Geophysical Research Abstracts,
Vol. 11, EGU2009-2059, 2009
EGU General Assembly 2009

Climate, water and CO2: Phanerozoic isotope record

J. Veizer
University of Ottawa, Earth Sciences, Ottawa, Canada (jveizer@uottawa.ca, 613 562-5192)

The development of a paleothermometer for ancient oceans has been a prime goal of stable isotope geochemistry since its inception. For the pre-Tertiary times, the earlier limitation of suitable carrier phases for the temperature signal is being slowly overcome by utilising low-Mg calcite shells of oysters, belemnites and particularly brachiopods. The band of baseline data for the Phanerozoic is reasonably well defined and likely represents a primary feature. Oxygen accounts for 60% of all atoms in the calcite (aragonite) lattice and replacement, via dissolution/reprecipitation, by extraneous oxygen would undoubtedly result in disruption of related attributes, such as texture, mineralogy, chemistry and isotopes. Yet the uncontested sulfur, calcium, carbon and strontium Phanerozoic isotope records all emerge from the same collection of shells. A higher order structure of greenhouse and icehouse episodes appears to be superimposed on the general Phanerozoic baseline and Permian data suggest an existence of the latitudinal temperature gradient of about 14ºC. Overall, this Phanerozoic pattern shows much better correlation with potential celestial climate drivers than with model concentrations of atmospheric carbon dioxide, with empirical records on shorter time scales providing additional support.