And now for the smog forecast . .

ON the first Tuesday of December, a transport strike forced Melbourne commuters off the trains and onto the roads. Grumpy drivers, sardine-tin trams and trudging, tired feet were obvious signs of anxiety on the ground, but who knew what was happening in the atmosphere?

Before long, it will be possible to predict, at short notice, the air quality impacts of such increased car use. The EPA of Victoria, if notified of the strike a day earlier, could notify commuters of the likely effects on Melbourne's air quality, perhaps helping to answer that agonizing question: 'Will I brave the traffic, or will I stay at home?'.

Provision of daily air-quality forecasts for Australia's major urban centres is the ultimate aim of a joint project between the EPA of Victoria, the Bureau of Meteorology and CSIRO Division of Atmospheric Research. Aspects of the forecasts, such as smog movements, will be animated for broadcasting on nightly news services, in much the same way as weather forecasts are presented today.

The forecasting system will combine databases of atmospheric emissions from the EPA, and weather forecasts from the bureau, with a CSIRO model that simulates air quality at a resolution of a few kilometers. It will enable suburb-by-suburb forecasts of daily variation in ground-level concentrations of key air-quality indicators. These include photochemical smog (ozone), fine particle matter, carbon monoxide, oxides of nitrogen, sulfur dioxide and toxic organic compound such as benzene.

The model will be run each day on a joint CSIRO/bureau NEC supercomputer, which was installed at the bureau in 1997. On a conventional computer workstation, an air-quality forecast for Melbourne can take up to 12 hours to complete, but test-runs on the supercomputer have taken less than one hour. Such a rapid turnaround may enable forecasts to be simultaneously generated for regional centres.

According to CSIRO's Martin Cope, the air-quality forecasting system will help 'at risk' people, such as asthmatics, to plan their daily activities. It will also enable long-term health effects, and the benefits of reduced or more efficient motor vehicle use (such as car pooling) to be estimated. Results of the daily simulations will be archived for research and analysis.

Preliminary testing of the forecasting system is taking place in Melbourne. The next stage will be to develop a system for Sydney, with the goal for it to be fully operational for the Olympics.

The system may-later be used to simulate and forecast haze or visibility degradation, a measure often used by the public as the primary indicator of air quality. Techniques will be developed to pictorially add 'artificial haze' to the image of a well-known landmark (such as the Dandenongs, or the Sydney Harbour bridge). Comparisons of perceived air quality and actual health issues can then be made.

Contact: Martin Cope, (03) 9239 4647, fax (03) 9239 4444, email: Martin.Cope@dar.csiro.au