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Global change has created a large subsoil carbon sink the U.S. Corn Belt

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Using long-term observations and experiments, we show that subsoils in the north central United States are a large modern organic carbon sink (~400 kg C ha^{-1} y^{-1}). In this region, which is dominated by arable lands, the strongest signal of global change is a wetter environment. Precipitation amount and intensity have increased while atmospheric vapor pressure deficit has decreased. At the same time, this region has experienced a number of changes in agroecosystem properties and management; agroecosystems have become less diverse and total crop residue inputs to the soil have increased (>100%) due to large increases in crop yield. We used repeated measurements from two independent long-term (>40 years) cropping systems experiments to reject hypotheses that changes in cropping systems diversity and increases in crop residue input can explain the observed increase in subsoil carbon. In contrast, we used regional observations in climate to demonstrate that an increasingly wet environment is coincident with an increase in subsoil moisture content to a level that would inhibit soil carbon mineralization. As a result, we attribute the subsoil carbon sink to a wetter environment that has led to lower subsoil carbon outputs via microbial mineralization.