Table 2. Census data for marine Brunhes indicator diatoms in ETV cores

Taxa	ETV–3	ETV–3	ETV–3	ETV–4	ETV–5	ETV–5	ETV–6	ETV–7
Core depth in meters	33.99	38.59	38.62	5.33	1.71	2.01	1.58	7.07
Actinocyclus actinochilus	—[a]	2++[b]	1-[c]	1-	—	—	—	—
Coscinodiscus lentigenosus	—	2+[d]	—	—	—	—	—	—
Coscinodiscus stellaris v. *symbolophorus*	—	1++	—	—	—	—	—	—
Nitzschia curta	1++	—	—	—	2++	1-	—	—
Rouxia antarctica	—	6-	—	3-	1-	—	1-	—
Thalassionema bacteriastrum	—	1-	—	2-	1++	—	3-	1-

[a] "—" denotes no species found in sample.
[b] "++" denotes positive identification.
[c] "-" denotes possible identification, but specimen badly broken.
[d] "+" denotes probable identification.

1.58 meters, possible specimens of *T. bacteriastrum* and *R. antarctica* were encountered, supporting a Brunhes age. This age supports the paleomagnetic results from ETV–5 and ETV–6 which are all of normal magnetic polarity (Elston, Robinson, and Rieck 1983).

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Ice-sheet overriding of the ice-free valleys of southern Victoria Land

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The antarctic ice sheet exhibited two forms of late Cenozoic expansion. During the last two (and probably three) late Quaternary glaciations, ice grounded in the Ross and Weddell embayments and on the narrow east antarctic continental shelf. However, the Transantarctic Mountains remained exposed to separate the east and west antarctic ice sheets. A surprising discovery from recent field work (Denton et al. 1984) is that several earlier expansions involved a massive ice sheet that flowed northeastward over the dry valleys and the central Transantarctic Mountains. We infer a unified ice sheet (figure 4 in Denton et al. 1984) with a volume substantially greater than in the latest Quaternary glaciations. It has been widely speculated that eustatic sea-level fluctuations were the primary cause of antarctic ice-volume changes (Hollin 1962; Thomas and Bentley 1978; Stuiver et al. 1981). However, additional factors such as changes in temperature and precipitation are probably important in driving the older, more massive ice budget changes. It is important to understand in detail this history of antarctic ice dynamics, because it bears on the coeval history of other climate-system components as well as on the long-term mechanics of global climate.

To reconstruct and date overriding glaciations, we are examining strategic field areas along an overriding ice flowband in the dry valleys between the Quatermain Range and McKelvey Valley. Field work in 1983–1984 in Beacon Valley (Potter), Taylor Valley (Denton), the Asgard Range (Ackert), and the Olympus Range (Prentice) confirmed northeastward overriding flow across the topographic grain of the valleys and showed more overriding events than previously reported (Denton et al. 1984). Current field and laboratory research will characterize deposits of overriding ice, explain their stratigraphy, and establish their chronology by radiometric and fossil dates.

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