

Ozone, nitrogen oxides, and volatile organic compounds in a central zone of Chile

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Resumen

The relationships between ozone (O₃) and its precursors, nitrogen oxides (NO (x)) and volatile organic compounds (VOCs), were investigated in the VIR region (34A degrees 10' S, 71A degrees 36' W), referred to as Libertador General Bernardo O'Higgins of Chile. Observations were obtained from a field study performed at four monitoring sites, which represented different environmental conditions, i.e., rural-coastal (Marchihue, MA), urban (Rancagua, RA, and Rengo, RE), and semi-urban (Codegua, CO) during the summer (between Feb 1 and Mar 12, 2010). Overall, greater O₃ concentrations were identified at the urban sites compared with the semi-urban and rural sites. In addition, the O₃ precursor concentrations were high in the early morning hours as a consequence of fresh vehicular emissions (from 11 to 40 ppbv for NO (x) and from 15 to 36 ppbC for VOC). The total VOC/NO (x) ratios at the study sites indicated that the formation of O₃ was limited by VOCs. Most O₃ was formed from ethene, isoprene, propene, 2-methylpropene, m- and p-xylenes, and toluene. These VOCs accounted for more than 50 % of the O₃ formation. The m- and p-xylene/ethylbenzene ratio confirmed the reception of aged air masses at the CO site. In contrast, at the RA site, the impact of pollution was primarily local. Control measures should be implemented to prevent O₃ exceedances of the National Ambient Air Quality Standard (NAAQS), despite the fact that the current O₃ concentrations do not exceed the current 8-h standard of 61 ppbv. These measures should include the control of VOC emissions and their chemical reactivity.

Palabras clave

Palabras clave de autor: [Surface ozone](#); [Central zone Chile](#); [Volatile organic compound](#); [Ozone precursors](#)

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