



Soil Management Units delimitation based on soil survey and multivariate techniques

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The aim of this study was to validate a methodology for delimitating soil management unit (DSMU) at farm scale using soil survey (SCALE 1:50.000), ancillary soil information, MULTISPAT-PCA and Euclidean distance analysis. DSMU was applied in 6 fields of 3 agricultural zones from Argentina. This study was carried out in three steps: (i) Zone delimitation by soil type using multivariate spatial classification of ancillary information (MULTISPATI-PCA) and fuzzy K-means (FKM); (ii) validation of zone delimited by soil type and (iii) determination of spatial relation among soil properties analyzed and those detailed in soil survey. Principal components (CPs) obtained from MULTISPATI-PCA showed higher spatial autocorrelation than those obtained from conventional analysis. In addition, MULTISPATI-PCA allowed identifying variables which had maximum spatial autocorrelation and that most contribute to global spatial variation. The number of zones by field was determined using summary index from FKM. The lowest summary index was selected by field. We delimited 3 zones by soil type in fields' zones 1 and 2, whereas in the other cases we delimited 2 zones. DSMU was capable to differentiate efficiently zones by soil type. Clay content, EC_{extr}, CIC and pH were properties more related to zone delimitation. Our results suggest that in zone 1 exist a spatial relation between zones delimited by soil type and Balcarce-Mar del Plata soil series. In zone 2 showed spatial correspondence among zones delimited and Canals and El Albion soil series. In zone 3, we could not find relation among zones delimited by field and soil survey information. In conclusion, DMSU proved to be an accurate methodology in 2 of 3 agricultural zones in Argentina. The soil degradative effect on fields of zone 3, may affect the application of DSMU.