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Environmental and diagenetic signals recorded in cherts from Archean to Cenozoic: combining *in situ* $\delta^{18}O$ and high-precision $\Delta^{17}O$ measurements

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There are large uncertainties associated with the current estimates of temperature and oxygen isotope composition of Precambrian oceans, largely due to preservation issues inherited by the sedimentary record. The advancing ability to measure oxygen isotope ratios on the micrometer scale provides an opportunity to distinguish between process that accompany deposition, early diagenesis, and late alteration of marine sediments. Further, the silica triple O isotope signals allow us to recognize the relative contributions of T-dependent fractionations vs crystallization from different fluids. Here we undertake a triple oxygen isotope study of marine cherts spanning in age between 3.5 and 0 Ga using a suite of samples from the Archean greenstone belts, well-preserved Precambrian formations and samples drilled from modern-day ocean floor. We provide careful documentation of petrographic, electron microprobe and SIMS isotope observations that are used together to interpret the polygenetic and polyphase nature of cherts. Then we critically evaluate the $\delta^{18}O$ – $\Delta'^{17}O$ systematics of chert, silica-bearing fluids and the effects of post-depositional exchange. Considering these new data, we critically evaluate possible hypotheses that potentially explain the controversial $\delta^{18}O$ trend recorded in marine sediments.