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## 基于多源数据和模糊k-均值方法的农田土壤管理分区研究

Zoning of soil management based on multi-sources data and Fuzzy-k means

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中文摘要:

以近地传感器(EM38)快速获取的土壤表观电导率数据(ECa)、高分遥感影像提取的归一化植被指数(NDVI)和雷达影像提取的后向散射系数为数据源,以滨海滩涂区为研究对象,利用聚类法进行农田土壤管理分区研究。在对不同的数据源进行空间变异分析的基础上,结合滨海滩涂区土壤盐分的空间变异规律,利用非监督分法—模糊k-均值聚类方法进行特征相似性归类,划分不同的管理分区。结果表明,最佳的分区数目为3个。根据每一分区的特点,可以采取相应的管理措施进行土壤改良和农田精确管理。分区结果不但可以指导采样,而且可用于实施变量投入和精确施肥推荐,为样区大面积农田土壤管理提供科学的决策依据。

Abstract:

Soil apparent electrical conductivity (ECa) acquired by proximal sensor EM38, normalized difference vegetation (NDVI) extracted from high resolution remote sensing images and backscattering coefficient obtained from radar images were selected as the source data for farm field soil management zoning with the clustering method of the coastal saline soil for precision agriculture. So, based on spatial variability analysis of the data and the law for spatial variation of soil salinity in the area, zoning was done using the unsupervised classification method—fuzzy k-means cluster algorithm. Results show that the optimal number of zones was 3. In light of the characteristics of each zone, corresponding management practices should be adopted to ameliorate the soil and implement precision farmland management. The zoning is useful not only to guiding soil sampling, but also to recommendation of variable input and precision fertilization, and moreover, provides scientific basis for decision making in large-scale soil management.

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