



Stable isotope thermometry and climatology versus traceability – An unfortunate situation?

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Application of stable isotope fractionations between minerals and water as a thermometer for natural conditions in recent or older mineral-fluid systems is a common procedure. Since all isotopic thermometers are related to the primary isotopic scales for the isotopic system of interest, i.e. the VSMOW-SLAP scale for hydrogen, the VPDB-LSVEC scale for carbon, the VSMOW-SLAP scale for oxygen, measured isotopic values, normally reported as ' δ -values', must be related to these primary scales. Relating of the measurements to the primary scale we call *traceability*. Because of application of traceability, a combined uncertainty that is larger than the 'local' laboratory measurement (= repeatability), such as generally are reported in literature, is introduced to the measurement. Additionally, application of isotopic thermometers, which are determined empirically, experimentally or by calculation, also carry uncertainties. These thermometers cannot be operated as 'absolute' equations, and therefore are not providing an absolute temperature. The thermometer uncertainty has to be taken into account, additionally to the combined uncertainty of the isotopic measurement. Unfortunately, major part of these uncertainties are generally neglected in thermometer applications if looking into literature (or else badly described..?), and therefore it might be questioned if their related interpretations are sound and realistic in such cases.