



Supplementary Figure S1: Isotopic composition (a) and absolute  $\delta^{18}\text{O}$  deviation (b) from the certified value (dashed line) for three in-house standards measured at different water volumes (symbols). The measured and corrected  $\delta^{18}\text{O}$  of crystalline water extracted from variable amounts of gypsum sample KV09-505 are also shown. (c) A 2nd polynomial fit surface to the measured deviations in  $\delta^{18}\text{O}$  as a function of sample  $\delta^{18}\text{O}$ , showing minimal deviation at the positive  $\delta^{18}\text{O}$  values of the gypsum crystalline water.