IMPROVED PREDICTIONS OF SEVERE WEATHER TO HELP REDUCE COMMUNITY IMPACT

Jeffrey D. Kepert[1,2], Kevin J. Tory[1,2], Robert J. B. Fawcett[1,2] and William Thurston[1,2]

[1] The Centre for Australian Weather and Climate Research, Melbourne, Australia
[2] Bushfire and Natural Hazards CRC, Melbourne, Australia

TO IMPROVE OUR UNDERSTANDING OF AND ABILITY TO PREDICT SEVERE WEATHER, INCLUDING FOR BUSH FIRES, TROPICAL CYCLONES, SEVERE THUNDERSTORMS AND HEAVY RAINFALL, THROUGH THE USE OF HIGH-RESOLUTION MODELLING IN CONJUNCTION WITH AVAILABLE OBSERVATIONS.

OUTLINE

The basic concept of this project is to extend our successful high-resolution fire weather modelling work with the Bushfire CRC in the following directions:

- Additional weather phenomena, particularly tropical cyclones, severe thunderstorms and intense extratropical cyclones.
- Begin to move from "deterministic" prediction of the most likely outcome, to a pilot demonstration of probabilistic prediction of the range of plausible scenarios, together with the estimation of their relative likelihood.
- Contribute to the development of a run-on-demand severe weather version of the Bureau's ACCESS numerical weather prediction (NWP) system.
- Collaborate with other projects within the BNHCRC which have a need for high-quality, fine-resolution meteorological data.

OUTCOMES

Specific outcomes of this project will include:

- Improved scientific understanding of severe weather phenomena relevant to Australia.
- Improved knowledge of how to best predict these phenomena, including NWP model configuration and interpretation.
- Contribute to the post-event analysis and "lessons learned" of selected severe events that occur during the course of the project.
- Inform the development NWP systems specifically for severe weather.
- Communicate the above knowledge through seminars, conferences and publication in the peer-reviewed literature, to the scientific and operational communities.

PROJECT STRUCTURE

Six subprojects over 3½ years, with staggered starts and overlapping in time.

Blue Mountains fires of October 2013: What was the meteorological contribution to this severe event?

Ember transport by fire plumes (see our other poster): Can we better predict where spot-fires will form?

Pyrocumulus simulation: To better understand fire-generated clouds, their influence on spotting and lightning ignitions.

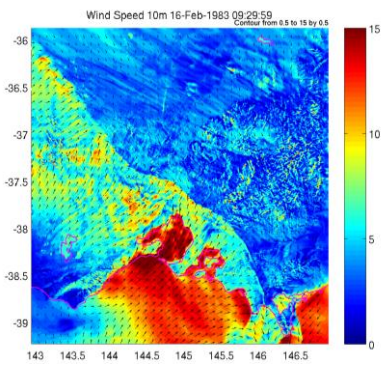
Pyrocumulus prediction: Can they form today? When? How big a fire is needed?

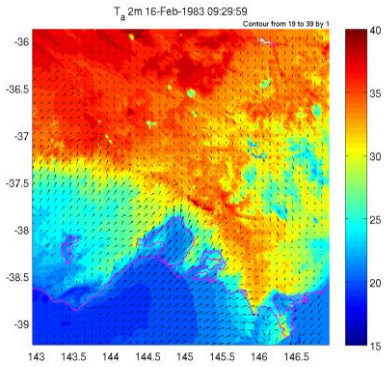
A tropical cyclone study: Possibly focused on heavy rain or formation. To be determined.

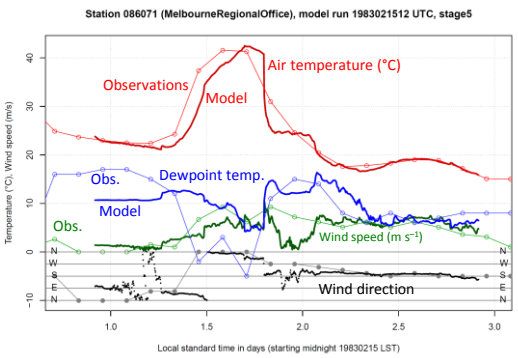
A place-holder: We expect the atmosphere will provide another interesting and important severe event during the project.

A TEASER.

We have taken a quick look at the meteorology of Ash Wednesday (16 February 1983), with our current high-resolution modeling setup. These figures show the temperature and wind speed shortly after the modelled change passed through Melbourne, and some verification. There are obvious similarities to Black Saturday, but also some important differences. Watch this space!







An Australian Government Initiative

Australian Government Bureau of Meteorology

The Centre for Australian Weather and Climate Research
A partnership between the Bureau of Meteorology and CSIRO