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Published in:
Abstracts (CD-ROM)

Publication date:
2008

Document Version
Publisher's PDF, also known as Version of record

EMS8/ECAC7 Abstracts,
Vol. 5, EMS2008-A-00702, 2008
8th Annual Meeting of the EMS / 7th ECAC

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The inversion height at the top of the boundary layer, zi, is one of the key parameter in atmospheric modelling and during the last decade has been more and more recognised as one of the parameters governing also surface turbulence and the interplay of processes at different spatial-temporal scales. At the same time also the correlation among scalars in the atmospheric surface layer (ASL) has received significant attention, because of its use in assessing i.e similarities in bulk scalar transfer parameters, used in models; furthermore, examining the main mechanisms by which covariance between two scalar fluctuations are produced, maintained, or dissipated is a legitimate fundamental problem in its own right. Understanding these mechanisms can highlight new dynamical processes modulating the structure of turbulence within the ASL not readily detected by other approaches. In the marine boundary layer a complete set of measurements through the entire Boundary Layer is even more seldom than over land. During the six days of the LASIE (Ligurian Air-Sea Interaction Experiment, 16-22 June 2007) in the Mediterranean Sea the height of the marine atmospheric boundary layer has been derived using two different measuring systems onboard of N/O URANIA of the Italian National Council of Research (CNR): radiosondes (DigiCORA Sounding MW21 System) were released every 3 hours while the ceilometer (VaisalaCL31) was continuously measuring. Simultaneous surface me-

teorological measurements were collected by sensors mounted on the buoy ODAS-Italia1 located in the center of the Gulf of Genova and a Gill research sonic anemometer and a LICOR 7575 were recording on board of the URANIA. Furthermore model outputs and satellite images were available from NATO-NURC Center. Surface time series of wind and temperature from the buoy show that during the central part of the campaign warm air from land flows over a colder sea induce creating a stable surface layer. Here, we present the evolution of the vertical structure of the marine boundary layer observed by both ceilometer and radiosoundings and the related development of mean and spectral and co-spectral proprieties of scalars at the surface.