

Development and analysis of a database of volcanic ash layers from IODP cores as a record of global explosive volcanism.

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Ocean drilling as part of the Integrated Ocean Drilling Program (IODP), Ocean Drilling Program (ODP) and the Deep Sea Drilling Program (DSDP) has collected over 366 km of core samples since 1966. This is a largely untapped source of information with global coverage of deposits throughout the oceans. We are using this source of information to generate a more complete record of global volcanism through time.

Volcanic ash layer data are gathered from literature, reports generated by IODP, as well as from searching the visual core description (VCD) archive. This process is complimented by a series of ground truthing campaigns to rigorously test the quality of these data and to get a feel for the amount of under/over recording of volcanic ash layers. During our recent ground truthing campaigns at the IODP repositories in Kochi Core Centre (Japan) and at Texas A&M University (U.S.A) we examined over 350 ash layers, to compare what is observed in the core with what is recorded in the shipboard VCD, reports and literature. We found they often differed, but by comparing the data source with the core photo it was often possible to identify these outliers. Due to this inconsistency, alternative approaches to data collection are being attempted to use the physical properties data to identify ash layers. This is intended to make ash layer identification and measurement more consistent, and create a more complete ash layer record.

Creation of this global dataset of ash layers through time will provide the required information for these layers to be translated into volcanic eruptions of varying magnitude, essentially forming a global time series of explosive volcanic eruptions. This can then be used to examine magnitude-frequency relationships and rates of activity change through time and space, as well as investigating physical relationships between volcanic activity and tectonics, glacial/interglacial periods and climate cycles.