

Figure 3. Left: Scanning electron micrograph (enlarged x650) of a fracture surface through a chert pellet recovered from the transition zone in *Eltanin* core 47-15. The chert is composed of blade-shaped crystals of unidimensionally disordered alpha-cristobalite, arranged in microspherulites about 10 microns in diameter. Right: View at higher magnification (x4,200) of the cristobalitic chert. Shown are thin, tabular crystals which compose the microspherulites, and partially dissolved fragments of siliceous microfossils which constitute the source material of the opaline silica. The arrow points to heavily etched diatom frustule.

fossil tests in a bedded chert, therefore, could indicate that many more tests originally were deposited in the sediment than are actually preserved. Secondly, the biogenic contribution to such a material could substantially be greater than deductible from the observation of a few ghosts of microfossils, in an otherwise featureless sample of diagenetically altered opaline chert. Significantly, we detected ghosts of siliceous microfossils in all bedded cherts and radiolarian mudstones we examined to date from Deep Sea Drilling Project Cores (legs 6 to 8).

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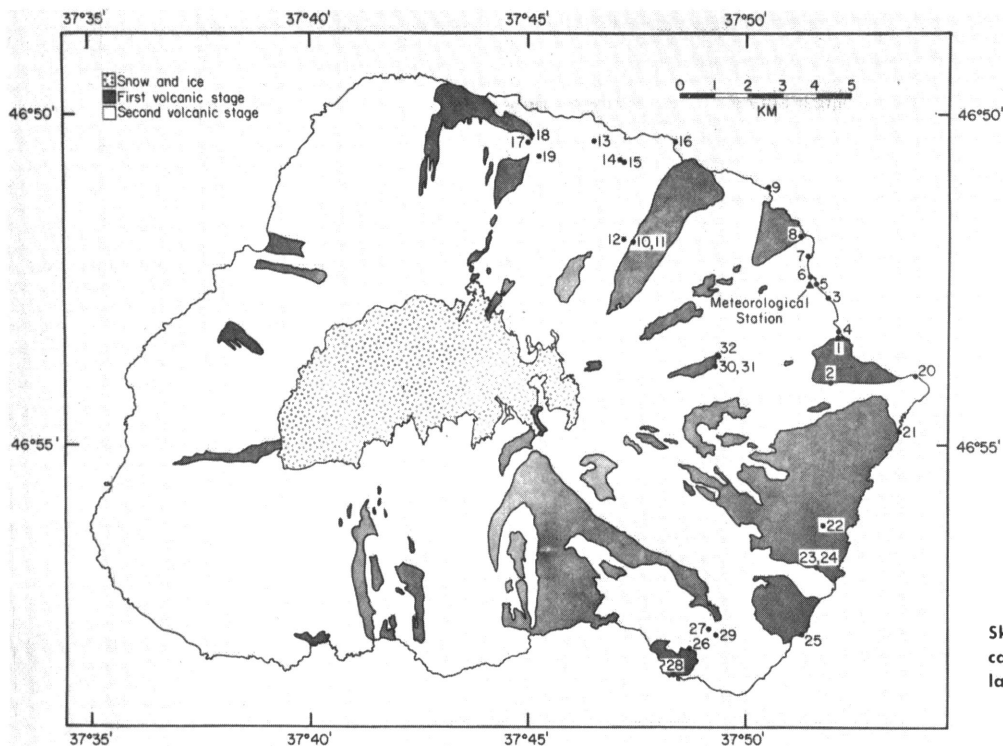
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Paleomagnetic, geochemical, isotopic, and petrographic studies of subantarctic islands

N. D. WATKINS

*Graduate School of Oceanography
University of Rhode Island, Kingston*

Previous studies of subantarctic islands (Watkins, 1970, 1971, 1972) have been extended to Marion Island (fig. 1), which was visited by Mr. Craig Amerigan,



Sketch map showing the location of the sites of sampled lavas on Marion Island (from Verwoerd, 1971).

in April and May of 1973. Transportation aboard the *Republic of South Africa* and other support facilities generously were provided by the South African government, and Professor Louis Nicolaysen (Bernard Price Geophysical Institute, Witwatersrand University). Two hundred and twenty-seven separately oriented cores were drilled from a total of 32 separate lavas (fig.). Preliminary results show that all lavas are normal polarity, consistent with the age of outcrop being less than 0.7 million years. The data will be used to analyze the geomagnetic secular variation in these latitudes during the Brunhes epoch.

Studies of Kerguelen Island and Amsterdam Island are being published (Watkins, in press; Watkins and Nougier, in press). It has been shown that, contrary to earlier speculations, no evidence exists for Kerguelen being of continental origin. Using diverse criteria it appears to be a simple oceanic island. The paleomagnetism of Amsterdam Island shows that an unusual "departure" of the geomagnetic field (whereby the geomagnetic pole effectively is in tropical latitudes) coincided with extrusion of lavas on both the north and the south sides of the island. The secular variation of the geomagnetic field during the Brunhes epoch otherwise was similar to that of present times.

Other studies in progress include major and minor element analysis; potassium-argon dating; paleomagnetism of St. Paul Island, on the southeast border of the mid-Indian ridge (in conjunction with Drs. B. Gunn,

University of Montreal, and I. McDougall, University of Canberra); a regional strontium 87/strontium 86 study of subantarctic island basalts for comparison with results from abyssal basalt in the same regions (in conjunction with Dr. C. Hedge, U.S. Geological Survey).

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