



Clustering classification of air pollutants to investigate their daily behaviour in an heavy industrialised area in the centre of Iberian Peninsula

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Seven air pollutants (ozone, NO, NO₂, SO₂, benzene, toluene and formaldehyde) were measured in a heavily industrialised area (Puertollano-Ciudad Real) in the centre of Iberian Peninsula using a DOAS system. Measurements were collected during a two years period, 2008-2009, using hourly values. A general meteorological study has been carried out in order to know the main weather conditions during the whole studied period as well as a general analysis to know the seasonal and daily evolutions that present these pollutants. Using the threshold defined in the European Directives have been identified air pollution problems related mainly with ozone, SO₂ and NO₂. The alert threshold has been exceeded 2 and 25 times for NO₂ and O₃ respectively. While the limit values for the protection of human health was exceeded in these two years for SO₂, NO₂ and ozone 9, 3 and 72 times respectively. Due to SO₂, NO₂ and O₃ are the pollutants that show exceedances of the limits established in the legislation, to daily variations of these pollutants has been applied non-hierarchical clustering technique (K-means) to form group according their daily variation. Moreover, for each cluster has also obtained of daily mean evolution of meteorological parameters (temperature, humidity and wind speed). Five clusters have been derived as the optimal number in the three pollutants applied, identifying thanks to this method the different daily behaviours and meteorological conditions associated.