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THE CHICXULUB EVENT – SULFUR-BEARING MINERALS AND LITHOLOGIES

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Evaporates form a major target lithology at the Chicxulub impact site. One of the postulated effects of the impact event at the Cretaceous/Tertiary boundary is the impact-induced dissociation of anhydrite to form sulfur-oxides and a solid residue; large isotope fractionation effects in sulfur should accompany this process. We have analyzed the sulfur isotope composition of (i) annealed anhydrite clasts in impact melt breccias of PEMEX core Yucatan-6 N 19, (ii) unshocked anhydrite from the CSDP well Yaxcopoil-1, which belong to the megabreccia below the suevite layer (YAX-1 1369, and 1376 m depth), and (iii) sulfide grains of hydrothermal origin in a finest-grained breccia, which transects a large limestone block of this megabreccia at a depth of 1369 m. Samples of groups (i) and (ii) yielded δ^{34}S values between 18.0 and 19.8 ppm CDT (unweighted mean is 18.3 ppm, n=7), with one slightly lower value of 15.3 ppm for an anhydrite clast in Y-6 N19/Part 6. These data are in agreement with the δ^{34}S value for the Late Cretaceous seawater (Strauss 1999). The δ^{34}S obviously remained unchanged despite the fact that textural features indicate a severe annealing of the clasts in the impact melt. Sulfides of group (iii) show δ^{34}S values around 41 ppm CDT (n=7), which are quite unusual values if these minerals are of non-biogenic origin. In contrast, δ^{34}S for the yellow glass from the K/T boundary at Haiti range from 1.5 to 13.2 ppm (Chaussidon et al. 1996). Using this preliminary evidence, we conclude that only distant ejecta lithologies, and probably secondary material inside the crater, may display impact-related fractionation of sulfur isotopes. This observation is consistent with petrologic data, modeling results as well as of shock recovery and annealing experiments: anhydrite obviously is quite resistant to shock-related dissociation.