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ABL determination by Raman lidar with different approaches in the frame of HyMeX SOP1

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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.

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 therefore it is very important to determine it correctly. The structure of ABL can be complex and highly variable. In this work different techniques to estimate the ABL height are compared. A first technique makes use of the pure rotational Raman lidar signals, which are strongly dependent on temperature. A second technique makes use of the water vapor roto-vibrational Raman lidar signals in the lower troposphere. Further techniques based on the Morphological Image Processing Approach (MIPA) are also considered. In the present research work, we consider the measurements from the University of Basilicata Raman lidar system BASIL collected in the period 16-21 October 2012 in the frame of HyMex SOP1 [1,2,3].

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