

Evaluating Hourly Sulphur Dioxide and Ground Ozone Simulated with the Air Quality Model in Lima, Peru

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Abstract : Sulphur dioxide (SO₂) and surface-ozone (O₃) concentrations are associated with diseases. The objective of this research is to evaluate the effectiveness of the air-quality-WRF-Chem model with a horizontal resolution of 5 km x 5 km. For this purpose, the measurements of the hourly SO₂ and O₃ concentrations available in three air quality monitoring stations in Lima, Peru were used for the purpose of validating the simulations of the SO₂ and O₃ concentrations obtained with the WRF-Chem model in February 2018. For the quantitative evaluation of the simulations of these gases, statistical techniques were implemented, such as the average of the simulations; the average of the measurements; the Mean Bias (MeB); the Mean Error (MeE); and the Root Mean Square Error (RMSE). The results of these statistical metrics indicated that the simulated SO₂ and O₃ values over-predicted the SO₂ and O₃ measurements. For the SO₂ concentration, the MeB values varied from 0.58 to 26.35 µg/m³; the MeE values varied from 8.75 to 26.5 µg/m³; the RMSE values varied from 13.3 to 31.79 µg/m³; while for O₃ concentrations the statistical values of the MeB varied from 37.52 to 56.29 µg/m³; the MeE values varied from 37.54 to 56.70 µg/m³; the RMSE values varied from 43.05 to 69.56 µg/m³.

Keywords : ground-ozone, lima, sulphur dioxide, WRF-chem

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