



Nocturnal fine structure of the temperature column between 2 and -0.1 m

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Most meteorological applications, including numerical models, use the temperature recorded at screen level as their lowest atmospheric level. This information is used in many parameterization schemes, most importantly in the determination of the energy fluxes between the atmosphere and the soil-vegetation system. On the other hand, very often thermal information in the ground is scarce or inexistent. Such a limited observational information implies that many assumptions must be made about the shapes of the temperature profile in the air below 2 m and in the first centimeters of the soil.

Recently, a column of thermometers has been displayed in several locations by researchers of the Group of Meteorology at UIB, displaying sensors with distances increasing logarithmically with height between the first layer at a few centimeters over the ground until the typical screen level height of 2 m. Depending on the exercise, unshaded thermocouples (with small thermal response to solar illumination) or thermistors inside well-ventilated shields have been used. Here results obtained in the UIB Campus at the island of Majorca and at the Pyrenean valley of La Cerdanya will be shown. Few thermistors in the ground were installed (typically between 2 and 4 in the first 15 cm), and there were always estimations of the land-surface temperature from the radiometer measurements of emitted longwave radiation. Turbulent latent and sensible heat flux, plus ground and radiation flux were available to assist in the interpretation of data.

Profiles of the temperature in the lowest layer of the atmosphere and the more superficial part of the ground will be shown, focusing on the nocturnal period and the corresponding evening and morning transitions for clear nights. Patterns will be identified, including transient unstable events along the nights, as well as fast response to these changes of the upper part of the soil.