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Rolando Cardenas* (rcardenas4@yisd.net), 8100 Turquoise Street, El Paso, TX 79904. *The Software Development for a Three Dimensional Gravity Inversion and Application to Study of The Border Ranges Fault System, South-Central Alaska.*

The Border Ranges Fault System (BRFS) is an important petroleum province within south-central Alaska. A primary goal of my research is to test several plausible models of structure along the BRFS using a novel three-dimensional inversion technique utilizing gravity data, constrained with other geophysical, borehole and surface geological information. This research involves the development of three-dimensional inversion modeling software. The novel inversion approach directly models known geology with "a priori" uncertainties assigned to the geologic model. This technique was developed to evaluate three-dimensional structure in regions of complex and poorly known geology. The software computes the density solution of a geologic structure by utilizing its location within the gravity field as well as the gridded surface files of known topography and subsurface units. The total gravitational effect of each body is calculated with a series of semi-infinite vertical line elements which improves the computational efficiency of computing forward models of structures with extremely complex geometry. The inversion algorithm considers "a priori" geophysical constraints and uncertainties due to gravity measurements, surface file inconsistencies, and forward calculations in the model solution. (Received September 22, 2015)