Soils as Storage for Atmospheric Carbon Dioxide

The map above shows the concentration of calcium carbonate in the soils of Nebraska. Calcium carbonate (CaCO₃), like soil organic matter, stores carbon dioxide from the atmosphere. This is important because excess carbon dioxide is a major driver for climate change. In soils in dry climates, calcium carbonate forms naturally as white clusters of small crystals in subsoil horizons (photos).

Carbon in the form of soil CaCO₃ is the second largest pool of terrestrial carbon. It even exceeds the amount of carbon in all of Earth’s land plants (graph). In the past, research has focused on using no-till agriculture and other management techniques to remove excess carbon dioxide from the air and store it in soils as organic matter. Currently, research includes how to remove excess carbon from the atmosphere and store it in soils as CaCO₃. This research involves understanding pH, root respiration, soil moisture, and the availability of calcium weathered from silicate minerals. Data on these soil properties are available from databases at the National Soil Survey Center. This map of Nebraska’s carbonate soils was produced using these databases, which are the largest soil databases in the world.