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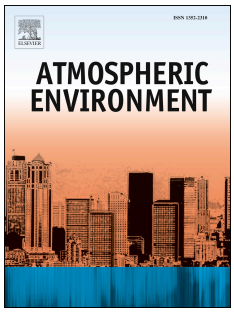

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Atmospheric mercury species measurements across the Western Mediterranean region: behaviour and variability during a 2015 research cruise campaign

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Abstract

In the framework of the ongoing MEDOCEANOR measurements program, an oceanographic cruise campaign was carried out during summer 2015 in the Western sector of Mediterranean Sea basin, on-board the research vessel "Minerva Uno" of the Italian National Research Council (CNR). The overall goal was to investigate the dynamic patterns of mercury in the Marine Boundary Layer (MBL) and the main factors affecting mercury behaviour at both coastal and offshore locations. The mean concentrations of the recorded Hg species were $1.6 \pm 0.5\ ngm^{-3}$, $11.8 \pm 15.0\ pgm^{-3}$, and $2.4 \pm 1.1\ pgm^{-3}$, respectively for GEM, GOM, and PBM. Moreover, during the measurement period typical fair-weather conditions of the Mediterranean summer were encountered with high levels of solar radiation and temperature that favoured photochemical reactions. Atmospheric pollutants such as ozone, sulphur oxides and nitrogen oxides and other meteorological parameters were in addition recorded and jointly discussed with selected mercury events in terms of their spatio-temporal variations. Changes in air pollutant concentrations were also argued in the light of their likely influencing sources, among which, anthropogenic activities, such as the mercury cell chlor-alkali complex in Tuscany, Italy, and natural influence, like volcanic ashes, detected around the Aeolian area and the *in-situ* production of reactive gaseous mercury within the Marine Boundary Layer.

Keywords: Mediterranean Sea, Mercury Species, Natural Sources, Marine Boundary Layer

1. Introduction

Knowledge of atmospheric mercury (Hg) cycling processes is needed to assess Hg impacts on humans, animals, and ecosystems, and to establish Hg emission control policies. While Hg pollution may occur from anthropogenic sources, Hg also enters the environment from

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