Earthquake Hazards Analysis

We are using high-resolution geophysical methods (seismic reflection, seismic refraction, ground penetrating radar, gravity, and magnetics) to image tectonically active geologic structures to assess the risks associated with earthquakes. We are focusing on seismically active regions of the Pacific Northwest. Traditional geophysical methods, with modifications in acquisition and analysis, are used to safely and successfully operate in diverse conditions such as urban centers, lakes, and other water ways. We study many locations that do not show surface expressions to suggest the faults are active, but our subsurface geophysical images confirm that many of these structures show recent movement and potentially pose a considerable risk to nearby residents.

Our recent focus has been on assessing earthquake hazards from active crustal faults within the Portland metropolitan area (population 1.5 million). The Portland Hills fault, East Bank fault, and Oatfield fault all extend through the region, but no direct evidence has suggested that these faults were active. This lack of evidence is due to the paucity of subsurface information and the 12-15 ka Missoula floods that reconstructed the area terrain and stratigraphy. Our high-quality geophysical images have shown that the Portland Hills Fault is tectonically active. By continuing the analysis of the geophysical data, we will provide details of deforming style and the history of faulting, and most importantly, improve the earthquake hazards assessment for the Portland metropolitan area.

Selected References


