Geophysical Research Abstracts
Vol. 12, EGU2010-4221, 2010
EGU General Assembly 2010


# Air – ground temperature coupling at the Caravelinha borehole climate observatory, Evora, south-central Portugal

Jan Šafanda (1), Antonio Correia (2), and Petr Dědeček (1)

(1) Institute of Geophysics, Czech Acad.of Sciences, Prague, Czech Republic (jsa@ig.cas.cz), (2) Geophysical Centre of the University of Evora, Portugal (correia@uevora.pt)

Long-term monitoring, with 30 minute sampling interval, of soil temperatures (at depths of 0.02, 0.05, 0.10, 0.20, 0.50, 1,00), and bedrock temperatures (at depths of 1, 2.5, 5, 10, 20, 30 and 40 m), complemented by air temperature measurements at 2 and 0.05 m above the ground, has been started in May 2005 at the Caravelinha borehole climate observatory, near Evora, in south-central Portugal. Its main goal is to study and explore the relationship between air and soil temperatures and its variability on the inter-annual scale, as well as the propagation of seasonal surface temperatures and inter-annual variations into the bedrock. The purpose of the monitoring is to prove, or disprove, the hypothesis that, on the long-term, the difference between the air and the ground temperatures is constant; this hypothesis has been used in climatic interpretation of the ground surface temperature histories obtained from the temperature-depth profiles measured in deep boreholes. The current data allowed estimating the mean annual difference between the ground (at a depth of 2 cm) and the air (at a height of 2 m) for the period 2007 – 2009. The difference amounts to +2.61 °C in 2007, +2.93 °C in 2008, and +3.54 °C in 2009. The results indicate that the ground is appreciably warmer than the air on the annual time scale, and that the inter-annual changes of the difference can vary by up to 1 °C. On the seasonal scale, the daily mean of the ground temperature is higher than that of the air temperature for most of the year with maxima in summer (a difference up to +11 °C). The only season with slightly negative difference (up to -3 °C) is winter.