

# Caliche Encyclopedia Article

## Caliche

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# Caliche

Caliche and calcrete are obsolete terms for well-developed calcic horizons that are common to soils in arid and semi-arid areas, and which are now known to **soil** scientists and geomorphologists as Bk or K horizons. Caliche is also a colloquial term that has many different uses among miners in Spanish speaking countries.

Calcic horizons form by the gradual **precipitation** of calcium carbonate ( $\text{CaCO}_3$ ) and, to a lesser extent, magnesium carbonate ( $\text{MgCO}_3$ ) within the B horizon of a soil and follow several well-documented stages of development ranging from I to VI. Stage I calcic soil horizons consist of partial carbonate coatings over the bottoms of gravel particles in the B horizons of coarse grained soils and thin carbonate filaments in the B horizons of fine grained soils. By stage III, carbonate is continuous throughout the zone of accumulation, and the zone of carbonate accumulation is known as the K horizon. Stages IV through VI are characterized by complete carbonate cementation of the former soil and, ultimately, brecciation. These most highly developed calcic horizons are sometimes referred to as petrocalcic because of their rock-like nature, and often form cap rocks atop bluffs and escarpments in arid to semi-arid regions such as the southwestern United States.

The primary source of carbonate in calcic soils is atmospheric, both as carbonate rich dust and rainwater that percolates through the soils carrying dissolved bicarbonate ions. In rare cases, calcic horizons can be formed by other processes such as the upward wicking of carbonate-rich **water** from shallow water tables. Gypsic or halic soils are formed in arid environments when **gypsum** ( $\text{CaSO}_4 \cdot \text{H}_2\text{O}$ ) or halite ( $\text{NaCl}$ ) are precipitated instead of carbonates.

Rates of soil development are controlled by many factors, so universal conclusions about the time required to form calcic soil horizons cannot be drawn. Studies in southern New Mexico have shown, however, that Stage I calcic soils can be hundreds to thousands of years old, Stage II calcic soils can be thousands to tens of thousands of years old, and Stage III and higher calcic soils can be tens to hundreds of thousands of years old.

## See Also

Breccia; Desert and Desertification; Limestone; Soil and Soil Horizons