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# Are catenas relevant to soil maps and pedology in Iowa in the twenty-first century?

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The modern intensity of agriculture brings to question whether anthropogenic impacts on soil profiles and catenas in agricultural areas are minor or dominant pedogenic influences. Answering this question is crucial to evaluating the modern relevance of historic soil maps, which use the traditional catena model as their foundation. This study quantifies the magnitude of change within the soil profile and across the landscape that result from decadal scale agriculture. Four benchmark catenas located on the Des Moines Lobe in Iowa, USA, were re-examined to determine the changes that occurred in the soils over the intervening years. The first site was initially studied by Walker and Ruhe in the mid 1960's. Burras and Scholtes initially examined the second catena in the early 1980's, while the remaining two catenas were first studied in the early 1990's by Steinwand and Fenton, and the late 1990's by Konen. Thus, the catenas were re-sampled for this study roughly 50, 30, 20, and 15 years, respectively, after the initial study. In this part of Iowa, continuous row crop agriculture (primarily Zea mays and Glycine max) and extensive subsurface drainage are very common. All study sites are closed-basin catenas located within 40 km of each other with a parent material of Late Wisconsinan glacial till. Soil cores to a depth of approximately two meters were taken with a truck mounted Giddings hydraulic soil sampler at 27 to 30 meter intervals along one transect for each of the four catenas, resulting in a total of forty-eight cores. The soil cores were then brought to the laboratory where soil descriptions and laboratory analyses are being completed. Soil descriptions include information about horizon type and depth, Munsell color, texture, rock fragments, structure, consistence, clay films, roots, pores, presence of carbonates, and redoximorphic features. Laboratory analyses include bulk density, particle size, total carbon and nitrogen content, cation exchange capacity, stable aggregate content, and pH. The resulting data is being analyzed and compared to historic data and models of pedogenesis. Preliminary and anticipated results indicate that soil properties such as bulk density, pH, geometric mean particle size, structure, A-horizon thickness, carbon distribution, depth to carbonates, and redoximorphic features have been altered by agricultural land use over the past 50 years. This indicates that anthropogenic impacts due to agriculture are a significant pedogenic influence, which is decreasing the scientific value of historic soil maps.