The use of tsunami-laid deposits to hindcast the magnitude and hazard of the event

Alan Ruffman
Geomarine Associates Ltd., P.O. Box 41, Station M, Halifax, NS, B3J 2L4 <aruffman@dal.ca>

When one finds a historic or palaeo tsunami-laid deposit in the geological record it is most often a sandy to coarse silty layer. If one is able to fully document it and its full extent survives in the record, one is left with certain geological parameters such as grainsize and thickness. With their variation over

the deposit, one may have the deposit's areal extent and the change of elevation over the deposit. One does not have the magnitude, the run-up height, or the run-up distance of the parent tsunami as it inundated the land surface. By thinking of a tsunami-laid deposit as the result of a moving, settling tube it is possible to use sediment dynamics to hindcast certain of the tsunami's parameters.

Tsunami deposits tend to thin landwards and each grainsize component of the deposit tends to decrease landwards; the deposit fines as the run-up distance increases from the original shoreline. Surveys of modern tsunamis show that the landward horizontal extent of the run-up and the vertical height of the run-up of the water exceed the equivalent run-up measurements of the tsunami deposit. It is of course the run-up distance and run-up height of the water that defines the potential hazard to humans and their communities.

Examples in Tamil Nadu, India from December 26, 2004, Burin Peninsula in Newfoundland from November 18, 1929, and from the Storegga Slide tsunami of about 8000 sidereal years BP, serve to illustrate the potential of this sort of analysis of tsunami deposits.