

Geothermics and Climate Change: joint analysis of borehole temperature and meteorological data

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Long period ground surface temperature variations contained in borehole temperature-depth profiles form a complementary climate change record to high frequency surface air temperature records at weather stations. We show the benefits of jointly analyzing geothermal and meteorological data for Southern Portugal, where both high quality temperature-depth measurements and century long surface air temperature records exist. The analysis yields a pre-observational mean temperature, a parameter describing the long-term mean surface temperature prior to the onset of surface air temperature measurements (i.e., prior to the 20th century). Furthermore, borehole temperature profiles might be used as an independent check on low frequency oscillations detected in surface air temperature data, using a maximum entropy spectral analysis.