
Zeolite Distribution in Volcaniclastic Deep-sea Sediments from the Tonga Trench Margin (SW Pacific)

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Abstract: 605 m of sediments were cored in Hole 841 of the Ocean Drilling Program (ODP) at the Tonga Trench margin. The sedimentary sequence consists mainly of Miocene vitric siltstones, vitric sandstones, and volcanic conglomerates. A major consideration for selecting this site was the presence of abundant authigenic minerals (40% to 70% of the whole rock), which consist of K-feldspars, clays, thaumasite ($\text{Ca}_3\text{Si}(\text{OH})_6\text{CO}_3\text{SO}_4 \cdot 12\text{H}_2\text{O}$), and zeolites. The zeolite minerals include phillipsite, clinoptilolite, analcime, mordenite, chabazite, heulandite, wairakite, and erionite. The increasing amount of analcime from 257 mbsf to 470 mbsf, and the joint occurrence of mordenite and wairakite in this zone of Miocene tufts, seems to be induced by the heat flow from a major intrusive sequence of basaltic andesite sills and dikes. This abundance of analcime in response to the thermal pulse could explain the unusual Na-depleted porewater compositions observed in ODP Hole 841.

Key Words: Analcime • Miocene tuffs • Mordenite • Pore-water • Thermal pulse • Tonga Trench margin • Wairakite • Zeolite distribution

Clays and Clay Minerals; February 1995 v. 43; no. 1; p. 92-104; DOI: [10.1346/CCMN.1995.0430111](https://doi.org/10.1346/CCMN.1995.0430111)

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