

Using Geospatial Techniques and Remote Sensing to Reduce the Number of Soil Salinity Samples

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Abstract. Geostatistical techniques and remote sensing are used in this study to help reduce the number of soil salinity samples needed for mapping soil salinity. Two datasets were collected in alfalfa and corn fields and satellite images with different spatial and spectral resolutions from Ikonos, Landsat, and Aster were acquired and processed. Generalized least squares (GLS) was used to regress the collected soil salinity samples with the selected bands; and ordinary kriging was used to krig the residuals of the GLS model. Variograms were used as indicators for using the proper number of samples needed for kriging in order to map soil salinity. The objectives of this study are: 1) to utilize the variograms to help reduce the number of samples needed for mapping soil salinity; 2) to compare different cover types (alfalfa and corn) as well as compare different satellite images in capturing the variation of soil salinity. The results of this study show that the variograms can be used as a good indicator to significantly reduce the number of samples needed for mapping soil salinity. It was determined that corn fields capture more variation in soil salinity than alfalfa fields. Among the different satellite images used, the IKONOS images performed the best.