



Boundary-layer characteristic in a costal site using long-term sodar data

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Mean characteristics of the Planetary Boundary Layer (PBL) at a Bulgarian Black Sea coastal site are obtained based on long-term (August 2008 - October 2016) acoustic remote sensing measurements. The differences between two main types of air flows (marine and land air masses) are studied. Exploring data of wind and turbulence profiles with high spatial and temporal resolution (output at every 10 minutes presenting running 20-minute averages with vertical resolution of 10 m from 30 to 700 m above ground) from Scintec MFAS sodar revealed typical for the investigated area parameters such as the heights of Internal Boundary Layer (IBL), the height of the marine boundary layer and Surface Layer (SL) for air flow from land. Averaging the measured profiles of 12 output parameters of the sodar, as well as several calculated from them other parameters near is a basis for climatological studies of the vertical structure of wind and turbulence in that coastal area near the town of Ahtopol in Southeast Bulgaria. These analyzes are deepened by exploring different time periods (as day or night) and seasonal variability of coastal PBL characteristics. The reported results can be used for verification of various theoretical, mesoscale and air quality models. The study contributes to the understanding of wind regime and turbulent structure in a region with modest observation networks, especially for vertical profiles of meteorological parameters.

Keywords: Scintec MFAS sodar, remote sensing data, Black Sea region, wind profiles, turbulent profiles, vertical structure, climatological studies, coastal area.