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Comparison of noble gas temperature with recent mean annual air and soil temperature in different regions of Hungary

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This paper describes the relation of noble gas temperature (NGT) and mean annual air (MAAT) and soil (MAST) temperature through studying water samples and meteorological data from six Hungarian regions. Alluvial plains, hilly and mountainous regions were studied to investigate the effects of geomorphological, hydrogeological and micro-climatic conditions. Water samples were collected from springs and wells fed from different aquifers. Comparing NGTs derived from these water samples with the MAAT and MAST values of the given region, we identified differences between the sampled areas. In case of the Geresd Hills, Mezőföld, Danube-Tisza Interfluves and Nyírség, the NGTs (13.0 ± 0.9 °C, 12.1 ± 1.1 °C, 12.1 ± 0.6 °C and 12.7 ± 1.6 °C, respectively) generally reflect MAST, however in karstic Bükk Mts. (6.8 ± 0.6 °C) and Mecsek Mts. (10.7 ± 1.9 °C) they are closer to MAAT. Consequently, it can be concluded that the direct relationship between noble gas temperature and mean annual air temperature is not always as well-defined as it is often assumed. It is shown that MAAT and MAST should be distinguished, especially when using NGT as a paleoclimate proxy.