

21. VOLCANIC ASH: LEG 16, DEEP SEA DRILLING PROJECT

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Light and dark volcanic glass and brown, weakly birefringent material (here called palagonite) were found in trace amounts at every site. Ash layers were found only at DSDP 158 and 162 and are described in Table 1. Other occurrences are assumed to represent reworked material.

The large number of ash beds in cores from DSDP 158 may reflect its proximity to Central America, where late Cenozoic igneous activity is widespread. If this is so, it is somewhat surprising that DSDP 157, located between the

high Andean volcanoes of Ecuador and the Galápagos volcanic center, is free of ash beds.

The near-surface Pleistocene ash at DSDP 158 has a lower index of refraction than the others and thus is more acidic. Pyrogenic biotite is the dominant mafic mineral. It is not clear whether the variability in index of refraction of the more basic glasses is due to primary variation in the composition of the glass or to submicroscopic alteration.

TABLE 1
Ash Layers, Leg 16

Site, Core, Section	Location in Section; Estimated Thickness (cm)	Estimated Depth Below Sea Floor (m)	Grain Size (μ)	Megascopic Description	Glass Characteristics	Index of Refraction at 25°C	Associated Minerals and Lithic Fragments	Age
158-1-2	0-10; 10 cm	2	5-300	Unconsolidated, sandy, white with black specks	Clear, colorless, with fluid-filled inclusions	1.497	Brown biotite, plagioclase, gr. hornblende (5% of ash)	Pleistocene
158-2-5	25-35; 5 cm	15	mostly 10-70	Unconsolidated, sandy, olive gray to black	Colorless, grayish yellow, very light brown	1.545-1.546 (colorless) 1.546-1.547 (light brown)	Plagioclase, clinopyroxene, palagonite	Pleistocene
158-3-2	20 and 45 (two lumps from same ash layer disturbed in coring); probably 2 cm	20	20-250	Pyritic, brownish gray ash, highly disturbed in core	Colorless, very light brown, and moderate brown glass, some with plagioclase micro-lites, some with fluid-filled inclusions	1.52 (colorless) 1.54 and slightly higher (brown)	Plagioclase, biotite	Pleistocene
158-3-2	75-85 and 95-105, (two lumps from same ash layer disturbed in coring); probably 2 cm	20	20-200	Pyritic, brownish gray ash, highly disturbed in core	Colorless to light brown, some with fluid-filled inclusions	1.52 (colorless) slightly higher than 1.54 (light brown)	Quartz, plagioclase, augite, hypersthene (?)	Pleistocene
158-22-5	130-33 (main ash); 95-130, ash mottled and re-worked with chalk ooze; 133-140, ash-filled burrows in chalk ooze; 3 cm	196	20-150	Olive gray to black pyritic ash	Colorless, very light brown, and brown glass, some with fluid-filled inclusions	1.542-1.547	Plagioclase, palagonite, clinopyroxene, apatite	Late Miocene
158-32-3	124-127, solid ash; 93-124, ash re-worked with chalk ooze; 127-140, chalk ooze with ash-filled burrows	283	20-250	Black pyritic ash	Colorless to brown some with fluid-filled inclusions	1.51 (light glass) 1.57 (dark glass)	Augite, plagioclase, apatite	Middle Miocene
162-7-5	30; 1 cm	60	30-70	Very pale orange in a moderate yellowish brown matrix; core disturbed	Colorless and light brown; fluid-filled inclusions	1.497-1.501 colorless 1.54 (brown)	Plagioclase, pyroxene, biotite, palagonite	Late Eocene