



Weather types and wind patterns classification in the Po Valley, during the PEGASOS field campaign (summer 2012)

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The Po valley in Northern Italy is a semi-closed basin surrounded by complex orography. Surface winds are very weak (average wind speed is approximately 2 m/s), and strong temperature inversions (also in excess of 10 degrees) are often observed near the ground and in the boundary layer. Moreover, the circulation in the lower troposphere is often affected by small scale phenomena such as sea breeze, mountain breeze, katabatic winds and surface temperature inversions.

Since Po Valley is a densely populated and heavily industrialised area, air pollution is a major issue, and day to day pollutant concentrations are tightly linked with meteorological conditions.

To schematically characterize the complex surface wind patterns in Po Valley, two classifications are performed with cluster analysis techniques: a large scale synoptic classification of weather types (WTs), and a wind pattern (WPs) classification focused on the south-eastern Po Valley.

The link between WTs and WPs is investigated, and the statistical properties of other meteorological variables and pollutant concentrations are studied in connection with WTs and WPs.

The classifications of WTs and WPs are finally used to assess the representativeness in time of the data collected during the intensive observation period of project Pegasus in summer 2012.