

Comparison of Different Mapping and Classification Algorithms for the Evaluation of Soil Salinity in Iran

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A standard survey of soil salinity in Iran has produced a classified soil salinity map and a data set of about 600 electrical conductivity (EC) measurements of the saturated paste extract determined at three depth intervals (0-50cm, 50-100cm and 100-150cm). However, since the EC values ranged from 1 to 109 mS/cm, a more detailed quantitative evaluation was desired. The study area covers about 450km², including different landscape units, and is located in the southwest of Iran. Using an independent test data set, the need to account for the coregionalization between the three depths was evaluated by comparing ordinary kriging (OK) with ordinary co-kriging. No improvement in the consistency over depth was found by using co-kriging. Therefore OK of EC at the different depths was chosen above the much more complex co-kriging to evaluate the soil salinity map. It was found that the overall similarity between the salinity classification predicted by OK was 0.4, whereas it was 0.34 for the soil salinity map.

An Iranian salinity evaluation criterion, combining the EC at the three observed depths, was used to compare different classification methods: a Boolean approach, a fuzzy set classification and multiple-variable indicator kriging (MVIK). The Boolean approach performed worse, fuzzy set improved the discretisation between sites with and without salinity limitation, but the best performance was obtained with MVIK. Therefore, we conclude that the latter method is a promising in land evaluation.