CORRELATION OF GRAVITY AND GEOTHERMAL ANOMALIES IN THE IMPERIAL VALLEY, SOUTHERN CALIFORNIA

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Detailed gravity and geothermal gradient measurements in the Imperial Valley indicate a very close areal relation between seven very prominent gravity maxima (closures of 2 to 22 mgals) and areas of high geothermal gradients (greater than 11°C/100 meters). In some instances thermal gradient measurements are too widely spaced to allow determination of the extent of overlap of these anomalies. Where sufficient gradient data are available the correlation is striking, but there is not a one-to-one correspondence in the maximum amplitude of the residual gravity anomalies and the maximum thermal gradients. Correlation of positive gravity anomalies and high geothermal gradients is hypothesized to arise from one or both of the following: (a) increase in density of sediments surrounding areas of high temperatures by the deposition of and cementation with silica and the formation of a metamorphic aureole; (b) the emplacement of higher density volcanic rocks. Occurrence of silica-cemented sandstone in a shallow borehole on one of the anomalies and occurrence of metamorphism associated with the Salton volcanic domes and Cerro Prieto in Mexico suggests that both proposed mechanisms are operating.