

METHODOLOGY FOR DETERMINING THE PARAMETERS
OF BIOTURBATION USING ASH LAYERS
IN AREAS OF FREQUENT VOLCANISM

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ABSTRACT

The mixing depth L and the coefficient of diffusion D associated with bioturbation can be estimated by applying the statistical methods of Guinasso and Schink (1975) to the concentration profile of a redistributed inert tracer such as microtektites or volcanic ash. For this method to yield accurate results, the concentration profile must be complete. This is frequently not the case in areas of high volcanism since the tails of a concentration profile are likely to be obscured by a diffuse background of ash. For this reason, a second methodology is developed which is more appropriate for incomplete profiles.

This methodology is applied to ash concentration profiles found in a piston core taken from the Lau Ridge. Ash concentration varies horizontally in the core. This variability is magnified by the statistical technique to greater variability in the possible values of L and D . The uncertainty is greatly reduced by averaging over several profiles. The average values determined are $L = 16.6$ cm and $D = 6.4$ cm²/kyr.