

## Project Abstract

The Eastern Transverse Ranges provides an ideal sampling location for crustal information because of the exposure of a variety of crustal layers from varying depths. The easternmost areas and the adjacent south central Mojave Desert expose upper crustal rocks, and rocks further to the west were exhumed from progressively deeper levels, nearly to the present day average Moho. Eastern areas of the ranges contain mostly volcanic, sedimentary, and granitic rocks. Western areas contain mostly granite, granodiorite, tonalite, and gneiss with no volcanic or sedimentary rocks. The variety of rock types and range of crustal depths allows detailed estimation of geophysical characteristics for a representative in situ southern California crustal column. This study is based on analyses of approximately 300 samples of basement rocks of the Eastern Transverse Ranges. P-wave velocity was calculated using Christensen and Mooney's (1995) equation for velocity variation as a function of density and temperature (table below). P-wave velocity through these rock types varies with depth, pressure, and temperature. Velocities for average heat flow are listed only for regions where the rock occurs; a volcanic rock, like basalt, occurs only in the upper crust and will not have a middle crust velocity listed. Rock types occurring in both upper and middle crust, like granite, will have a velocity range listed for each depth region. Rock Type Upper Crust Vp (km sec-1) Middle Crust Vp (km sec-1) basalt 6.6 - 6.7 quartzite 5.8 - 6.2 granite 5.6 - 6.1 5.6 - 6.1 granodiorite 5.8 - 6.2 5.8 - 6.2 gneiss 5.7 - 6.9 amphibolite 6.8 - 7.6 tectonite 5.8 - 6.5 tonalite 6.2 - 6.5 Magnetic susceptibility was directly measured on hand specimens, and results follow two trends with increasing P-wave velocity. Generally, a positive correlation exists in the volcanic and granitic rocks, but no correlation is apparent for the metamorphic rocks. These velocity and magnetic susceptibility values, based on surface samples, will be used to make a depth-dependent geophysical model using GIS. Depth assignments for surface samples were derived from pressure estimates based on the aluminum content of amphiboles in selected granitic rocks. The resulting model range of velocities and magnetic susceptibilities at varying depths in the crust can be compared to models constructed from aeromagnetic and seismic data.