

Can *C. davisiana* accumulation rate variations be used to estimate organic flux to intermediate-water depths?

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Deep-living (200m) species can dominate the LGM sedimentary Radiolarian assemblage but are usually <5% in the Holocene. These remarkably high percentages raise the possibility that the accumulation rate (flux) of deep-living Radiolaria can be used to monitor organic flux to intermediate depths. We propose to determine if changes in deep-living Radiolarian flux correlate with changes in diatom flux to the sediments. There is much dissolution of diatoms within the water column (much less for Radiolaria) but we expect this occurs in the upper levels of the ocean where silica concentrations are low not the intermediate and deep water where silica concentrations are high. There is also no reason to believe that diatom dissolution is significantly different between glacial and interglacial times. If, on the otherhand, deep-living Radiolaria fluxes are decoupled from measures of changing of primary productivity this will be interesting but less easily explained.

Abundance changes with time of deep and shallow-living (<50m) radiolarian species in a 17 meter core raised from the Bering Sea's Siberian margin have been studied using Climate Center funds (Fig. 1). A C^{14} date of 15,390 +/- 110 years at 655cm marks an approximate boundary between the Pleistocene and Holocene and indicates Holocene sedimentation rates are more than 40cm/1000 years. Additional age control, through correlation of *C. davisiana* curves between this core and a Shatsky Rise core with a detailed O^{18} record, indicates Holocene and Pleistocene sedimentation rates are similar. A near barren interval between 540 and 630 cm. is probably a small turbidite.

The rhythmic abundance variations (**specimens per gram of sediment**) of the deep-living *C. davisiana* are little changed between Pleistocene and Holocene. The shallow-living *S. venustum*, on the otherhand, is more than an order of magnitude more abundant in the Holocene than Pleistocene (Fig.1). Other shallow species, accounting for more than half the total counted, mimic *S. venustum*'s abundance variations suggesting *S. venustum* is representative of shallow-living species in general. *C. davisiana*'s high Pleistocene relative percentages are clearly primarily a result of low abundances of shallow living species.

These species abundance variations can't both be caused by a third factor e.g. terrigenous material, nor could sediment bulk density or accumulation rate, vary by as much as *S. venustum*'s abundance varies. Hence *S. venustum*'s and probably *C. davisiana*'s abundance variations are probably responses to changing accumulation rates. To relate deep and shallow-living species abundance variations to changing primary productivity we will estimate diatom accumulation rate changes by measuring total opaline silica (mostly diatoms) at the same levels as radiolarian counts have been made. Radiolarian opaline silica will be measured on selected samples so total radiolarian counts can be used to estimate radiolarian opal. Dry bulk density will be measured at selected levels by taking plugs of known volume and weighing the dried sediment after removing salt. From these data accumulation rate estimates of total opal, radiolarian opal, total Radiolaria and individual radiolarian species can be made.

The response to changing primary productivity of deep and shallow-living species may differ between Holocene and Pleistocene if, as our radiolarian data indicates (Fig.1), there are far more shallow-living consumers in the Holocene than Pleistocene. Our Holocene data suggest an inverse relationship exists between deep and shallow-living species abundances but more counts are needed to determine if this is true. We request funding to make 70 more radiolarian counts that will bring sample spacing in the Holocene to 5cm intervals and allow for additional Pleistocene measurements.