Geodesy on the Seafloor

Mark Zumberge¹, Noel Bartlow², Andrew Newman³, David Schmidt⁴, Spahr Webb⁵

- 1. University of California San Diego (email mzumberge@ucsd.edu)
- 2. University of Kansas
- 3. Georgia Institute of Technology
- 4. University of Washington
- 5. Columbia University

Most of the planet is covered by water. Except for a few noteworthy exceptions, all of the tectonic plate boundaries are under water. The largest earthquakes and the resulting tsunamis occur offshore, yet the geodetic tools used to infer the ground-deformation associated with them have mainly been used on land. Subaerial geodesy has a limited capability to quantify the offshore seismic hazard; studying these phenomena requires tools specifically designed to collect data offshore. In recent decades, a number of new tools for marine geodesy have been developed, and many instruments proven useful on land have been adapted to seafloor use. The main seafloor geodetic methods are GNSS-Acoustic, direct-path acoustic, ambient seawater pressure, multibeam mapping from both ships and AUVs, linear and volumetric strain, tilt, and gravity. All are currently in use at varying levels at numerous locations.

