Geophysical Investigation of a Microplaya Landscape of the Desert Southwest, USA

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**ABSTRACT**

Microplayas are common, small depressions (50 to 200 m in diameter) that form islands of hydrologically enhanced biota in the otherwise moisture-limited Chihuahuan desert of the southwestern USA. Microplayas are of interest to ecologists because their dense vegetation results in higher net primary production and to hydrologists because they may be locations of increased aquifer recharge. Although the formation of these features is expected to be related to subsurface accumulations of cemented CaCO3 (soil petrocalcic horizons) the exact mechanisms that create and persist these microplayas are unknown.

In this work, we investigate a microplaya and the surrounding landscape with electrical resistivity (ER), electromagnetic (EM), and soil profile descriptions in an effort to understand subsurface variability. The ER showed that fine-grained clayey soils exist within the microplaya but appeared to be limited to about 3-5 m depth and extended about 90m across. Beneath the microplaya was a discontinuous layer of highly resistive soils that likely formed an impeding surface of petrocalcic origin. Where absent, the resistivity values suggest sandier soils. The EM data revealed that the most conductive material was bound to the microplaya but isolated pockets of moderate conductivity were observed in the dunes which is likely related to exposed subsurface horizons of clay accumulation. Work is on-going, but initial soil profiles were excavated, described, and analyzed to confirm some of our findings.