



The Observation and Numerical Simulation of Convective Boundary Layer in Badain Jaran Desert

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The development of convective boundary layer (CBL) in Badain Jaran region is discussed by using the observation data obtained in 30th August in 2009. There is a neutral layer capped CBL found before noon, which can be divided into 5 sub-layers, containing surface layer (SL), mixed layer (ML), inversion layer (IL), neutral layer (NL) and inversion-neutral layer (INL) from surface to about 3000 m high. The development of the CBL is quite different from a 3-layer CBL observed in 31st August 2009, being composed with SL, ML and IL. Although the underlying sensible heat flux density in 31st is much greater than in 30th during the daytime, at the time near 14:00 (LST), the CBL height in 30th became almost twice as in 31st, which indicates a jump of ML top. By simulating a 5-layer liked CBL with NCAR-LES, the jump of ML top is reproduced. It is found that during the jump, the horizontal mean vertical heat flux and thermals inside the CBL are regulated quickly, meanwhile, small thermals are strengthened and combined together to form large thermals. The rising ratio of ML top during the regulation is found very sensitive to the stratification condition of NL. After discussing the large scale circulation in the night of 29th-30th and 30th-31st, we suggest that the strong warm advection of large scale circulation near the 500 hPa level accompanying with nearly no heating advection below during the nighttime may have caused the formation of NL and INL.