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Characterization of specific meteorological conditions contributing to high PM10 and O_3 concentrations in Belgium.

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Over the past century, methods for the classification of circulation patters have been used in a broad range of applications. The recent increased interest in this procedure is attributed to its utility in solving a wide array of climatological applications. In order to use these techniques in air quality monitoring studies, it is important to consider links and feedbacks between meteorological parameters and the considered air quality components. The aim of this study is to search for characteristic meteorological conditions for high concentrations of PM_{10} and O_3 in 2001 on a local and mesoscale resolution in Belgium. Therefore, 5 air quality-monitoring sites, each characterized by a different environmental setting and location, are selected from the AIRBASE dataset (European air quality database system). Meteorological information is used from the mesoscale meteorological model ARPS (Advanced Regional Prediction System) on a 4km horizontal resolution for 2001. Previous studies have shown that ARPS is capable of reproducing the meteorological characteristics for Belgium (and other regions). Advantages of using gridded modeled data compared to point measurements of the RMI (Royal Meteorological Institute) meteorological measurement sites are the higher temporal and spatial resolution, higher number of meteorological parameters and the availability of the latter on various vertical layers. Using a stepwise regression technique with forward and backward selection, a minimum of meteorological parameters will be selected in order to characterize a maximum in variability of PM_{10} and O_3concentration values. In a following step, these results will be used to implement

in a objective classification technique in order to be able to reproduce middle long-term air pollution statistics, using meteorological input data from GCMs or prognostic mesoscale models.