Nov 7th, 3:00 PM - 4:00 PM

Are the Oxygen Isotope Values of the Late Cretaceous Western Interior Seaway Different from the Open Ocean?

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The Western Interior Seaway (WIS) was a North American epicontinental sea that was connected to the open ocean through the passage of the northern Boreal Sea and the southern Tethys Sea from the early Albian (~113 million years ago) to the early Paleogene (~65 million years ago). The WIS began to recced and lost its connection to the southern Tethys Sea in the late Campanian (~72 million years ago). In the early Paleogene, the WIS dried up completely. The oxygen isotopic composition ($\delta^{18}O$) of benthic bivalves was measured from the upper Campanian and lower Maastrichtian (75 million years ago to 69 million years ago) to decipher if the WIS had different $\delta^{18}O$ values than the $\delta^{18}O$ values of the open ocean. This study would begin to answer the question if the $\delta^{18}O$ values of the WIS changed over time since the WIS began to retreat from the open ocean in the late Campanian. We measured $\delta^{18}O$ of a variety of well-preserved epifaunal (*Anisomyon, Endocostea, Inoceramus, Ostrea,* and *Pteria*) and infaunal (*Cucullaea, Cymbophora, Geltena, Lucina, Nucula,* and *Tenuiptera*) bivalves. Then, we compared the $\delta^{18}O$ values of the WIS benthic bivalves to a literature search conducted on the $\delta^{18}O$ values of WIS bivalves and ammonites and $\delta^{18}O$ values of the open ocean foraminifera, bivalves, and ammonites. Most WIS $\delta^{18}O$ values range from -6‰ to 0‰ and these $\delta^{18}O$ values overlap with the open ocean studies, which range from -5‰ to +2‰. The $\delta^{18}O$ values of the WIS are not significantly different than the $\delta^{18}O$ values of the open ocean even though the WIS began to lose its connection to the open ocean. However, the WIS does has lower $\delta^{18}O$ values than the open ocean and this could possibly be due to freshwater input to the WIS or increased evaporation in the WIS. This systematically collected dataset of bivalve $\delta^{18}O$ values may contribute to Late Cretaceous climate models and paleoecological and paleoenvironmental studies.