

Observation of Diatoms in Greenland Ice

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ABSTRACT. Diatom frustules have been found in small concentrations in a section of ice core from Crête on the Greenland ice cap.

RÉSUMÉ. Des petites concentrations de diatomées ont été trouvées dans une coupe de carotte glaciaire provenant de Crête sur le cap glacial du Groenland.

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In a recent study (Ram and Gayley, 1983), we measured particle size distributions in a 200-year-old Greenland ice core by filtration from the melt. The ice studied was a continuous 0.6-m section from the Crête core (71°07'N, 37°19'W, elevation 3170 m above sea level, distance from nearest coastline over 350 km) which spans a two-year period from early 1782 to early 1784 (Hammer *et al.*, 1978).

The 0.6-m section was divided into 13 samples of approximately equal size. Each sample was rinsed with doubly distilled MilliQ filtered water. After rinsing, the sample was melted and microparticles were recovered by filtration through a 13-mm-diameter Nuclepore membrane filter with pore size diameter of 0.08 μm . Melting of the ice and recovery of insoluble microparticles were carried out on a class 100 clean bench in a clean room environment. The typical mass of water filtered for each of the samples was approximately 30 g. Recovered microparticles were studied and photographed with a scanning electron microscope.

In the course of our measurements, we observed several diatom frustules and frustule fragments and measured every one having any dimension $> 10 \mu\text{m}$ ($n = 28$). Frustule counts for individual specimens varied from 0 to 11. Figure 1 shows some recovered unbroken frustules and Figure 2 shows typical fragments.

The statistics are poor and do not allow us to determine the diatom concentration accurately. Based on our measurements, we estimate the average diatom density ($n \cdot \text{g}^{-1}$) for the 0.6-m section to be $0.1 \cdot \text{g}^{-1}$. Also because of poor statistics, we have not been able to test whether the diatom number density exhibits seasonal variations, nor have we been able to identify the species or points of origin of the diatoms. We subsequently learned (C. Lorius, pers. comm. 1983; L.G. Thompson, pers. comm. 1983; L.H. Burckle, pers. comm. 1983) that diatoms have been observed in continental Antarctic ice. We know of no similar reports for Greenland ice.

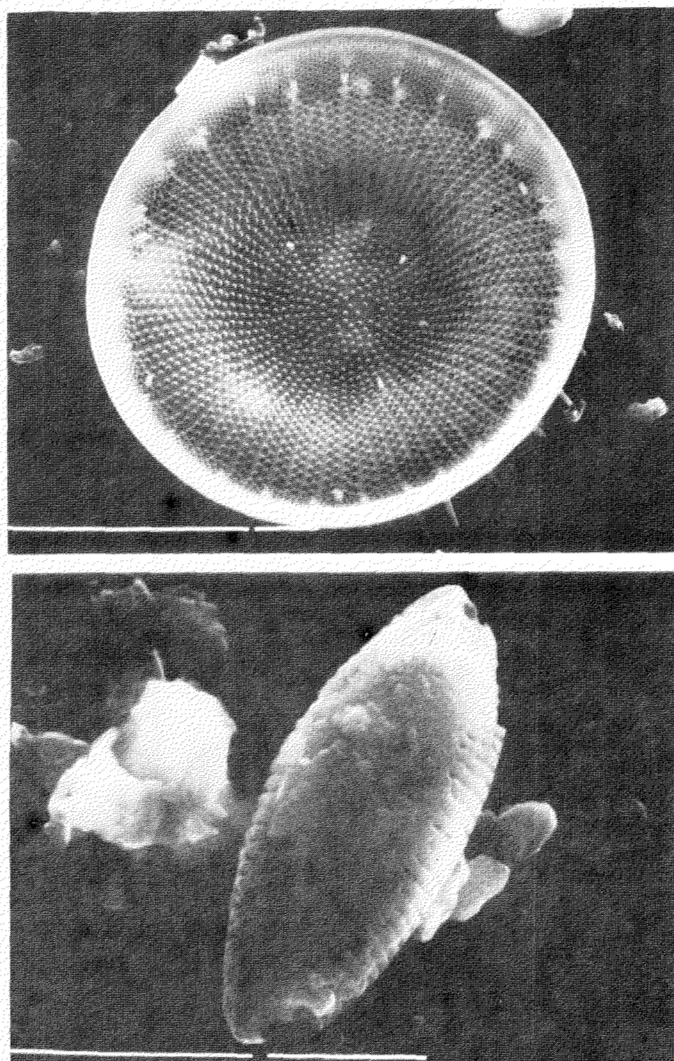


FIG. 1. Scanning electron micrographs of diatom frustules recovered from 200-year-old ice from Crête, Greenland. (Top) 2000 magnification; (bottom) 5000 magnification. The small gap in the straight bright line is 0.5 μm wide.

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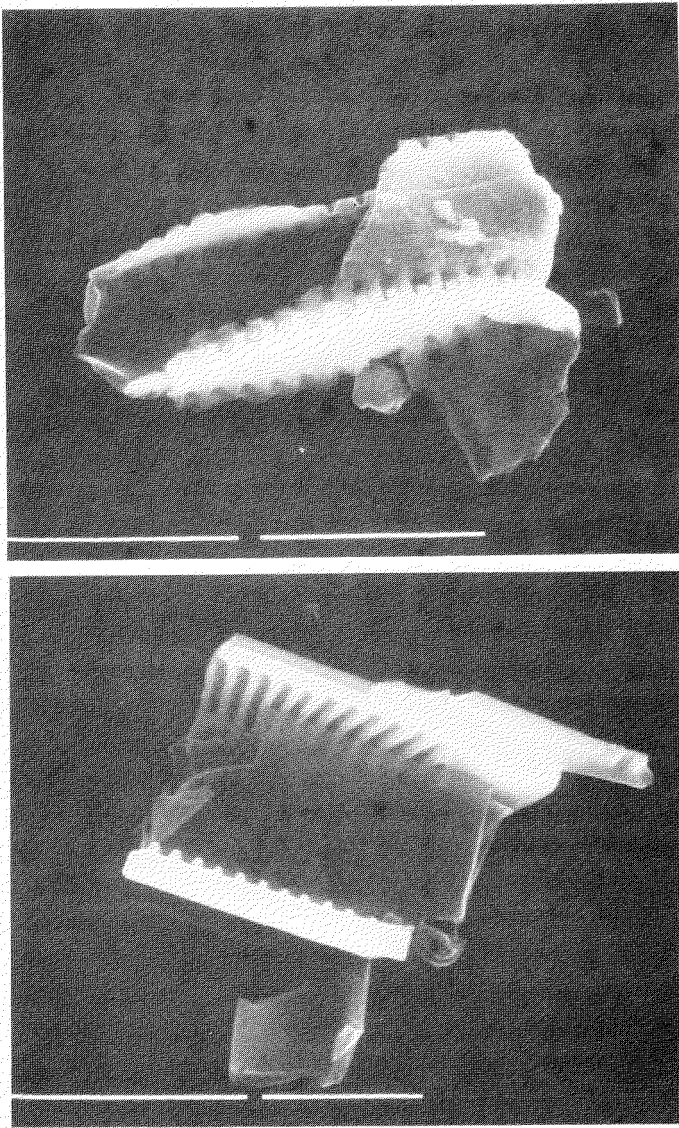


FIG. 2. Scanning electron micrographs of diatom frustule fragments recovered from 200-year-old ice from Crête, Greenland. (Top) 7000 magnification; (bottom) 5000 magnification. The small gap in the straight bright line is 0.5 μm wide.

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