

## EarthScope IDOR controlled-source seismic transect across a steep cratonic margin

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The EarthScope IDOR (Idaho-Oregon) project is an investigation of the steep cratonic margin in western Idaho and eastern Oregon. This boundary juxtaposes relatively juvenile island arc accreted terranes against Precambrian continental crust across a distance of less than 15 km. Since terrane accretion the region has undergone multiple phases of deformation, including transpression, voluminous magmatism, and Basin and Range style extension. The IDOR project is utilizing a multidisciplinary approach to characterize the growth and modification of this steep continental margin, and the associated implications for lithospheric strength and the role of reactivation during magmatism and deformation.

The IDOR controlled-source seismic project consists of a 430-km refraction and wide-angle reflection profile through eastern Oregon and Idaho. The goals of the line are to characterize lithospheric-scale structures associated with the cratonic margin, Western Idaho shear zone (WISZ), Idaho batholith, and Blue Mountains province. Data acquisition in August 2012 involved 53 volunteers, mostly undergraduate and graduate students, from 22 universities. The deployment consisted of 2555 vertical-component seismometer stations recording 8 explosive shots and background seismicity. Analysis of these data is currently in the preliminary stages. First arrival tomography shows a difference in upper crustal seismic velocity between the slower craton and batholith to the east and the faster accreted terranes to the west. Wide-angle reflections and upper mantle refractions have not yet been modeled, but indicate strong variations in crustal thickness. Wide-angle reflections from the middle crust and uppermost mantle vary along the line. These seismic observations will be used to construct a model of the subsurface, providing constraint on the tectonic and deformation history.

