

Ash grains of the 1991 Mt Pinatubo eruption as a tracer in Rose Bengal stained deep sea agglutinated foraminifera: How old is Freddy?

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ABSTRACT

The use of volcanic ash particles (including dark-coloured grains) by agglutinated foraminifera that survived the 1991 eruption of Mt Pinatubo volcano provides a useful tracer to help determine growth rates and longevity in the deep sea. In the case of a specimen of *Cyclammmina pusilla* Brady, the rate of chamber addition in this Rose Bengal stained sub-adult individual is three chambers over a timespan of five and one-half years.

INTRODUCTION

Until now, we have had no idea of *in situ* growth rates or life spans of agglutinated foraminifera in the deep sea. In shallow environments benthic foraminifera reproduce seasonally, completing two phases in their life cycle over the span of a year (Matsushita & Kitazato, 1990). However, the frequency of sampling required to properly study growth rates and life cycles of foraminifera in the deep sea has never been attempted.

An unexpected result of the studies of benthic foraminifera that are colonising the 1991 Mt. Pinatubo ash layer in the South China Sea (Hess & Kuhnt, 1996) is the observation that many species of agglutinated foraminifera can preferentially utilise dark-coloured grains of volcanic origin for the construction of the test wall.

An exceptionally well-preserved individual of *Cyclammmina pusilla* was found by B. Spivey, who analysed a multicore station from R/V Sonne Cruise 114 for his M.Res. thesis (Station 18222; 13°37.1'N, 119°54.8'E, 3322 m water depth). At this station the volcanic ash was comparatively thin (about 15 mm), and we expected that at least some of the fauna would have survived the ashfall.

RESULTS

At station 18222, we found a subadult specimen of *Cyclammmina pusilla* that was alive at the time of collection in early December, 1996. Its early chambers were made of small aeolean quartz grains, but the animal constructed its last three chambers out of volcanic ash particles. Apparently the individual had survived the ashfall, been able to exhume itself, then began using volcanic minerals from the ash to construct its test. This specimen, named "Freddy the Foram" by the students, demonstrates that the 1991 Mt Pinatubo

tephra layer can also serve as an excellent tracer to monitor growth rates of agglutinated foraminifera in the distal part of the ash lobe.

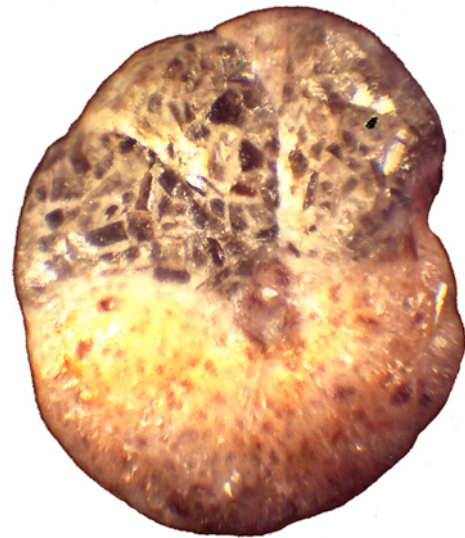


Figure 1. "Freddy"; a specimen of *Cyclammmina pusilla* with the final three chambers made of 1991 Mt Pinatubo ash.

REFERENCES

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