New constraints on K-Pg boundary environmental changes with Li isotopes

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Climatic and oceanic perturbations associated with the Deccan Traps eruption and with the Chicxulub impact are still strongly debated. Because lithium isotopes significantly fractionate during low temperature processes, the composition of mineral phases formed across the K-Pg boundary can provide quantitative information concerning environmental changes at that time. In this study, we investigate in parallel the Li isotope composition of both marine authigenic smectite and benthic foraminifera over a time window of 3 Ma. Comparing both phases is important because the δ^7Li of foraminifera may be subject to vital effects during calcification, while authigenic clays are not. The objectives are: 1/ To determine the long-term variation of seawater δ^7Li due to changes in continental flux and alteration rate and 2/ To detect short-term variations of the ocean carbon chemistry, recorded by Li isotope fractionation during foraminifera growth.

Li isotopes are measured in clays by MC-ICP-MS, and in benthic foraminifera tests using the ims 1280 ion microprobe, at University of Hawaii. Initial results show a limited variation (<2‰) of clay δ^7Li across the Ir-rich layer, indicating little disturbance of the ocean Li at that time. Compared with 0-6 Ma seawater, K-Pg seawater δ^7Li was 5.5‰ lower, suggesting a lighter input from continents due to more intensive and more congruent continental alteration.

In contast, contemporaneous benthic foraminifera tests vary significantly on time scales much shorter than the oceanic residence time of Li (≈1.5 Ma), too short to attribute to changes in the δ^7Li of the global ocean Also, these variations precede deposition of the Ir-rich layer. These results strongly suggest changes in Li isotope fractionation through time. The δ^7Li of cultured foraminifera indicate a strong dependency on the DIC concentration, but no impact of pH and T on Li isotope fractionation during foraminifera growth. If these data are representative of natural conditions, then our results indicate significant short-term oscillations of ocean DIC before Chicxulub, possibly related to eruption events in the Deccan.

Wild rats as sentinel animals in the assessment of asbestos pollution: a pilot study

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Asbestos fibres are potential carcinogens to humans when reach lungs. Animals can be served as sentinels being exposed like humans to contaminants. Recently investigations on the asbestos burden to evaluate the exposure level in the environment has been successfully carried out on cows [1]. To investigate in towns where these animals don't' live, rats as diffused species can be considered. Rats live in colonies in a circumscribed territory. The use of rats as "sentinel animals" would allow to carry out an innovative monitoring method with important practical applications. The aim is to identify the neighbourhoods of the city at risk, by searching for asbestos fibres in the lung tissue of wild rodents captured in specific areas of the Casale Monferrato town. Three kinds of asbestos (crocidolite, chrysotile and asbestos tremolite/actinolite) and five groups of non asbestos fibres (metallic oxides; Al-, Ti-, and vitreous silicates; phyllosilicates) have been detected in the rat lungs by SEM-EDS investigations. These data together with that obtained from positive and negative control rat lungs showed rats are suitable sentinel animals to detect air dispersion hidden sources of asbestos and other inorganic fibres. Regarding the studied area, crocidolite and asbestos tremolite/actinolite are related respectively to anthtropogenic and natural sources. Therefore a complete investigation would allow to identify sites of noxious inorganic phase potential dispersion in order to adopt tools to contain or eliminate it before the general population can be damaged.

[1] FORNERO E., BELLUSO E., CAPELLA S., BELLIS D. (2009). *SCI TOTAL ENVIRON,* 407, 1010-1018

www.minersoc.org
DOI:10.1180/minmag.2013.077.5.22