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## Boundary layer height variability in winter in southeastern France for typical meteorological situations

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The boundary layer is the main dilution factor of gas and aerosol sources but high uncertainties remain on its variability, in particular in southeastern France. Atmospheric dynamics that take place there are complex due to the presence of the sea in the west and the south and by hills in the north and the east. This study is based on a field campaign performed in this area from November 7th, 2019 to January 27th, 2020. Four sites were selected : an urban site equipped with a CIMEL CE376 lidar in the city center of Marseille, two suburban sites (Nîmes and Marignane) equipped with a radiosounding facility and a Vaisala CL31 ceilometer respectively, and a rural site (Observatoire de Haute-Provence – OHP) equipped with radioundings and a CIMEL CE376 lidar, unfortunately encountering many issues during that period. Wind measurements are available for each site. The boundary layer height was retrieved with both the Richardson method and the wavelet transform one. Due to the complexity of aerosol layers encountered above Marseille, the boundary layer height temporal variability is investigated through 2 typical meteorological situations encountered in Marseille, e.g. sea/land breezes and Mistral (regional-northwestward-colder wind blowing over southeastern France from Rhône valley). To better trace the origin of the air masses, the depolarisation ratio from lidar is used. Comparisons between the four sites contribute to describe the spatial variability of the boundary layer height in south-eastern France.