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IS THE CLEAN AIR OF BRISBANE THREATENED BY FUTURE POPULATION GROWTH?

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Abstract

An investigation into the potential implications for regional photochemical ozone due to the expected significant future growth of population in Southeast Queensland (SEQ) has been conducted using CSIRO's advanced numerical model TAPM-CTM. Results suggest that existing rural and urban fringe regions of Ipswich and Toowoomba to the west and the current urban areas of Greater Brisbane and the Gold Coast have a high risk of exposure to ozone based on projected population growth. Recommendations for air quality monitoring to assist in management of airsheds are given.

Keywords: Chemical transport model, ozone, exposure, urban expansion.

1. Introduction

Southeast Queensland (SEQ) covers an area of about 57,600 km^2, centred to the southeast of Brisbane and encompassing the eighteen local government areas between the Gold and Sunshine Coasts, and from Toowoomba in the west to the Moreton Bay Islands in the east.

The region's population is generally concentrated along the Eastern Corridor, i.e. along the east coast from Brisbane to the Sunshine Coast (approximately 100 kilometres) to the north and to the Gold Coast (approximately 80 kilometres) to the south.

In 2000 the population of Southeast Queensland was approximately 2.472 million (Australian Bureau of Statistics), 86% of which was located along the eastern corridor. The population is expected to increase to 3.954 million people by 2026, a 60% increase (Planning Information and Forecasting Unit 2006). Current plans to accommodate this population will see residential, commercial and industrial development expanding further west in areas currently on the urban/rural fringe.

Historically Brisbane's air quality has been good with air quality monitoring over the past 10 years indicating an apparent improvement or stabilisation in ground-level concentrations of ozone. However, the occurrence of elevated levels of ozone (particularly in the western suburbs of Brisbane) influenced by topographical features and a sub-tropical climate, highlight the susceptibility of Southeast Queensland to photochemical activity.

Previous studies of ozone events suggest that meteorological variability, in particular the inland penetration of sea breezes, is very important to the occurrence of pollution-conducive days. If changing vehicle emission technologies do not keep pace with the increase in regional traffic, then the stabilising trend suggested by the previous 10 years of monitoring data, may not be indicative of conditions in the future.

This paper looks ahead to 2026 to determine whether air quality in Brisbane and Southeast Queensland is likely to worsen as a result of the current growth in population and the implications this may have for air quality management in terms of the monitoring network. A sophisticated chemical transport model was used in conjunction with a prognostic meteorological model to investigate ozone statistics for current and future emissions inventories.

2. Ambient air quality guidelines for ozone

National standards and goals for air quality are set by agreement between the Federal and State Governments through the National Environment Protection Council (NEPC) and published in the National Environment Protection Measure (NEPM) for Ambient Air Quality.

The *Environmental Protection (Air) Policy 1997* (EPP(Air)) commenced on 1 February 1998 and is subordinate legislation under the *Environmental Protection Act 1997*. The EPP(Air) aims to achieve the objectives of the Act in relation to Queensland's air environment.

The 1-hour and 4-hour standards for ozone contained in Schedule 1 of the EPP(Air) (1997), and the NEPM (1998) for Ambient Air Quality are listed in Table 1.

The recent review of the NEPM standard for ozone had investigated health studies conducted since the original setting of the ozone standards in 1997. This review highlighted the evidence of setting longer term averages for ozone standards