

A three-tiered smoke forecasting system for managing air pollution from planned burns



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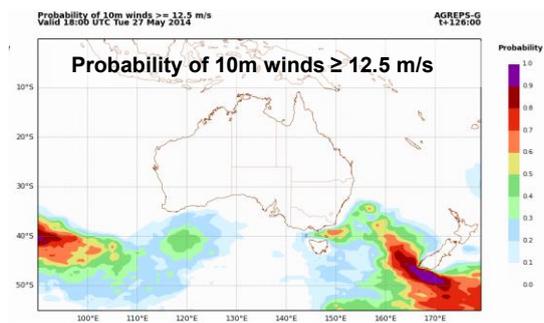
The principal outcome of the Smoke Emission and Smoke Transport project will be a prototype forecast modelling framework optimised for Victoria and using state-of-the-art modelling systems informed by local observational data which characterises the fuel loads, fire behaviour and emission characteristics of planned and un-planned fires.

How does the three-tiered system work?

1/ TEN DAYS PRIOR TO A BURN- DO AN ENSEMBLE WEATHER FORECAST

An ensemble prediction system (EPS) consists of a large number, or ensemble, of possible weather scenarios to simulate the actual forecast uncertainty from which probabilities of high impact weather can be estimated.

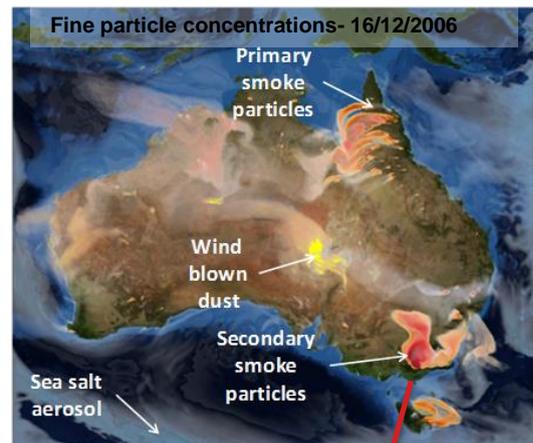
Ensemble forecasting provides reliable advanced warning of high impact weather and its actual uncertainty from a few hours out to 10 days. This type of analysis can be tailored to forecast for the chance of bushfire and other high impact weather events and thus can be used by fire agencies to assess the likelihood that conditions will be suitable for fuel reduction burning. The Bureau of Meteorology's experimental EPS is discussed in more detail at <http://tinyurl.com/ltd8c4j>



2/ THREE DAYS PRIOR TO A BURN- WHAT ABOUT EXISTING AIR POLLUTION?

Health risk due to air pollution increases approximately linearly with concentration. Therefore part of the forecasting process is to establish the likely levels of air pollution within a region targeted for fuel reduction burning.

The regional air pollution is forecast using a chemical transport model which takes the Bureau's meteorological forecasts; Australia-wide observations of burning fires, estimates of dust and sea salt particle emissions, an inventory of anthropogenic emissions for Victoria, and forecasts the concentrations of fine particles, ozone, nitrogen dioxide, and carbon monoxide concentrations for periods out to 72 hours.



3/ ONE DAY PRIOR TO A BURN- FORECASTING LOCAL SMOKE TRANSPORT

The fuel reduction smoke prediction system will provide the capability to forecast smoke dispersion from one or multiple fuel reduction burns for periods of up to 24 hours. The system is based on a purpose built fuel burn behaviour model and HYSPLIT, a fast particle-puff smoke transport model. The forecast smoke concentrations will be combined with the regional air pollution to give a total air pollution loading advisory. It is planned that the capability for operating this system will sit within the District Offices.

