

ABL determination and comparison with different approaches in the frame of HyMeX SOP1

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Characterization of the planetary boundary layer is of primary importance in a variety of fields such as weather forecasting, climate change modeling and air quality forecasting and is therefore very important to determine it correctly.

The atmospheric planetary boundary layer (ABL) represents the lower region of the atmosphere directly in contact with the earth's surface and strongly influenced by this surface. In this layer physical quantities such as flow velocity, temperature and humidity exhibit rapid fluctuations associated with turbulent motion and vertical mixing.

The structure of ABL can be complex and highly variable. In this work, different techniques are compared to estimate ABL height. A first technique makes use of pure rotational Raman lidar signals, which are highly temperature dependent.

A second technique uses the roto-vibrating Raman lidar signals of water vapor in the lower troposphere. For the characterization of the boundary layer, further techniques based on the defined Morphological Image Processing Approach (MIPA) are also considered. In the present research work, we consider the measurements of the BASIL lidar system of the University of Basilicata collected in the period 16-21 October 2012 as part of HyMex SOP1 in the south of France considering the various weather-climatic aspects and giving a comparison in term of statistical error on the various methods described and used in the present work.