

New age for the vitrophyric rhyolite-dacite from Ancud (42° S), Chiloé, Chile

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Vergara and Munizaga (1974) reported an age of 760,000 years for a sample of rhyolite-dacite obsidian from the mainly late Oligocene to Miocene Central Valley volcanic belt at Ancud, Chiloé (Fig. 1). They interpreted this sample as representing «a last and isolated volcanic event in this series».

The age they determined is very much younger than any other in the Central Valley volcanic belt; all other documented Andean volcanism of this age occurs in the Main Andean Cordillera approximately 100 kilometers to the east. Valenzuela (1982) suggested that this date was in error, possibly because the sample had been collected in a zone of faults and its age may have been reset by recent movements along these faults. Based on fossil evidence, he considered the volcanic complex of Ancud to be Miocene in age, and most likely early to middle Miocene.

The age of the volcanic complex of Ancud is of interest not only for the understanding of the evolution of Andean magmatism, but for other aspects of Andean geology as well. For instance, in a recent paper Heusser (1990) stated that the oldest glacial drift on Chiloé, the Fuerte San Antonio drift, overlies this volcanic complex, and thus must be younger than 0.76 Ma. Also, in a study of obsidian artifacts from archaeological sites of Chiloé, the age of the obsidian was determined as 0.3 Ma (Stern and Porter, in press). This young obsidian could be of local origin if the Ancud volcanic complex did indeed include Pleistocene volcanic activity. Otherwise it would have had to have been transported from the recent volcanic belt on the mainland by either glacial or human mechanisms.

The authors recollected and redated the rhyolite-dacite vitrophyre that outcrops along the Balneario Arena Gruesa - not the Plazoleta El Cañón as described by Valenzuela (1982) - just a few hundred meters north of the Punta San Antonio on the northern edge of the city of Ancud (Fig. 1). This lithic-rich welded pyroclastic flow contains many stretched black obsidian fragments. The flow is highly weathered in most places, but a recent road cut has exposed fresh outcrops. A K-Ar age determination was done on hand-picked black obsidian fragments selected from unweathered portions of this pyroclastic flow. These glassy fragments were crushed and the 80 to 200 mesh fraction was cleaned in a dilute solution of HF prior to analysis in order to remove altered or hydrated portions of the glass. The new age obtained is 25.6 ± 0.7 Ma (Table 1). This is within the range of 20.4 to 27.7 Ma for all other published ages of samples from the Central Valley volcanic belt (Vergara and Munizaga, 1974).

No explanation is offered here for the difference between this age and that previously published, but the validity of the new determination is accepted based on its consistency with the stratigraphic information (Valenzuela, 1982) and the other published ages from the Central Valley volcanic belt. The new age implies that there is no evidence for post-Miocene volcanism on Chiloé, that the Fuerte San Antonio drift may be older than 0.76 Ma, and that obsidian of Pleistocene age used by the prehistoric inhabitants of Chiloé to fashion artifacts was most probably derived from the active volcanic chain on the mainland and carried to Chiloé by either glaciers or humans.

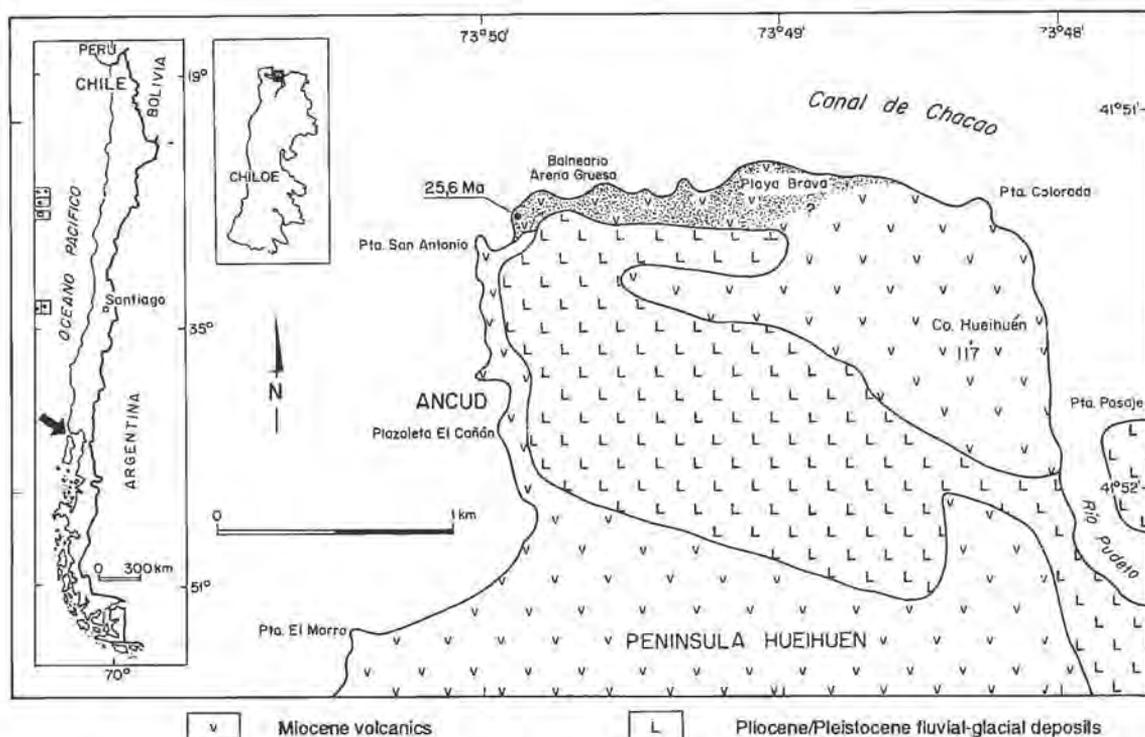


FIG. 1. Location of the sample of obsidían dated, north of Punta San Antonio in the city of Ancud, Chiloé. Extent of the geological units on Península Hueihuén (Miocene volcanics and Pliocene/Pleistocene fluvial-glacial deposits) modified after Valenzuela (1982). The lithic-rich pyroclastic flow (shaded), within which the dated obsidían occurs as stretched fragments, extends east from Balneario Arena Gruesa for an undetermined distance. Massive andesites crop out at the Plazoleta El Cañón and andesite breccias occur at Punta San Antonio.

TABLE 1. K-Ar AGE DETERMINATION FOR THE VITROPHYRIC PYROCLASTIC FLOW FROM BALNEARIO ARENA GRUESA, ANCUD, CHILOÉ*

Sample [†]	%K	⁴⁰ K ppm	⁴⁰ Ar ppm	⁴⁰ Ar/ ⁴⁰ K	Age Ma
X-9644	3.461	4.12	0.006191	0.001499	25.6 ± 0.7

[†] Laboratory sample number. ⁴⁰Ar = radiogenic Ar.

* Analysis performed by Geochron Laboratories, Division of Krueger Enterprises, Cambridge, Massachusetts, U.S.A.

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