

**Harvard University, Solid Earth Physics Seminar**  
Tuesday 27 April 2010, 1:30 pm  
Room B-108 (basement level), Northwest Building, 52 Oxford St.

***Reducing the Tsunami Risk in  
Padang, West Sumatra, Indonesia:  
A Focus on Vertical Evacuation***

**Veronica Cedillos**

Project Manager, GeoHazards International  
Palo Alto, California

***Abstract:*** Padang, West Sumatra, Indonesia has one of the highest tsunami risks in the world. Currently, the strategy to prepare for a tsunami in Padang focuses on developing early warning systems, planning evacuation routes, conducting evacuation drills, and educating the public about its risk. These are all necessary, yet insufficient efforts. Padang is located so close to the offshore megathrust and has such flat terrain that a large portion of its populace will be unable to reach safe ground in the time—less than 30 minutes—between the earthquake and the tsunami arrival at the shore. It is estimated that over 100,000 inhabitants of Padang will be unable to evacuate in that time, even if they head for safe ground immediately following the earthquake. Given these circumstances, other means to prepare for the expected tsunami must be developed. With this motivation, GeoHazards International and Stanford University partnered with Indonesian organizations—Andalas University in Padang, the Laboratory for Earth Hazards (LIPI), and the Ministry of Marine Affairs and Fisheries (KKP)—in an effort to evaluate the need for and feasibility of developing Padang’s tsunami vertical evacuation structures—structures designed to rise above the maximum tsunami water level and to withstand the expected earthquake and tsunami forces. This project team designed and conducted a course at Stanford University, undertook several field investigations in Padang, and participated in a reconnaissance trip following the M7.6 September 30, 2009 earthquake. The team concluded that: 1) the tsunami-generating earthquake is still a threat despite the recent earthquake; 2) Padang’s tsunami evacuation capacity is currently inadequate and evacuation structures need to be implemented as part of the evacuation plan; 3) suitable evacuation solutions are highly dependent on the natural and built environment; and 4) previous estimates of the number of people unable to evacuate in time are probably grossly low. The GHI Project Team is now proposing to: 1) design and construct a tsunami evacuation raised earth park; 2) retrofit existing mosques to serve as evacuation structures; and 3) design and construct pedestrian overpasses to serve as evacuation sites.