

Differentiation between Different Rangeland Sites Using Principal Component Analysis in Semi-Arid Areas of Sudan

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Abstract : Rangelands in semi-arid areas provide a good source for feeding huge numbers of animals and serving environmental, economic and social importance; therefore, these areas are considered economically very important for the pastoral sector in Sudan. This paper investigates the means of differentiating between different rangelands sites according to soil types using principal component analysis to assist in monitoring and assessment purposes. Three rangeland sites were identified in the study area as flat sandy sites, sand dune site, and hard clay site. Principal component analysis (PCA) was used to reduce the number of factors needed to distinguish between rangeland sites and produce a new set of data including the most useful spectral information to run satellite image processing. It was performed using selected types of data (two vegetation indices, topographic data and vegetation surface reflectance within the three bands of MODIS data). Analysis with PCA indicated that there is a relatively high correspondence between vegetation and soil of the total variance in the data set. The results showed that the use of the principal component analysis (PCA) with the selected variables showed a high difference, reflected in the variance and eigenvalues and it can be used for differentiation between different range sites.

Keywords : principal component analysis, PCA, rangeland sites, semi-arid areas, soil types

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