# Oxygen and Silicon Isotopes in Precambrian cherts : a proxy of paleotemperatures

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Oxygen and silicon isotopes in cherts have been extensively used for the reconstruction of seawater temperatures during the Precambrian. During the past decade, the advance of in-situ analysis of Si isotopes has enhanced the interest on cherts as a paleo-environmental proxy. The coupled O and Si isotope compositions variations show secular and correlated trends that have been interpreted as a progressive cooling of the ocean. However, this reconstruction has been challenged because cherts can have various origins (hydrothermal, sedimentary, volcanic silicification) and their isotopic compositions might have been reset by metamorphic fluid circulation. According to this alternative interpretation, the secular oxygen and silicon isotope variations are considered as reflecting a mixing between seawater and hydrothermal sources. A key point in this discussion deals with the origin of cherts: sedimentary, hydrothermal or chemically silicified? Therefore, several petrographical and geochemical criteria were proposed to recognize the pristine sedimentary origin of a chert. Namely they are: (1) the occurrence of microquartz, (2) the bulk oxygen isotopic composition, (3) the occurrence of large $\delta^{18}O$ ranges at a micrometer scale, (4) trace elements compositions coupled with $\delta^{30}Si$, (5) the occurrence of large ranges of $\delta^{30}Si$ in pure microquartz. These criteria should be regarded as guides to the identification of pristine diagenetic cherts in order to better constrain seawater paleo-temperature reconstructions by taking into account the effect of diagenesis. Based on comparison between modern and Precambrian cherts, we will review the different interpretations about O and Si isotope variation and proposed a model of formation based the comparison of Precambrian and modern cherts studies.