

The determination of the Atmospheric Boundary Layer structure used in sailplane flights

Picui Lucretia-Alexandra and Vraciu Cristian-Valer

University of Bucharest, Faculty of Physics, P.O. BOX MG-11, Magurele, Bucharest, Romania (picuilucretia@gmail.com)

The aim of this study is to find a method to determine the Atmospheric Boundary Layer structure important in the sailplane flights, by analyzing the meteorological conditions and the airborne data obtained with the help of sailplanes. For this purpose, we analyzed three days of cross-country flights conducted at the National Cross-Country Championship, held in South of Romania (Craiova Airfield) in August 2017. The inflight data from the sailplanes provided important and accurate information regarding the Atmospheric Boundary Layer height and strength of thermal updrafts. The inflight data was recorded with an International Gliding Commission-approved flight recorder and analyzed with the SeeYou Naviter software. At the same time, the ERA-Interim reanalysis data for air temperature and volumetric soil water content, as well as the surface roughness and the surface albedo were taken into account, in order to determine the Atmospheric Boundary Layer thermodynamic conditions. The thermal convection conditions were also analyzed using radio-sounding and windgrams using the HYSPLIT model. The comparison of these two methods that we used, data from sailplanes and those from the atmospheric thermodynamics, has shown differences of the layer's structure. In our opinion the discrepancies are explained by the thermal convection data obtained differently. The conclusion is that the forecast using the thermodynamic method can be improved by taking into account the information from many more cross-country sailplane flights for different synoptic conditions.