

Abstract

Base of soil information for environmental modeling is soil survey and mapping as a way to determine soil distribution patterns, describe and display it to understood and interpreted for different users. Digital soil mapping creates link between classes or soil characteristics and environmental factors affected soil formation and development by using mathematical models which can provide more precise and accurate soil maps and reducing cost of soil survey and mapping projects. This study was done at different levels of the classification system for mapping soil classes to the American way by using Random Forest technique in the Hirmand county lands in Sistan plain. In this study 108 soil profiles were dug on about 60.000 hectares of Hirmand county lands. Sixteen environmental variables were used as estimator for soil mapping including land properties, salinity and vegetation index. After classification of soil profiles to great groups and subgroups, soil classes map provided by using random forest (RF) method. It should be mentioned 80 percent of data was used for model training and 20 percent for independent validation. Pedological studies showed soils that formed in Sistan plain haven't high development and most of them are Entisol and Aridisol. Most soil profiles classified as Torrifuvents on great groups in Typic Torrifuvents as subgroups and Coarse-loamy, mixed, active, calcareous, hyperthermic, Typic Torrifuvents as famil level . Also the result of RF showed the lowest estimation error of out of bag (OOB) samples in soil great groups, subgroups and soil famil were 43.53, 50.59 and 60 respectively. Independent validation results showed the best accuracy obtained for soil great groups , subgroups and soil famil were 48 ,53 and 44 percent respectively. Valley depth, convergence index, channel network between and salinity in soil great groups, valley depth, elevation and catchment area in soil subgroups, elevation, grooves depth and convergence index in soil famil were the most important environmental variables to estimate soil classes. The results showed Hirmand regions despite low up and downs Soil digital mapping and random forest technique could be for soil classes prediction and soil mapping.

Keywords: Flood plain, Random forest method, Arid regions soils, Hirmand county



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