

## **BOREHOLE GROUND SURFACE TEMPERATURE HISTORY AND COUPLING BETWEEN GROUND AND AIR TEMPERATURES: A CASE STUDY FROM A THERMOMETRIC WELL NEAR EVORA, PORTUGAL**

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Ground surface temperature (GST) history reconstructed from a 200 m deep borehole (TGQC-1) located near the town of Evora, Portugal, suggests warming of 0.9 - 1.0 K since the second half of the last century to the middle of the 90s, increasing considerably in the last ten years. The results agree with the air temperatures recorded at the meteorological station of Lisbon since 1856, which display a warming trend with amplitude of about 1 K for the same period. Usually, the effects of convective heat transfer, unrecognized thermal conductivity variations, topography and vegetation bias GST history reconstructions. However, for the TGQC-1 well these effects are eliminated to a great extent because of the geological and geographical characteristics of the region where it is located. This allowed to study in detail the degree of coupling between the mean annual surface air temperature (SAT) and the GST. Furthermore, the meteorological SAT series measured in Evora was combined with the Lisbon 143 years long series and used as a forcing function to compute the subsurface temperature profile. This was compared with the temperature log obtained in the TGQC-1 well and the results show that the GST tracks the long-term SAT trend.