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Application of digital soil mapping in traditional soil survey – an approach used for the production of the national soil map of the United Arab

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Abstract

Digital soil maps are essential part of the soil assessment framework which supports soil-related decisions and policy-making and therefore it is of crucial importance that they are of known quality. Digital soil mapping is perhaps the next great advancement in soil survey information. Traditional soil survey has always struggled with the collection of data. The amount of soil data and information required to justify the mapping product, how to interpolate date to similar areas, and how to incorporate older data are all challenges that need further exploration. The present study used digital soil mapping to develop a generalized national soil map of the United Arab Emirates with available recent traditional soil survey of Abu Dhabi Emirate (2006-2009) and Northern Emirates (2010-2012), together with limited data from Dubai Emirate, an important part of the country. The map was developed by joining, generalizing, and correlating the information contained in the Soil Survey of Abu Dhabi Emirate, the Soil map of Dubai with limited data, and the Soil Survey of the Northern Emirates. Because the soil surveys were completed at different times and with different standards and procedures, the original map lines and soil classifications had to be modified in order to integrate the three original maps and legends into this single national level map.

The Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) Global Digital Elevation Model (GDEM) version 2 was used to guide line placement of the map units. It was especially helpful for the Torripsamments units which are separated based on local landscape relief characteristics. A generalized soil map of the United Arab Emirates is produced, which consists of fifteen map units, twelve are named for the soil great group that dominants each unit. Three are named “Rock outcrop”, “Mountains”, or “Miscellaneous units”. Statistical details are also presented. Soil great groups are appropriate taxa to use for soil classification at a small scale, such as this national map. The map unit descriptions provide information about the general range of important soil properties of the soil great group. The overall extent of each soil map unit in the United Arab Emirates is presented, as well as the percentage of the map unit that occurs within each emirate. The general soil map provides an overview of the kinds of soils making up the United Arab Emirates and their general location.