Ordovician and Silurian Cherts and Their Relation to Paleoclimate and Paleoceanography

By
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The value of cherts as a paleoclimatic marker for the Paleozoic is still questionable, in contrast with the Mesozoic and Cenozoic cherts closely related to climatic and oceanographic changes. Abundance of Mesozoic and Cenozoic biogenic siliceous deposits is controlled by diatom productivity, tightly linked to upwelling and global cooling events. Paleozoic biogenic siliceous deposits were produced by radiolarians and siliceous sponges, and the relationship between their abundance and paleoclimate and paleoceanography is less well established. The purpose of the investigation is to test the hypothesis that chert-producing Paleozoic organisms behaved similarly to diatoms regarding their response to changes in oceanic circulation and climate.

I will build a database on worldwide Ordovician-Silurian chert distribution and use it to test for the presence of a pronounced Late Ordovician peak in chert abundance, and of an Early Silurian chert gap. The Late Ordovician is particularly interesting for this study, being characterized by a glaciation whose timing is open to controversy. A short-lived chert pulse coeval with the glaciation would support the short glaciation hypothesis and would argue that Ordovician cherts responded to abrupt changes in ocean circulation. A longer interval of chert deposition would be consistent with a glaciation of longer duration and/or might mean that sponge and radiolarian cherts were not as responsive to oceanographic changes as are diatom cherts. An Early Silurian gap in chert abundance may reflect sluggish ocean circulation and possible climate warming similar to the Middle Cretaceous and Early Triassic, both marked by lows in chert abundance.