

Distribution of Fine-Grained Sediments and Subsidence in Borrego Valley

Kristie C. Tordai

Advisor: Dr. Kathy Thorbjarnarson

By analyzing well logs from 50 locations throughout Borrego Valley, a high percentage of fines were found to be widely distributed in the upper central portion of the valley. In a previous study, ground surface changes of Borrego Valley were observed by InSAR and found not to be correlated to groundwater level change (Pickard and Mellors, 2005). In this study, well-log fine-grained sediment distributions were used to find any association between areas of subsidence and the amount of fines. It was observed that well locations with high percentages of fines, ranging from 20-87%, corresponded to areas of increasing subsidence at a rate of 0.2 cm/yr to 0.4 cm/yr throughout the valley. Clay content was also found to be concentrated in the central portion of the valley, which is characteristic of alluvial fan depositional environments. Well log data and associated cross sections showed that clay content did increase with depths of up to –200 feet below sea level towards the southeastern portion of the study area. Areas that showed lower percentages of clays correlated to areas with less subsidence. In contrast, the areas that contained high values of clay content and were not in vicinity of subsidence, as observed by InSAR, primarily had clays in the lower portion of the aquifer, which would not be dewatered by the dropping water table.

References Cited:

Pickard, S., Mellors, Dr. R., 2005. Subsidence in Borrego Springs as Observed by InSAR Undergraduate Thesis, San Diego State University, Spring 2005