# Ca-isotope evidence of ocean acidification along the K-T transition

SILVA-TAMAYO AND JUAN CARLOS[1]

[1]Department of Earth and Atmospheric Sciences, University of Houston, email: jsilvata@central.uh.edu

The Cretaceous – Paleocene (K-T) transition witnessed one of the big five extinctions of the Phanerozoic Eon. The K-T biologic crisis has been intensively studied due to the almost complete disappearance of large animals on land (i.e. dinosaurs) and the extinction of nearly 75% of marine species [1]. During the K-T transition marine calcifying planktic communities were highly impacted; with net losses of planktonic foraminifer genera and species reaching 92% and 97% respectively. Between 73% and 88% of calcareous nannoplankton genera and species were also wiped out [2]. The loss of primary producers, especially the loss of marine calcifying nannoplankton, seems to have ultimately affected the marine C cycle, as suggested by a pronounce C-isotope negative anomaly displayed by carbonates spanning the K-T transition [3]. The marine C cycle is closely linked to the marine Ca cycle as both are partially controlled by marine carbonate deposition and burial [4]. The marine Ca-isotope cycle is mainly controlled by imbalances between the main Ca-isotope input (continental weathering) and Ca-isotope out put (carbonate burial). The large affection of marine calcifying organisms along the K-T transition allows hypothesizing important coupled perturbations in the marine Ca- and C-isotope cycles paralleling the biologic crisis. In this work Ca- and C-isotope compositions of marine carbonates spanning the K-T transition at ODP site 149A (Blake Nose) are reported and used to investigate potential perturbations of the marine Ca-cycle. A positive $\delta^{44/40}Ca_{(NIST\text{-}SMR915a)}$ isotope excursion from a background of +0.5‰ in upper Cretaceous carbonates to a maximum of +1.4‰ in the lower Danian carbonates is observed. This $\delta^{44/40}Ca$ positive excursion partially parallels a negative excursion on the carbonate $\delta^{13}C$ values. The evolution and duration of the Ca- and C-isotope anomalies are interpreted as reflecting a major perturbation of the marine carbonate budget resulting form ocean acidification during a period of the rapid and massive volcanic $CO_2$ outgassing.

[1] Jablonski, D, Chaloner, W. G. *Phil. Tran. Bio. Sci.* **344**,11-17. [2] Thierstein, H.R., *Geol. Soc. Am. Spec. Pap.* **190**, 385–399. [3] Zachos, J.C., Arthur, M.A., *Paleocanography* **1**, 5–26. [4] Fantle, M.S., *Am, Jour. Sci.* **310**, 194-230.