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INTEGRATING PASSIVE SAMPLING AND INTERPOLATION TECHNIQUES TO ASSESS THE SPATIO-TEMPORAL VARIABILITY OF URBAN POLLUTANTS USING LIMITED DATA SETS

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Abstract

Air quality monitoring provides a means for regulatory bodies to evaluate pollution levels and to determine if air quality targets are being achieved. Unfortunately, monitoring networks can be expensive to maintain and financial restraints means that data are often obtained in less than ideal quantities. This is notably the case when considering some historical measurement networks or current ones in developing countries. This paper considers a spatial modeling approach to produce a pollution concentration map. A case study is presented for SO₂ levels in a conurbation in central Iran (Yazd) that incorporates historical passive (diffusion tube) sampling results with a Geographical Information System (GIS) modeling technique. The daily mean SO₂ concentration for the area was found to increase significantly (t-test=19.2; p<0.0001) from 16.0±2.4 m⁻³ in 1997 to 45.9±11.2 m⁻³ in 2007 and differences in air concentration have been related to both spatial and temporal differences in industrial activity.

Key words: air pollution, mapping, spatial variability, sulfur dioxide, urban areas

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