

coal would be useful to determine the level of mercury pollution in the vicinity of such installations.

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Obsidian Hydration Dating Applied to Dating of Basaltic Volcanic Activity

Abstract. *Basalt flows and bombs that contain remelted rhyolite glass can be dated by obsidian hydration dating.*

Recent rhyolitic volcanic eruptions have been dated (1) by the thickness of the hydration rind on obsidian associated with these events. The technique is now being applied to a study of the rhyolitic volcanism in the area of Newberry volcano, Oregon, approximately 20 miles (32 km) northeast of Bend, Oregon, and in special cases (as described below) may be used to date basaltic eruptions.

On the north shore of East Lake in the Newberry volcano area, there is a small fissure where fountaining basalt magma tore off pieces of solidified rhyolite from the fissure wall during the eruption. The rhyolite has been remelted and is very vesicular. Thin sections of the remelted rhyolite show that it has a hydration layer that allows us to date the time of the remelting. The hydration thickness in three of these

samples is $3.0 \mu\text{m}$ ($\pm 0.2 \mu\text{m}$). A hydration rate of $3.1 \mu\text{m}^2$ per 1000 years (2) yields an age for this event of 2900 ± 400 years. Rhyolite flows within 2 miles (3.2 km) of this fissure, as determined by the obsidian hydration method, date from about the same time; thus, a variety of volcanic activity at about this time is indicated.

During a recent collecting trip to Newberry crater, Peterson (3) mentioned the occurrence of cored bombs—that is, basaltic bombs that contain centers of other rocks, including rhyolite. These cored bombs occurred in some quantity at the Diamond craters, an area of recent volcanism near the center of Harney County in southeast Oregon. The area is in T. 28–29 N, R. 32 E, about 60 miles (96 km) south of Burns. Rhyolitic glass from four of the bombs was examined for occurrence of a hydration rind, and hydration rind was found on all the samples examined (see Fig. 1). All the samples displayed rinds that ranged in thickness from 7.0 to $7.3 \mu\text{m}$. Using the hydration rate as mentioned above ($3.1 \mu\text{m}^2$ per 1000 years) gives an age for this explosive volcanicity at Diamond craters of $17,000 \pm 2000$ years.

Remelted obsidian-like material associated with basalts probably is not uncommon. The presence of such material makes it possible to date basaltic eruptions that remelt the rhyolite, provided that the eruptions occurred in the time interval from 200 to 250,000 years ago (4).

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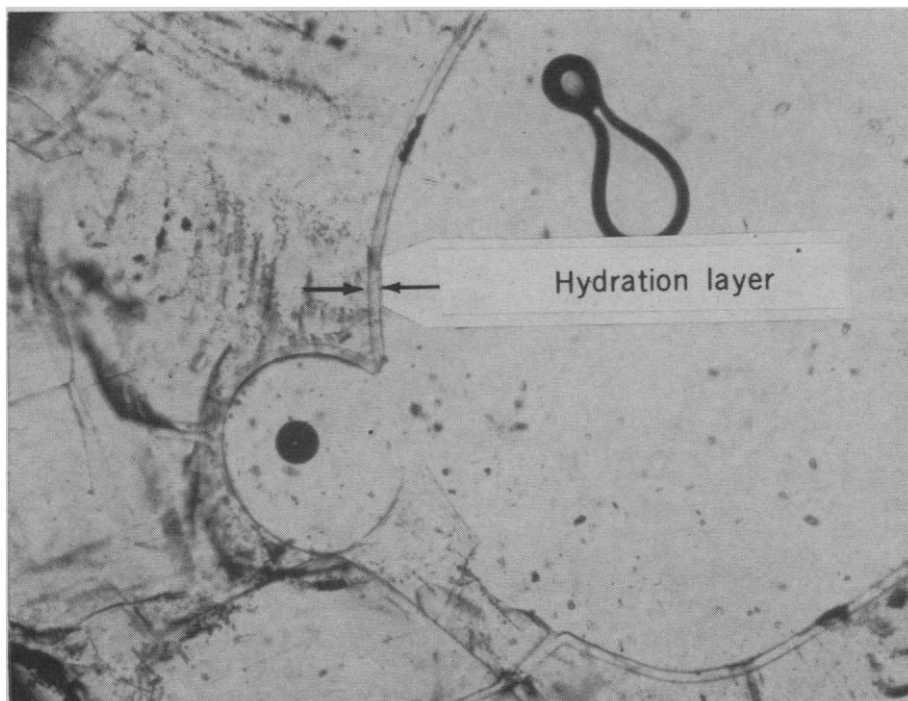


Fig. 1. Photomicrograph of a thin section of cored bomb from Diamond craters, Oregon; with the hydration layer ($7 \mu\text{m}$ thick) indicated.