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An analysis of ozone pollution by using functional data: rural and urban areas of the Community of Madrid

Abstract

This paper analyzes the relationship between tropospheric ozone levels in rural and urban sites in the Spanish Community of Madrid (CM). The paper makes use of functional data and the Kendall's Tau functional statistic (KFT) to identify significant correlations between areas. The results are based on very detailed data, extracted from hourly records from 33 air-quality stations covering de CM during the period 2011-2018, producing more than 95500 point observations. The results show a large degree of correlation between distant sites, whereas in a number of cases they reveal very moderate correlations between adjacent sites. This pattern is suggestive of complex recirculation patterns.

Keywords: Functional data, Ozone, Pollution, Rural areas, urban areas.