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Boundary Layer Height and Structure during the NATO LASIE Campaign

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The NATO Ligurian Air-Sea Interaction Experiment (LASIE) took place in 2007, from 16 to 22 June, in the Mediterranean Sea. This filed campaign was organized under the auspices of the NATO Undersea Research Centre (NURC), located in La Spezia, Italy. The main scientific goal was to contribute to the evaluation and development of parameterizations of the oceanic and atmospheric boundary layers and their interactions. Extensive meteorological and oceanographic measurements were collected, on board the research vessels Leonardo, Planet, and Urania, and from the spar buoy ODAS Italia 1. In this study ceilometer (Vaisala CL31) and atmospheric radiosondes (Vaisala DigiCORA) measurements are used to assess the evolution of the marine atmospheric boundary layer (MABL) structure and height during the LASIE cruise. The ceilometer measured continuously the cloud height base, while the radiosondes, launched every 3 hours, recorded vertical profiles of wind speed, wind direction, potential temperature and relative humidity. Several methods available in the literature are used to determine the height of the MABL from observations. The results from these methods are compared with the MABL heights from the limited-area numeric weather prediction models WRF (Weather Research and Forecasting) and MM5 (Fifth-Generation Mesoscale Model).