Topics:
- coastal [2]
 - forecasting [3]
 - vulnerability [4]

Impact-based forecasting for the coastal zone: East Coast Lows [5]


The project demonstrated a pilot capability to deliver wind and rain impact forecasts for residential housing from an ensemble of weather prediction models runs. The project focused on the wind and rainfall impact from the 20-22 April 2015 East Coast Low in New South Wales. Through the utilisation of Geoscience Australia’s HazImp software, the research team developed and tested a workflow that integrated the numerical weather forecasts, vulnerability relationships and exposure data at the community level. The project set up the end-to-end workflow from wind and rain hazard to spatial impact. These spatial impact outputs were delivered into the Visual Weather system at the Bureau of Meteorology, foreshadowing the possibility of easily achievable future visualisation to operational meteorologists.

Project: detail Notabs


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Description

This project set out in 2017 to demonstrate a pilot capability to deliver wind and rain impact forecasts for residential housing from an ensemble of weather prediction models runs. The project was a collaborative effort between the Australian Bureau of Meteorology (Bureau) and Geoscience Australia (GA).

The project was initially focused on the wind and rainfall impact from the 20-22 April 2015 east coast low event in New South Wales (Wehner and Maqsood 2015). The wind and rainfall hazard data were provided by a 24-member ensemble of the Australian Community Climate Earth System Simulator (ACCESS; Bureau of Meteorology 2018) model on a 1.3 km grid, with damage data provided by NSW State Emergency Services (SES) and the Emergency Information Coordination Unit (EICU). Exposure data were sourced from the National Exposure Information System (NEXIS; Nadimpalli et al. 2007; Power et al. 2017) at GA. Heuristic wind vulnerability functions, derived in a previous project, were also provided by GA, while no large-scale rain vulnerability relationships existed.

Through the utilisation of GA's *HazImp* software, the research team developed and tested a workflow that integrated the numerical weather forecasts, vulnerability relationships and exposure data at the community level, and early in the second year of the project, they started producing the first spatial quantitative wind impact plots.

The project set up the end-to-end workflow from wind hazard to spatial impact. These spatial impact outputs were delivered into the Visual Weather system at the Bureau of Meteorology, foreshadowing the possibility of easily achievable future visualisation to operational meteorologists.

To evaluate the performance of the quantitative wind impact forecast that the research had produced, very careful and detailed processing of the available damage data was needed to remove damage reports due to tree fall, as opposed to structural failure, rain ingress, and flood inundation. The research has shown that the inclusion of exposure and vulnerability information can outperform a wind impact forecast that only uses a plain wind hazard prediction. In other words, the Dungog case study suggests that the extra effort needed for the quantitative inclusion of exposure and vulnerability information is a promising approach in the pursuit of future quantitative impact forecasts in Australia.

[Read the final report here.](#) [40]

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[41]



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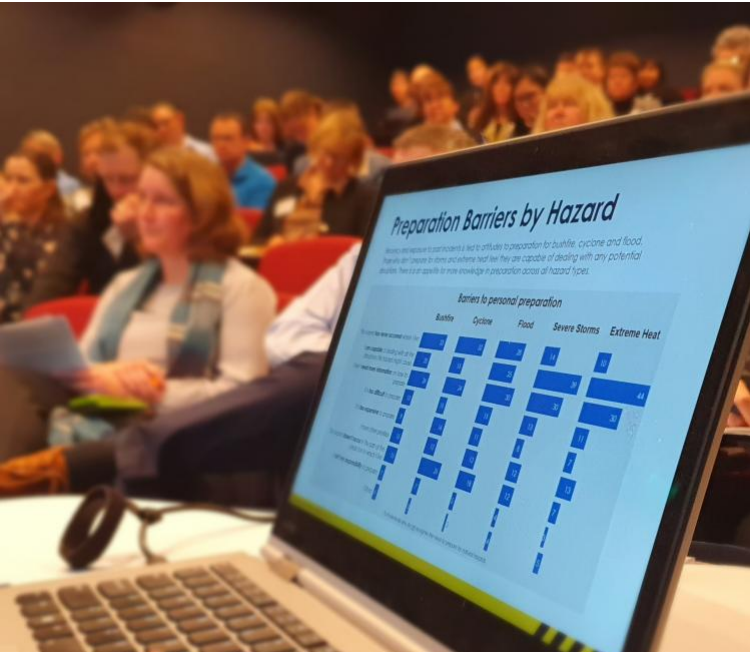
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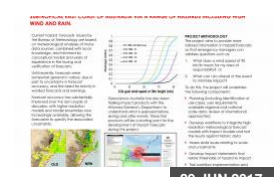
Publications

Year	Type	Citation
2022	Book Chapter	Golding, B. [52] <i>et al.</i> Towards the “Perfect” Weather Warning: Bridging Disciplinary Gaps through Partnership and Communication 149 (Springer Nature, 2022). doi:doi.org/10.1007/978-3-030-98989-7_
2021	Report	Richter, H. [6] <i>et al.</i> Impact-based forecasting for the coastal zone: East Coast Lows - final project report [40]. (Bushfire and Natural Hazards CRC, 2021). Google Scholar [57] BibTeX [58] EndNo
2020	Report	Richter, H. [6] <i>et al.</i> Report on the second end-user workshop – Impact-based forecasting for the coastal zone: East Coast Lows [60]. (Bushfire and Natural Hazards CRC, 2020). Google Schola
2020	Report	Richter, H. [6] <i>et al.</i> Impact-based forecasting for the coastal zone – East Coast Lows: annual report 2019-2020 [64]. (Bushfire and Natural Hazards CRC, 2020). Google Scholar [65] BibTeX [66] E
2019	Conference Paper	Zovko-Rajak, D. [68], Tory, K. J. [69] & Kepert, J. [12] A case study of South Australia's severe thunderstorm and tornado outbreak [70]. <i>AFAC19 powered by INTERSCHUTZ - Bushfire and Natur</i>
2019	Conference Paper	Richter, H. [6] <i>et al.</i> The physical impact of strong winds and heavy rain on residential housing: a pilot study [75]. <i>Bushfire and Natural Hazards CRC Research Day AFAC19</i> (2019). at <Researc
2019	Report	Richter, H. [6] <i>et al.</i> Impact-Based Forecasting for the Coastal Zone: East Coast Lows- Annual Report 2017/2018 [80]. <i>Impact Based Forecasting for the Coastal Zone: East Coast Low</i> 1-28 (2019)
2018	Conference Paper	Richter, H. [6] <i>et al.</i> Impact-based forecasting for the coastal zone [84]. <i>AFAC18</i> (Bushfire and Natural Hazards CRC, 2018). Google Scholar [85] BibTeX [86] EndNote XML [87]
2018	Conference Paper	Bates, J. [88] Research proceedings from the 2018 Bushfire and Natural Hazards CRC and AFAC Conference [89]. <i>Bushfire and Natural Hazards CRC & AFAC annual conference 2017</i> (Bushfire a
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