

Tsunami deposits sciences as geohazard research program of ICDP

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Tsunamis initiated by the 2004 Indian Ocean earthquake (Mw 9.1?9.3) and the 2011 Tohoku-oki earthquake (Mw 9.0) have provided recent demonstrations of the widespread catastrophic damage and loss of life that can be caused by mega tsunamis. Mega tsunamis have dramatic impacts on geological processes as well as on human societies. Large-scale erosion and the mass transport of sediments by tsunamis cause rapid environmental change and biological turnover in coastal areas. Mega tsunamis leave evidence of their passage in the geological record on a time scale far beyond human memory.

Over geological time, mega tsunamis have been caused by events such as subduction-zone earthquakes, volcanic eruptions, landslides (on land and submarine), and meteorite impacts. Large submarine collapses of gas-hydrate-bearing sediments may also have caused mega tsunamis. These facts demonstrate that the risk of catastrophic tsunamis is not limited to active tectonic margins. Although the frequency of these catastrophic events is low compared to a human lifetime, there is no telling when and where the next events will occur.

The 2004 and 2011 events, and the recognition that mega tsunamis have occurred many times on both historical and geological time scales, have prompted international efforts to better understand the hazards associated with tsunamis and to design disaster control strategies at regional and global levels. The foundation on which mega-tsunami risk management is built is hazard assessment, including knowledge of the location, frequency, and magnitude of past events. This basic research leads to a better understanding of the dynamics of geological and biological evolution in coastal regions. Historical documents provide important information for regional analysis of past tsunamis, but their value is limited by the short length of the historical record. Studies of tsunami deposits provide a useful means of extending the length of those records onto a geological time scale.

To solve the above mentioned problems and aim at further development in these study field, following research programs are prospected.

Understanding past mega tsunamis from geological records.

- + Mega tsunami events during earth history.
- + Mega tsunami impacts through human history.

Global coordination of research to develop an inventory of tsunami deposits

- + Catalogue of mega tsunamis (size, source, age) at plate subduction zones.
- +Catalogue of mega tsunamis (size, source, age) for island countries that have suffered far-field effects of mega tsunamis.

Outreach to and nurturing of young scientists in the field of tsunami geology

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