

The siliceous organisms range from 1 to 3 per cent., averaging 1.40 per cent.

The mineral particles consist of angular and rounded particles with a mean diameter of 0.84 mm. They make up from 25 to 80 per cent. of these sands, the average percentage being 60.

The fine washings vary from 2.35 to 18.86 per cent., the average being 9.81 per cent.

The following table gives the average percentage composition of the Challenger samples of Volcanic Sand, and comparison with the similar table given for the Volcanic Muds shows the difference to consist chiefly in the larger number of mineral particles and the less abundance of the fine washings.

Carbonate of lime,	{	Pelagic Foraminifera,	13.00	
		Bottom-living Foraminifera,	3.80	
		Other organisms,	11.99	
			28.79	
Residue,	{	Siliceous organisms,	1.40	
		Minerals,	60.00	
		Fine washings,	9.81	
			71.21	
			100.00	

The mineral fragments in these muds and sands are variable as to their nature, being determined by the mineralogical composition and structure of the volcanic rocks or volcanoes in the neighbourhood of which they are formed. The most characteristic are sanidine, plagioclases, augite, hornblende, rhombic pyroxenes, olivine, and magnetite. Among the lapilli the most frequent are those belonging to the basaltic and andesitic series of rocks, especially those belonging to the vitreous varieties, and they are often decomposed into palagonitic matter. The pumice fragments usually present may, from the manner in which pumice floats, be derived from distant sources, and from the lands in the immediate neighbourhood of the deposit. Generally the fragments of minerals enumerated above are more or less enveloped by vitreous matter frequently altered by hydration. These points will be dealt with in greater detail when describing specially the rocks and minerals of marine deposits.

The following table gives the analyses of three Volcanic Muds:—

				PORTION SOLUBLE IN HCL.									PORTION INSOLUBLE IN HCL.					
Station.	Depth in Fathoms.	No.	Loss on Ignition.	SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	MnO ₂	CaCO ₃	CaSO ₄	Ca ₃ P ₂ O ₈	MgCO ₃	Total.	SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	CaO	MgO	Total.
VIIr.	640	68	4.94	10.76	5.91	7.02	...	35.68	1.05	0.52	2.04	62.98	19.17	4.30	5.38	2.58	0.65	32.08
VIIr.	1750	69	6.30	11.71	5.71	7.14	...	41.43	1.15	g. tr.	1.43	68.57	15.84	3.71	3.43	1.43	0.72	25.13
VIII.	620	70	6.22	16.22	5.00	11.69	tr.	32.22	0.27	l. tr.	0.83	66.23	17.90	4.22	3.77	1.44	0.22	27.55