

Studies on fossil silicoflagellate assemblages from North America

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The western and eastern coasts of North America have very different oceanographic characteristics, with the former associated with cooler, upwelled waters and the latter with warm Gulf Stream waters. Because it is known that living silicoflagellates are somewhat sensitive to changes in water temperature, these differences should be apparent in the fossil silicoflagellate assemblages found in coastal diatomaceous outcrops. Many of these outcrops were deposited during the Miocene, when significant tectonic and oceanographic changes were occurring, as well as silicoflagellate extinctions (*Naviculopsis* and *Corbisema*) and shifts in skeletal morphology (e.g. the change in bridge orientation in *Dictyocha*). Our results show that on the Pacific side, the assemblages were often dominated by the cold-water genus *Stephanocha*, while on the Atlantic side, *Distephanopsis* was more numerous, suggesting the latter may be related to warm water.

Some fossil silicoflagellate species exhibit a wide range in skeletal size and morphology, as well as having long stratigraphic ranges. This is certainly the case with the species complex *Distephanopsis crux*, and in order to understand this variation, the type materials, or samples from the type localities, should be examined. In this study, which focused on *D. crux* from Miocene–Pliocene samples, the specimens could be separated into three types on the basis of the major-axis basal spine length, the apical ring diameter and the major-axis basal ring diameter. Type 1, *D. longispinus* (*D. soljanii* and *D. contraria* are probably synonyms), has very long major-axis basal spines, shorter minor-axis basal spines, and a large apical ring. Type 2, *D. crux* sensu stricto (*D. schauinslandii* subsp. *stradneri* is probably a synonym), has variable-sized basal spines and a small apical ring, while Type 3, *D. cf. D. crux* f. *asper*, has variable-sized basal spines and a large apical ring.