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On the role of stagnation as driver of surface PM pollution: a case study for long-term observations from Styria, Austria

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The Austrian national limit and target values for particulate matter (PM) are most frequently exceeded during the winter season, with the state of Styria being particularly prone to PM exceedances. Here we review PM seasonality and pollution events in long-term observational records and link them with weather classification types from the WLKC733 method. This classification method uses predefined circulation types and includes information about weighted wind field vectors, cyclonicity and anticyclonicity. We show that PM pollution episodes are strongly linked to a few circulation types and that anticyclonic weather conditions, which facilitate stagnant weather, can lead to long lasting periods of continuous PM build-up and target and limit value exceedances. In addition, we investigate changes in local/regional PM abundances due to precursor emission controls and highlight topographical influences on ambient PM concentrations.