On Soil Salinity Mapping Using Satellite Imagery

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Abstract. Soil salinity is a serious problem that affects agriculture (specially irrigated areas) in many parts of the world and can cause substantial reduction in yield. Mapping soil salinity is the first step in identifying the magnitude of the problem so that it can be dealt with. In order to determine the amount of soil salinity soils samples can be collected and analyzed in the lab or more recently Electro Magnetic (EM) devices have been developed that can estimate the amount of salt in the soil based on the EM readings. Both of these techniques can give good estimates of soil salinity but both of them are time consuming and might not be practical when trying to evaluate large areas. This research is trying to use satellite imagery to evaluate the severity of soil salinity and its impact on crop yield. The reflectance of the crop based on multi-spectral satellite images is being used as an indication of the severity of soil salinity. Based on field data collection the multi-spectral data is trained to distinguish the amount of soil salinity and its impact on the crop. Based on this information then the image can by classified and the impact of salt (and an estimate of the soil salinity) on the crop can be estimated. This work is being conducted in an area in the Arkansas River Basin of Colorado using 5 m IKONOS multi-spectral data.