Geophysical Research Abstracts,
Vol. 10, EGU2008-A-05280, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-05280
EGU General Assembly 2008

Metabolic rates and stable carbon isotopes in biominerals

C. Trueman

School of Ocean and Earth Sciences, University of Southampton, U.K.
(Trueman@noc.soton.ac.uk / Phone: +44 2380 596571).

The isotopic composition of carbon in biomineralised tissues is commonly influenced by both inorganic processes and biological 'vital effects'. In non-photosynthesising marine animals the carbon utilised for biomineralisation may be derived from dissolved inorganic carbon and/or metabolically derived carbon, and 'vital effects' largely reflect changes in the proportion of metabolic and inorganic carbon incorporated into the biomineralised tissue. In all animals, metabolic rates (and thus the amount of metabolically derived carbon available in the bloodstream) vary with ambient temperature, ecological conditions and body size. To compare carbon isotope composition between individuals, or temporally within a sub-sampled biomineral, it is therefore important to control for potential variations in ecological conditions and body size. Fortunately, incrementally grown carbonate biominerals provide almost all of the information needed to standardise measured carbon isotope compositions to a common ecological environment and body size.

Using otoliths from deep water fish as an example I will demonstrate one method of standardising for ecological and physiological effects on metabolic rates. I will show how adopting a standardisation technique provides both a more reliable measure of the carbon isotope composition of dissolved inorganic carbon and additional insight into the behaviour and metabolism of the biomineralising organism.