



The Annual Behaviour of the Temperature Inversion at Dome C, Antarctica

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The persistent condition of surface-based temperature inversion existing over the Antarctic plateau is a key feature of the Antarctic climate.

In this work we analyze the behaviour of the temperature inversion at the plateau station of Concordia at Dome C, Antarctica during the STABLEDC – Study of Stable Boundary Layer Environmental at Dome C – field experiment in 2005. The temperature profiles were obtained each ten minutes with a microwave radiometer for all the year.

The behaviour of the temperature inversion has been analyzed studying its strength and height; these parameters were then correlated with the surface temperature and mean wind speed and direction. The measurements evidence that a temperature inversion exists the 63% of the time during the summer and nearly 99% of time during the winter with the inversion strength ranging between 4°C (summer) and 20°C (winter), if we do not consider the winter warming events.

The inversion strength is anti-correlated to the surface temperature allowing to determine monthly coefficients for its parameterization.

Considering the first 50 m, the inversion strength and wind speed are uncorrelated during the summer, while during the other seasons, in particular during the winter, the maxima inversion strength occur under low wind speed conditions. The average inversion height varies between 100 and 250 m, with the narrower layers observed during the summer.