MODELLING THE FIRE WEATHER ON BLACK SATURDAY

Jeffrey D. Kepert[1], Leslie W. Logan[1] and Kevin J. Tory[1]

[1] Centre for Australian Weather and Climate Research, Bureau of Meteorology, 700 Collins St, Docklands Vic 3008.

Project Aims: Produce very high resolution simulations of three significant fire events.

To support the research of the other project components by providing meteorological data and guidance on its interpretation.

To analyse and learn from the meteorology of the events.

To comprehensively document and communicate the results.

Applications:

• Input to fire intensity and spread models.

• Input to fire decision support tool (GA).

• Understanding and predicting smoke dispersion.

• Understanding and predicting small-scale variability.

ACCESS, Australian Community Climate Earth Simulation System

A comprehensive earth system model, comprising:

• Atmospheric Model (all applications)

• Atmospheric 4D-Var Assimilation (weather forecasting applications)

• Ocean Model and Data Assimilation (ocean and climate applications)

• Sea-ice model (climate applications)

• Atmospheric chemistry (weather and climate)

• Biosphere, river routing, etc, models (climate)

The main atmospheric system is from the UK MetOffice. This state-of-the-science atmospheric model and assimilation has provided a huge upgrade to Australia's weather forecast and research capability, and is now fully operational.

Analysis will focus on:

• Understand the meteorology of some severe fire events

• Was there something "special" in the meteorology that made them so bad?

• Can we identify precursors that will help forecasters to identify this?

• How well can we forecast these events?

• How useable is this data in fire operations?

  - In general
  - Within the Bureau's NexGen forecast preparation system
  - Within the FireDST framework

• Are there any limitations on using the data?

• What needs to be improved?

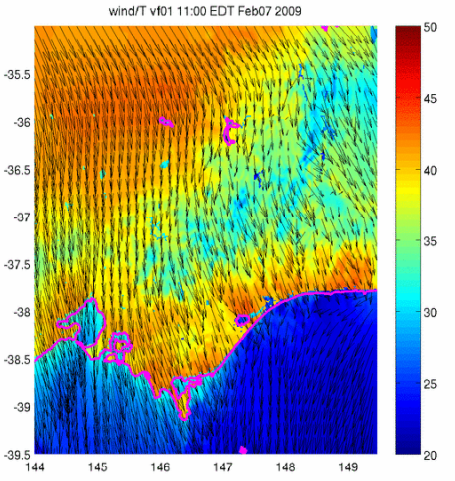

Fig 1: ACCESS simulation of surface wind (arrows) and temperature (colour) at 1-km grid resolution over eastern Victoria at 11 am on the morning of Black Saturday. Note the high temperatures and winds to the north of the divide, flow channelling over the divide, and the substantial small-scale variability to the south of the divide.

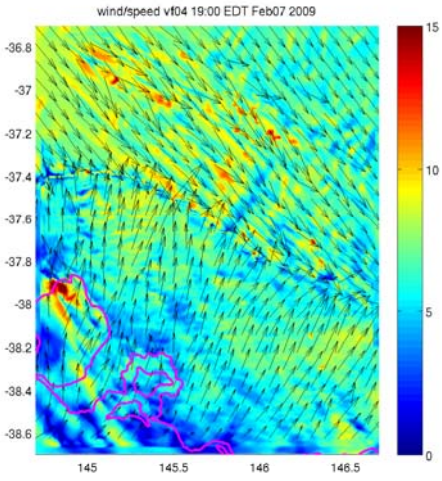

Fig 2: ACCESS simulation at 400-m resolution at 7 pm on Black Saturday. Port Phillip Bay is on the lower left edge of the region shown. The modelled wind change has passed northwards through Melbourne and is extending inland. Note the strong southerly winds behind the change, and the small-scale variability in wind and temperature to the north. Research to come will include an assessment of the realism of these features.

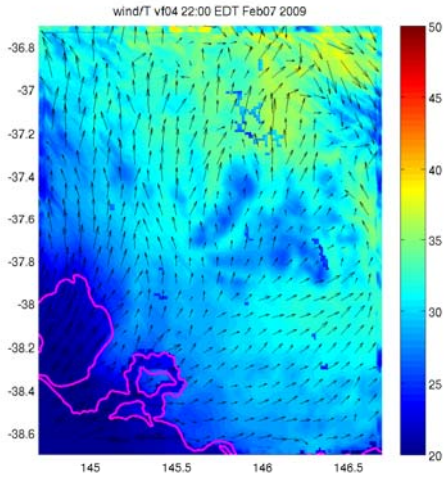

Fig 3: As for Fig 2, but at 10 pm in the evening. The wind-change has moved further inland and is just visible at the northeast corner of the area shown. Extensive areas of relatively high temperatures and strong winds (for night-time) are apparent to the north and east of Melbourne.