

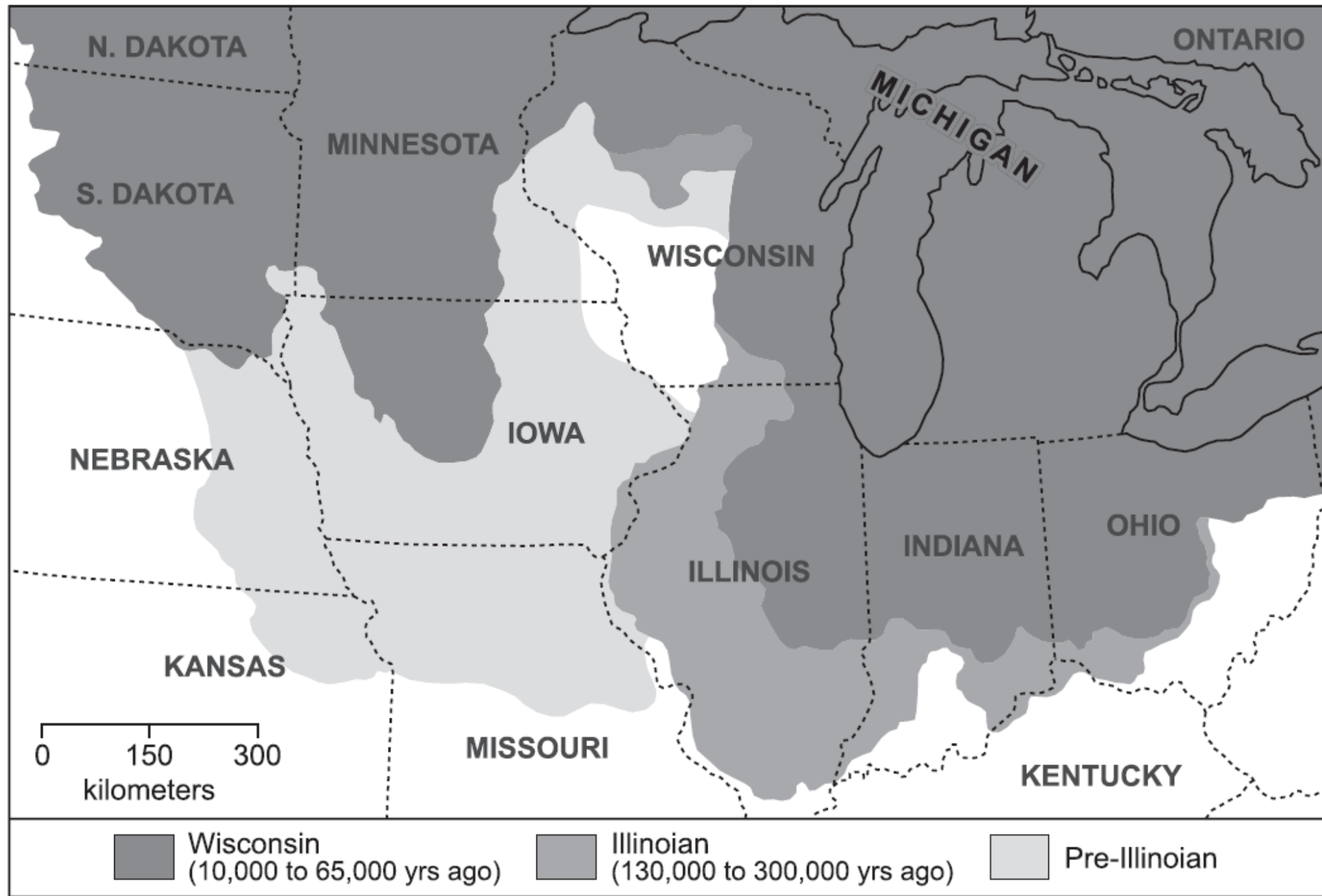
Robert V. Ruhe

**Geologist: Stratigraphy and soil
geomorphology**

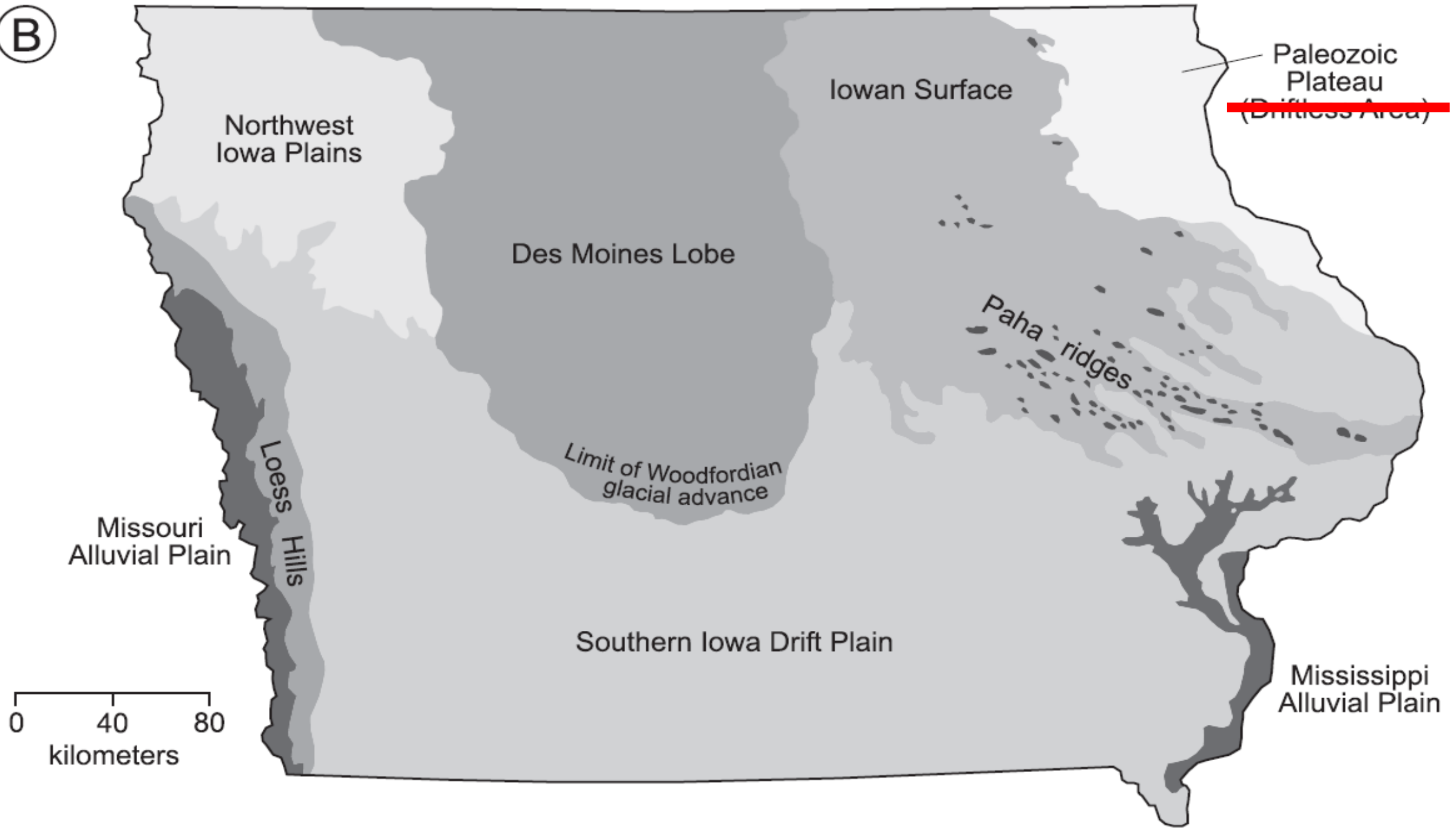
**Landscape Evolution and
Paleosols**



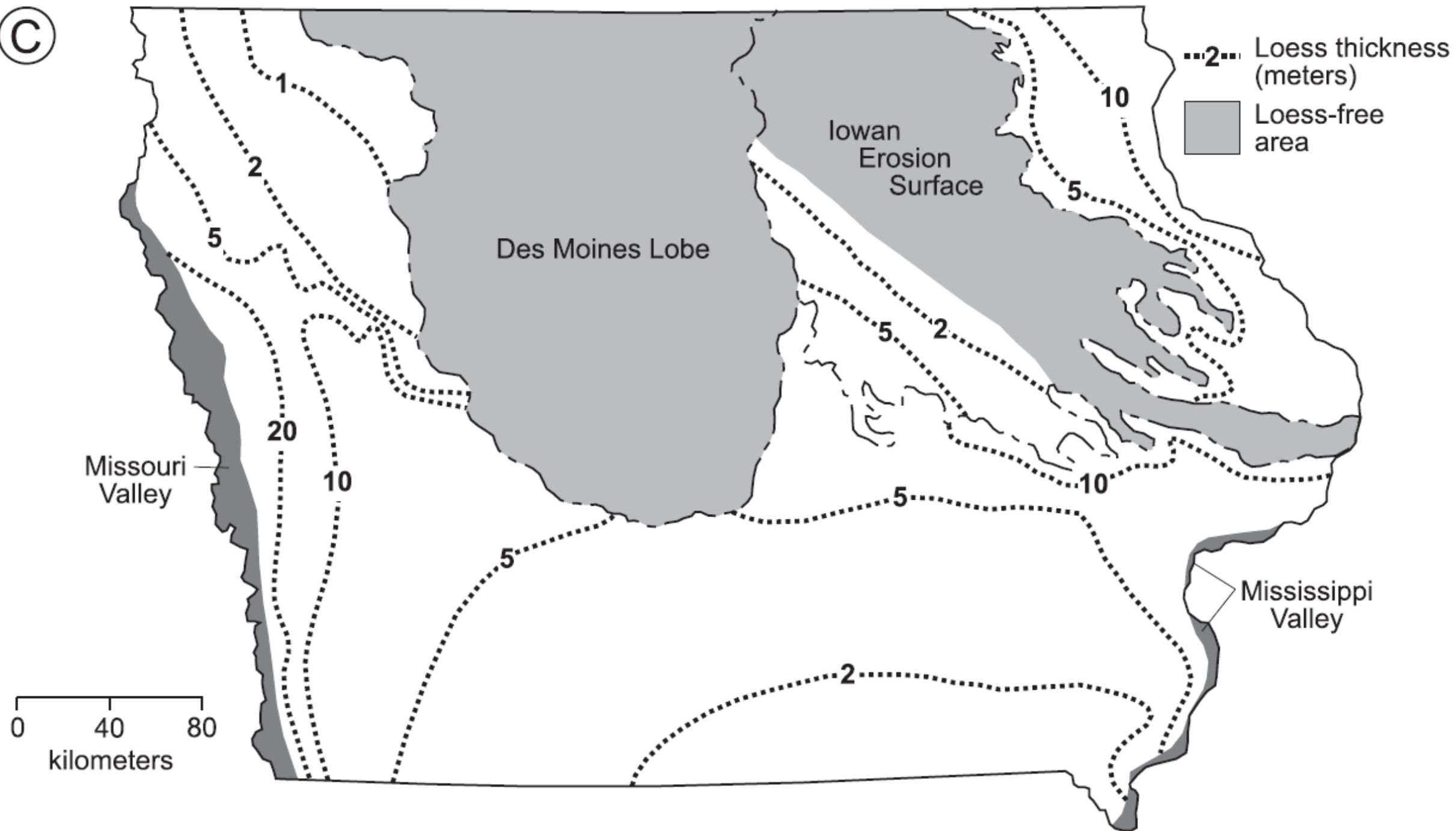
Robert Ruhe's work in Iowa



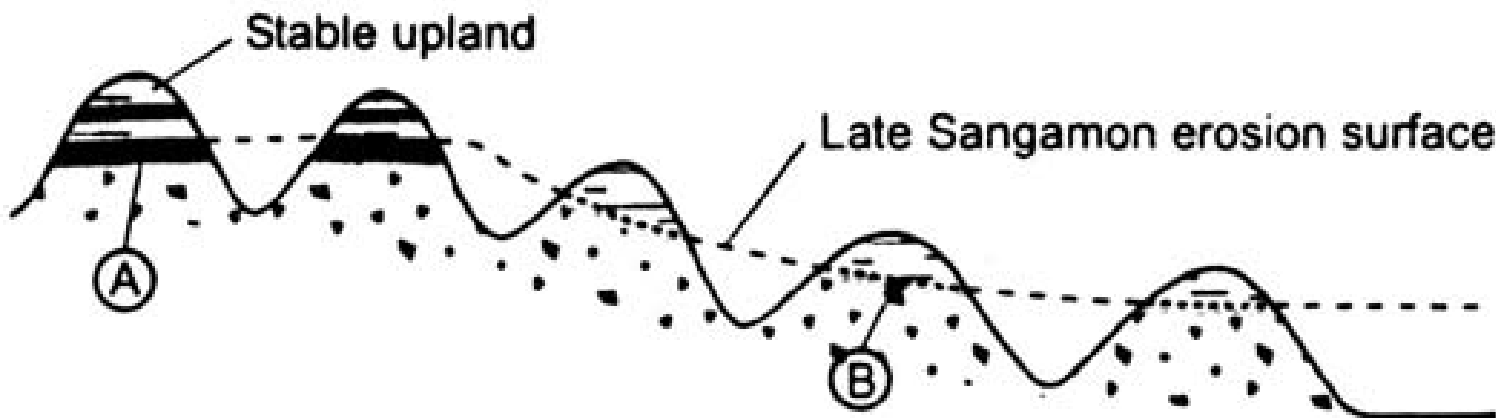
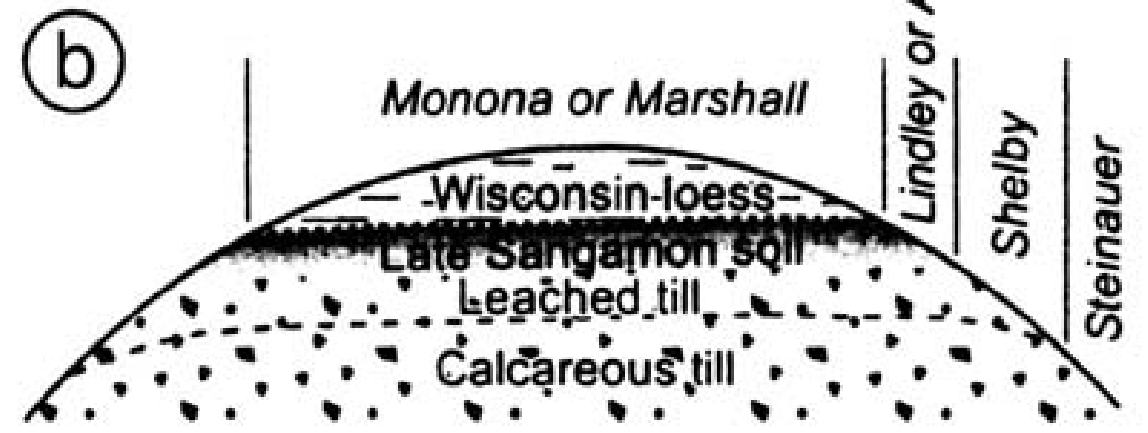
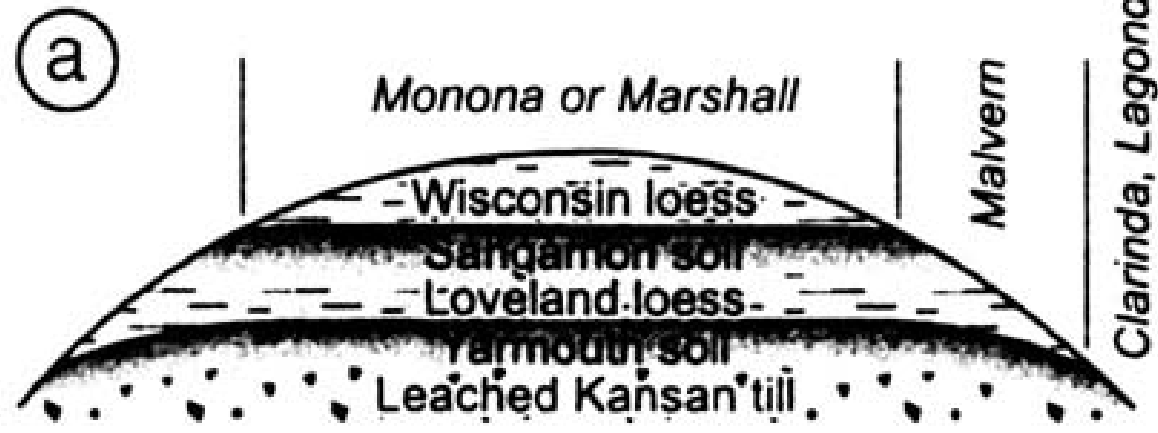
B



C



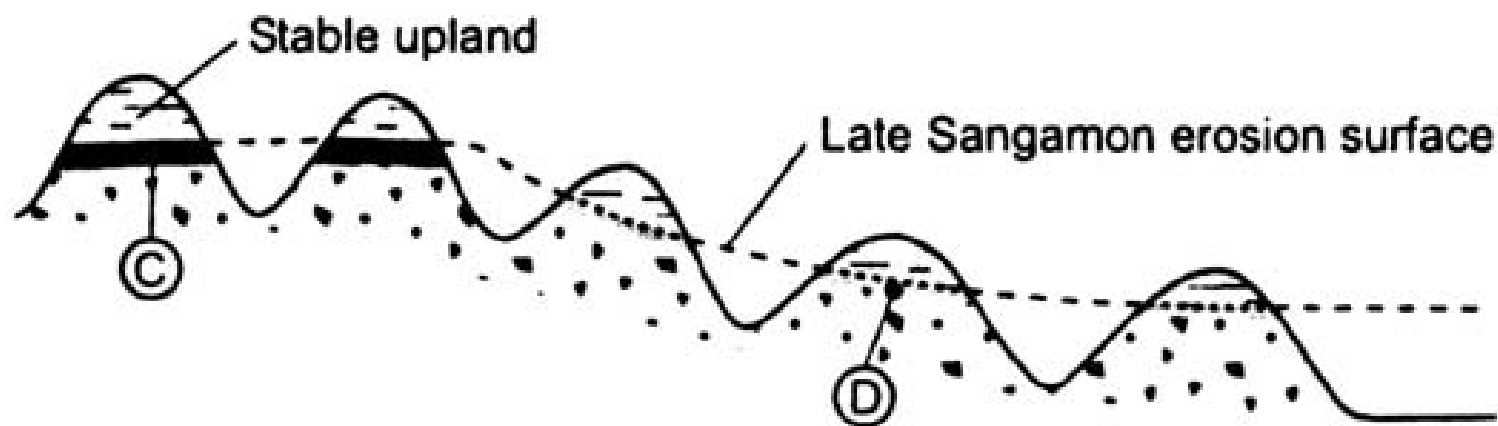
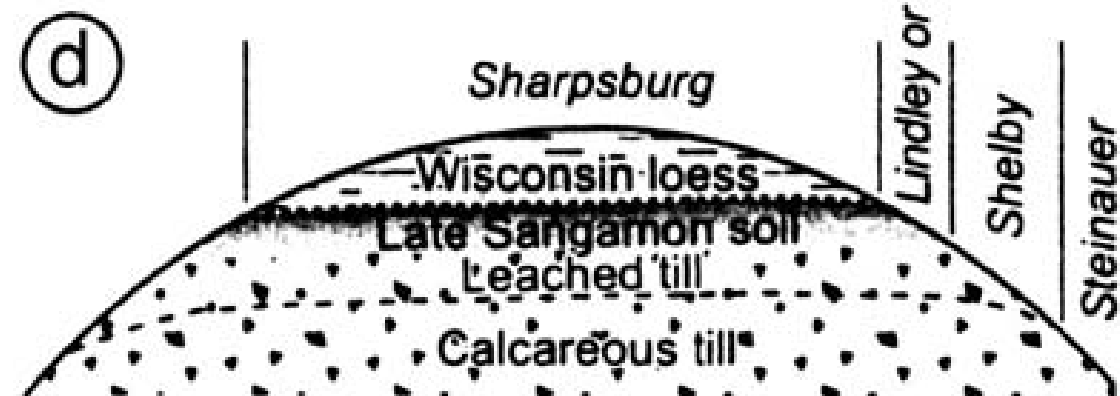
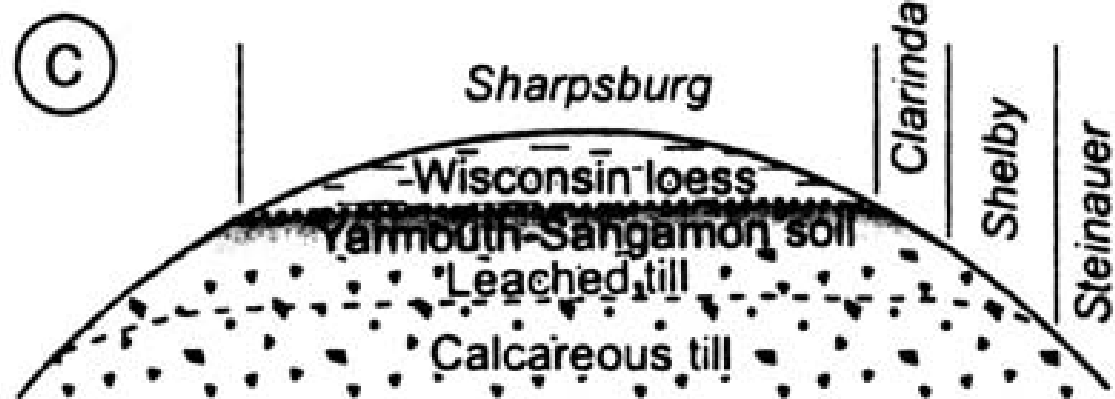
Near loess source areas



Geomorphic sequence

- Yarmouth soil formation on stable landscape
- Deposition of Loveland loess
- Sangamon soil formation on stable landscape
- Late Sangamon pedimentation and soil genesis
- Early Wisconsin dissection, loess deposition and soil genesis
- Late Wisconsin and Holocene slope beveling and soil genesis

Far from loess source areas

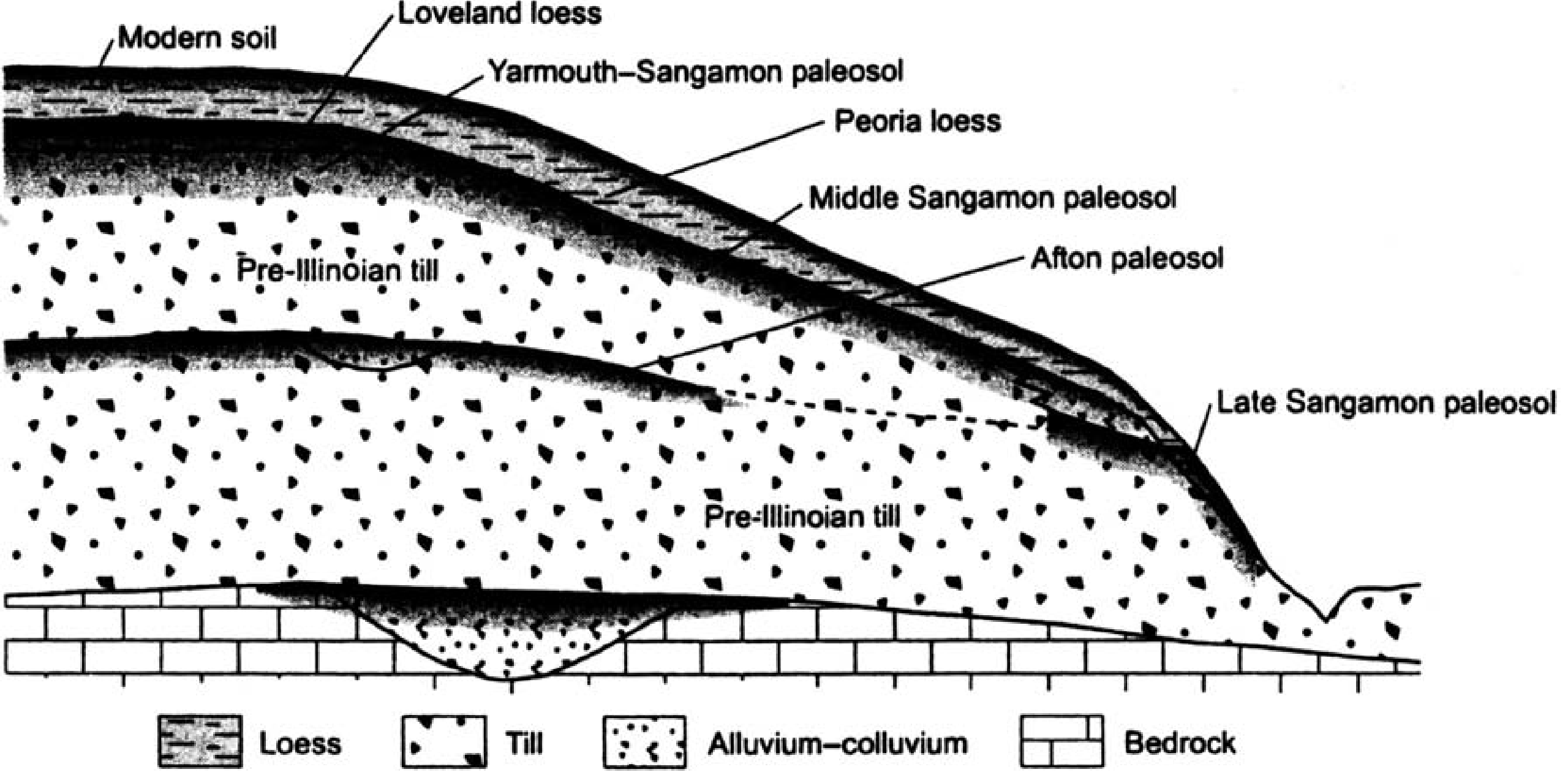


Geomorphic sequence

- Yarmouth-Sangamon soil formation on stable landscape
- Late Sangamon pedimentation and soil genesis
- Early Wisconsin dissection, loess deposition and soil genesis
- Late Wisconsin and Holocene slope beveling and soil genesis

Polygenetic Paleosol / Welded Paleosol/ Palimpsest

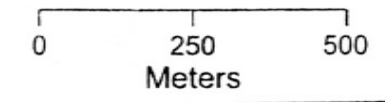
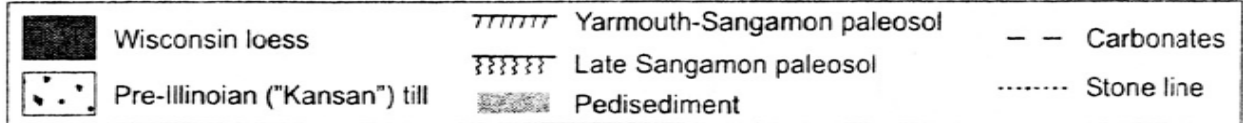
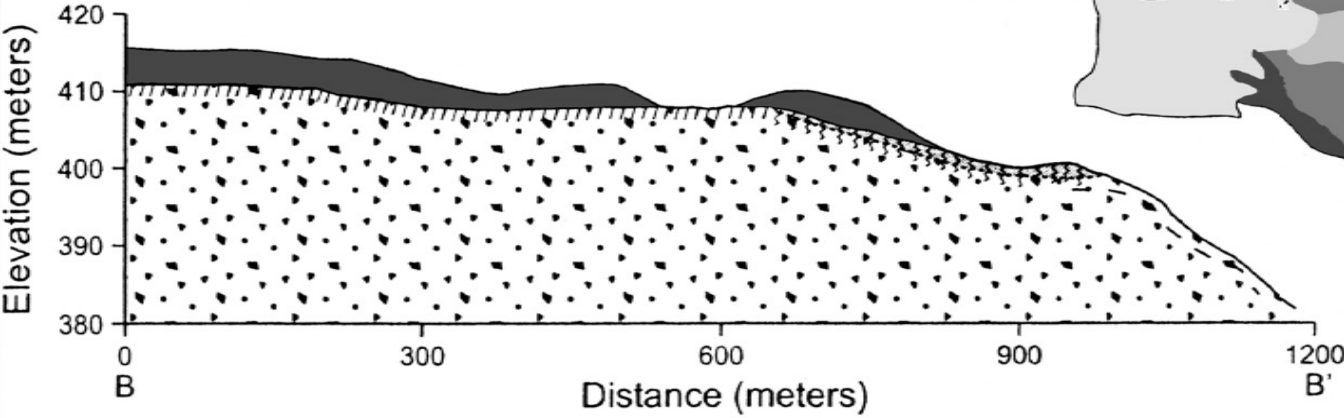
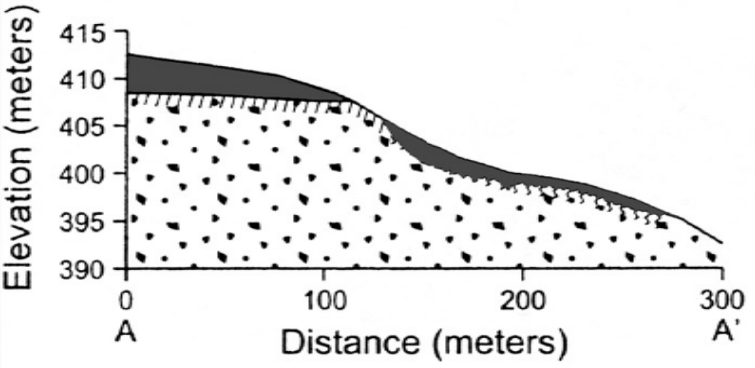
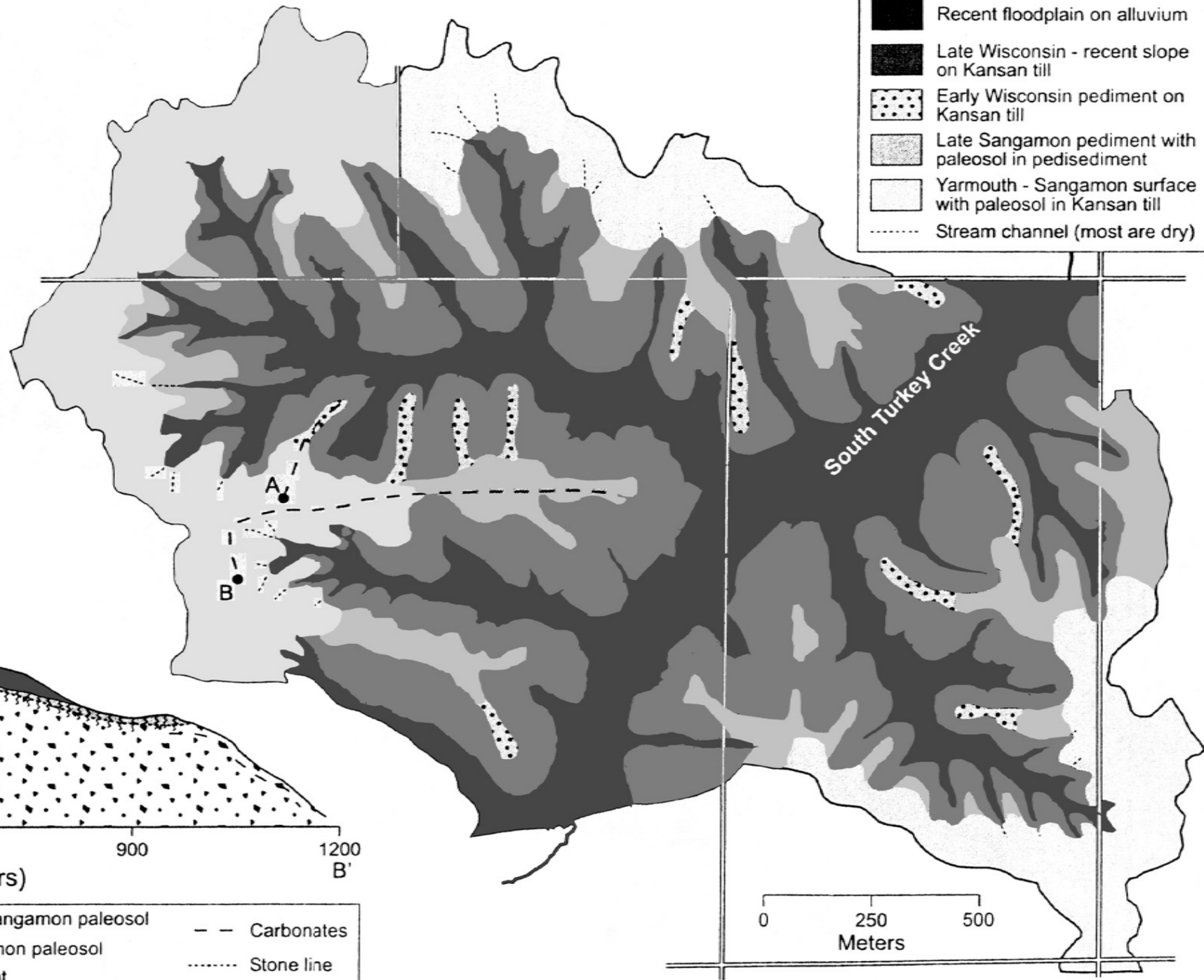
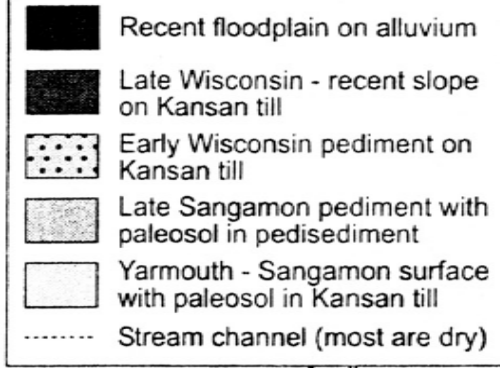
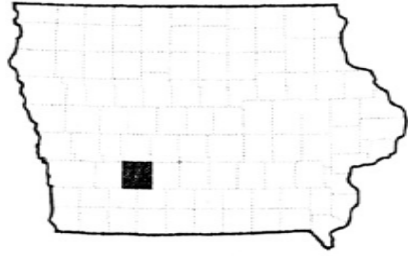
- Geosol = buried soil of an unknown time
- Paleosol = buried soil of a known time
- Welded soil , extensive pedogenic (CLORPT) processes extend downward AND begins 'connecting' to an underlying paleosol

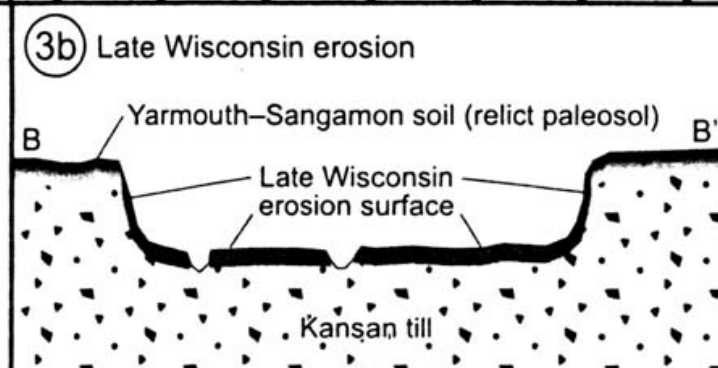
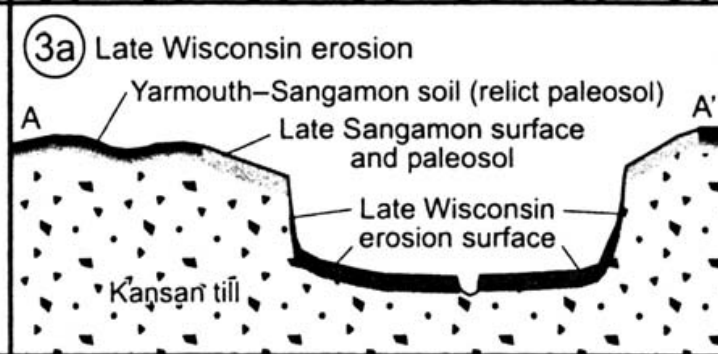
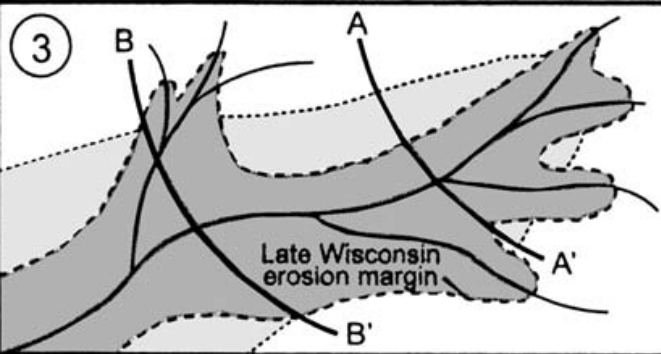
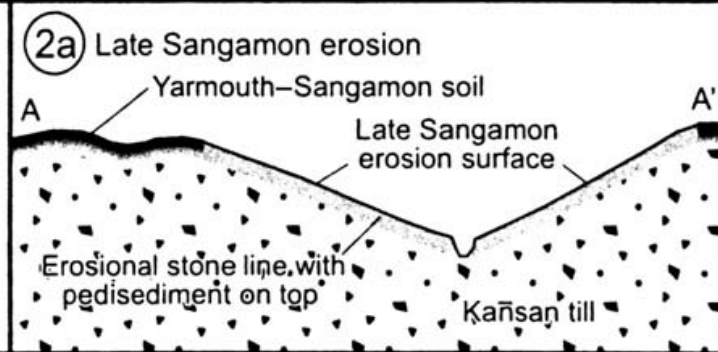
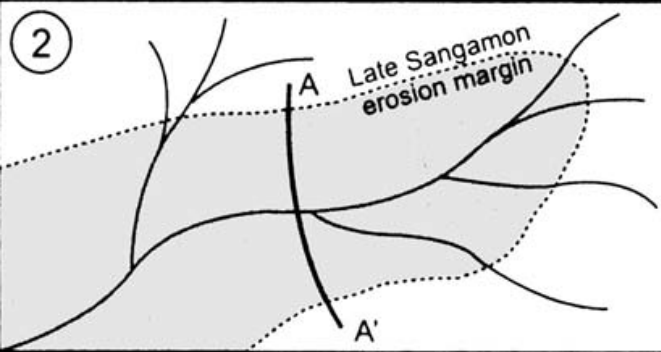
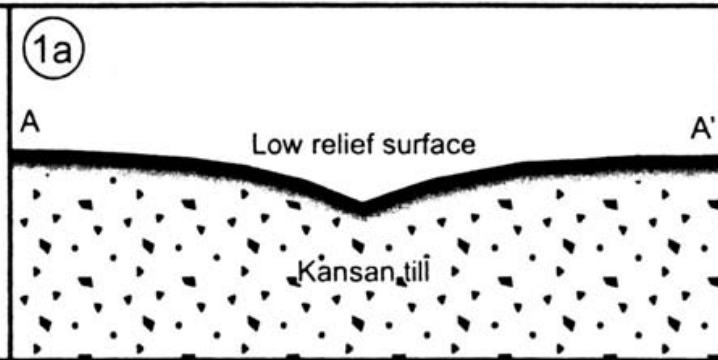
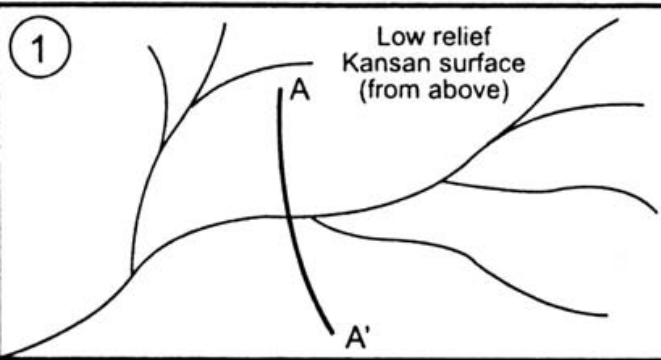


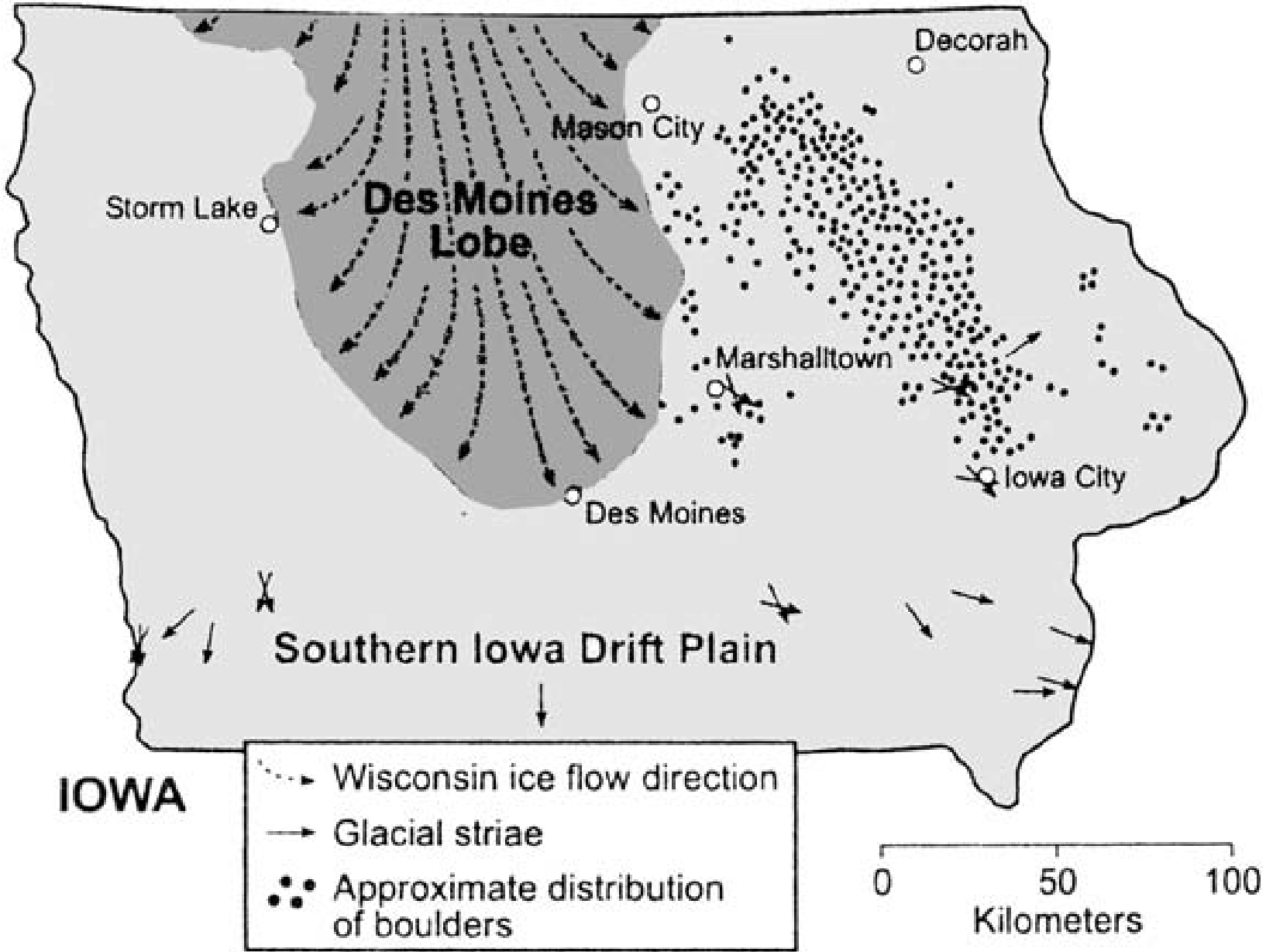
Southern Iowa

- Ruhe was the 1st to identify Southern Iowa's stepped erosion surface.

South Turkey Creek Area Adair County, Iowa







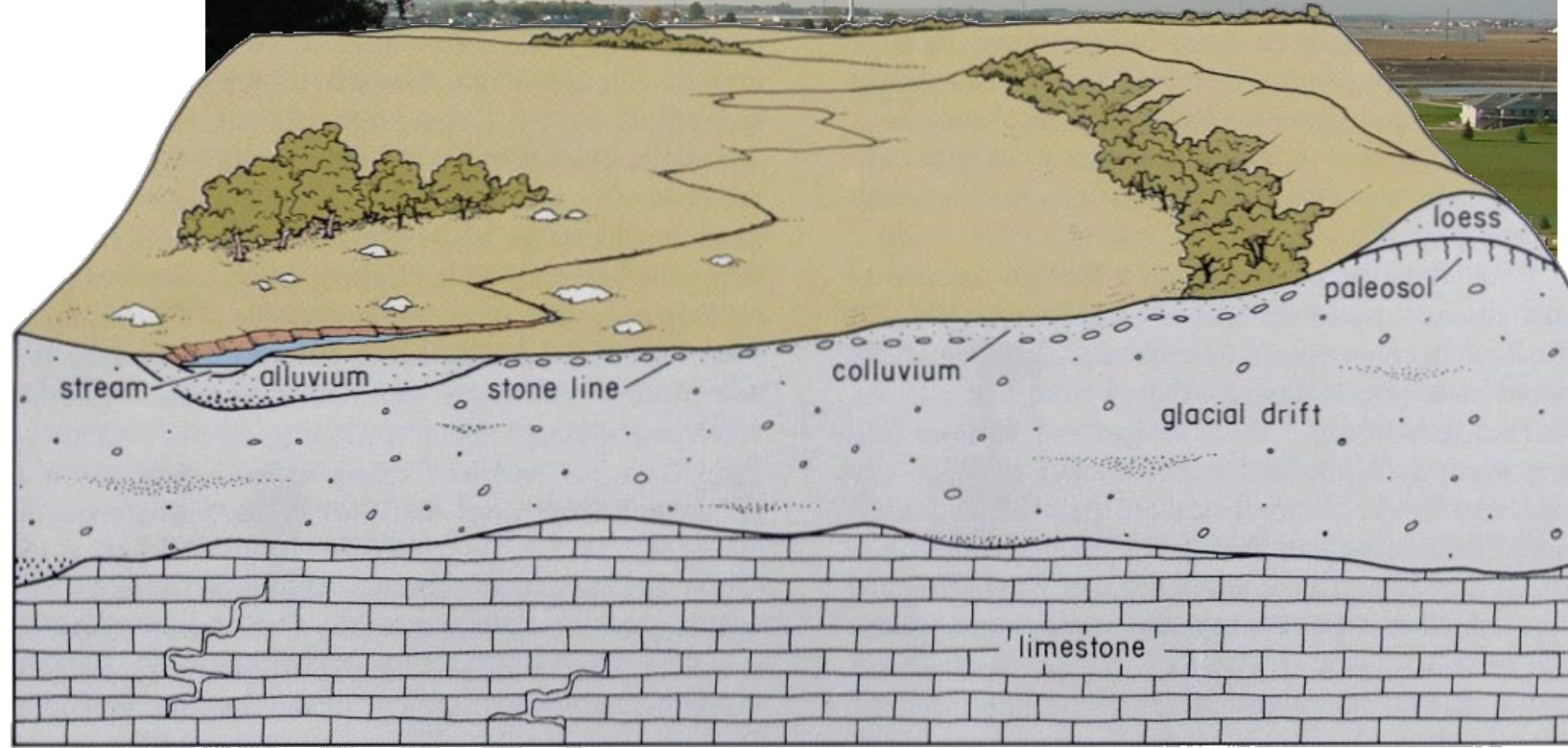
Iowa **Erosion** Surface



lowan Surface



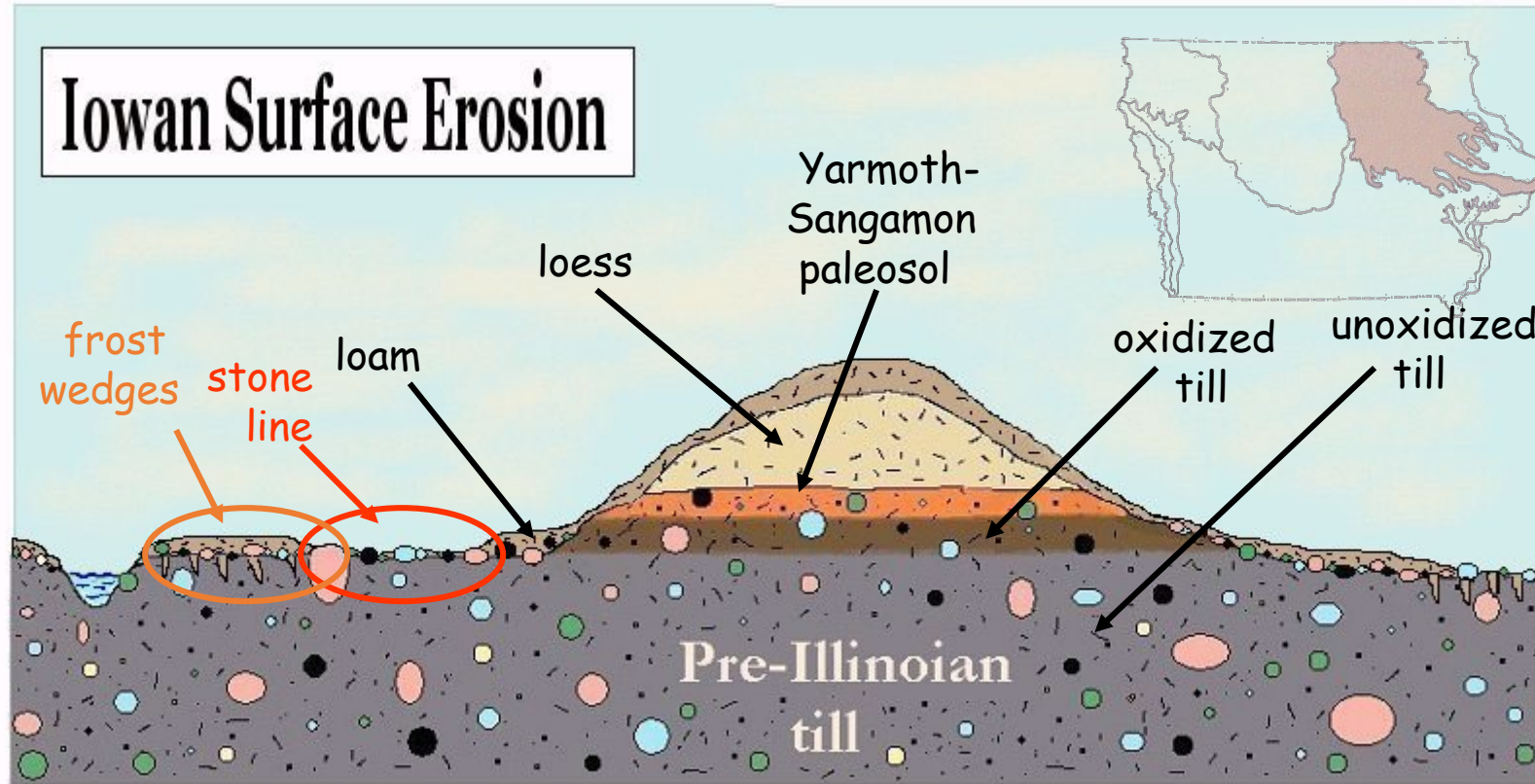
photo by Ray Anderson



Terrain Characteristics

- * gently rolling terrain
- * thin, discontinuous loess or loam over glacial drift
- * bedrock near surface
- * local karst conditions
- * scattered glacial boulders
- * integrated drainage network
- * isolated elongate hills (paha)

Formation of the Iowan Surface 16,500 – 21,000 ybp



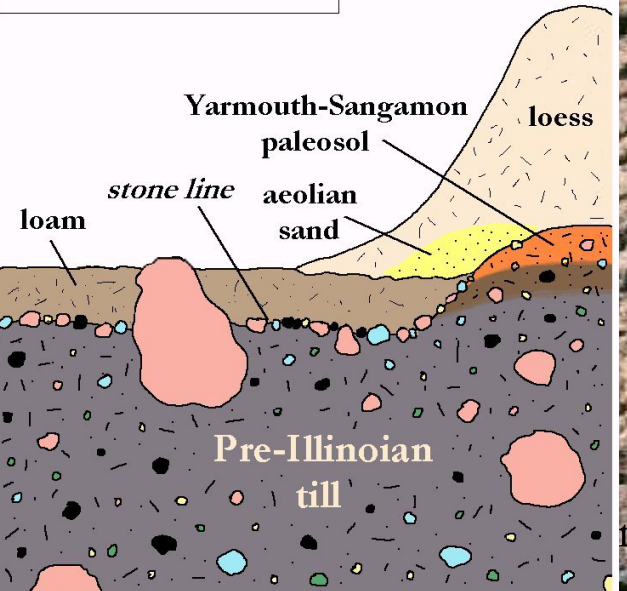
thin, discontinuous loess or loam over glacial drift

loam →

stone line →

PreIllinoian
till

Iowan Surface

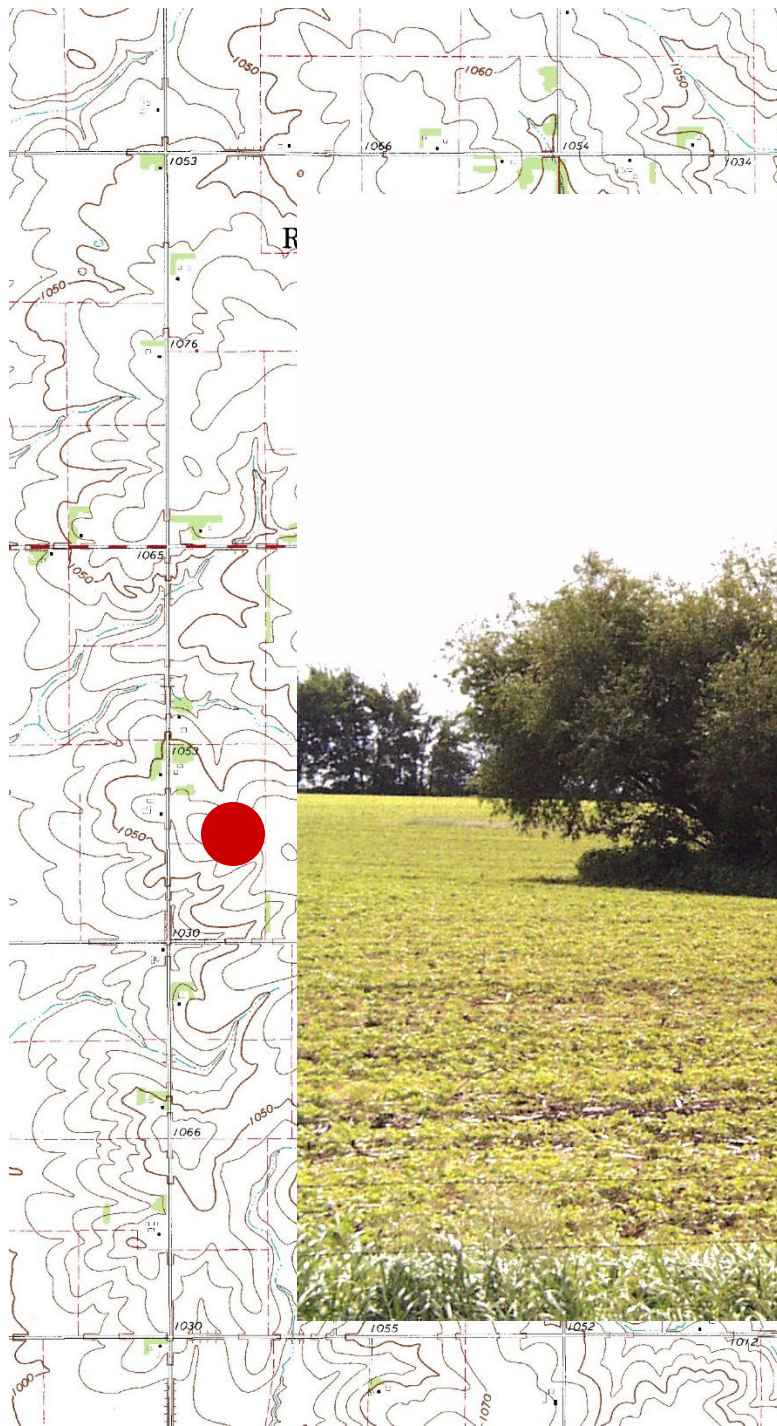


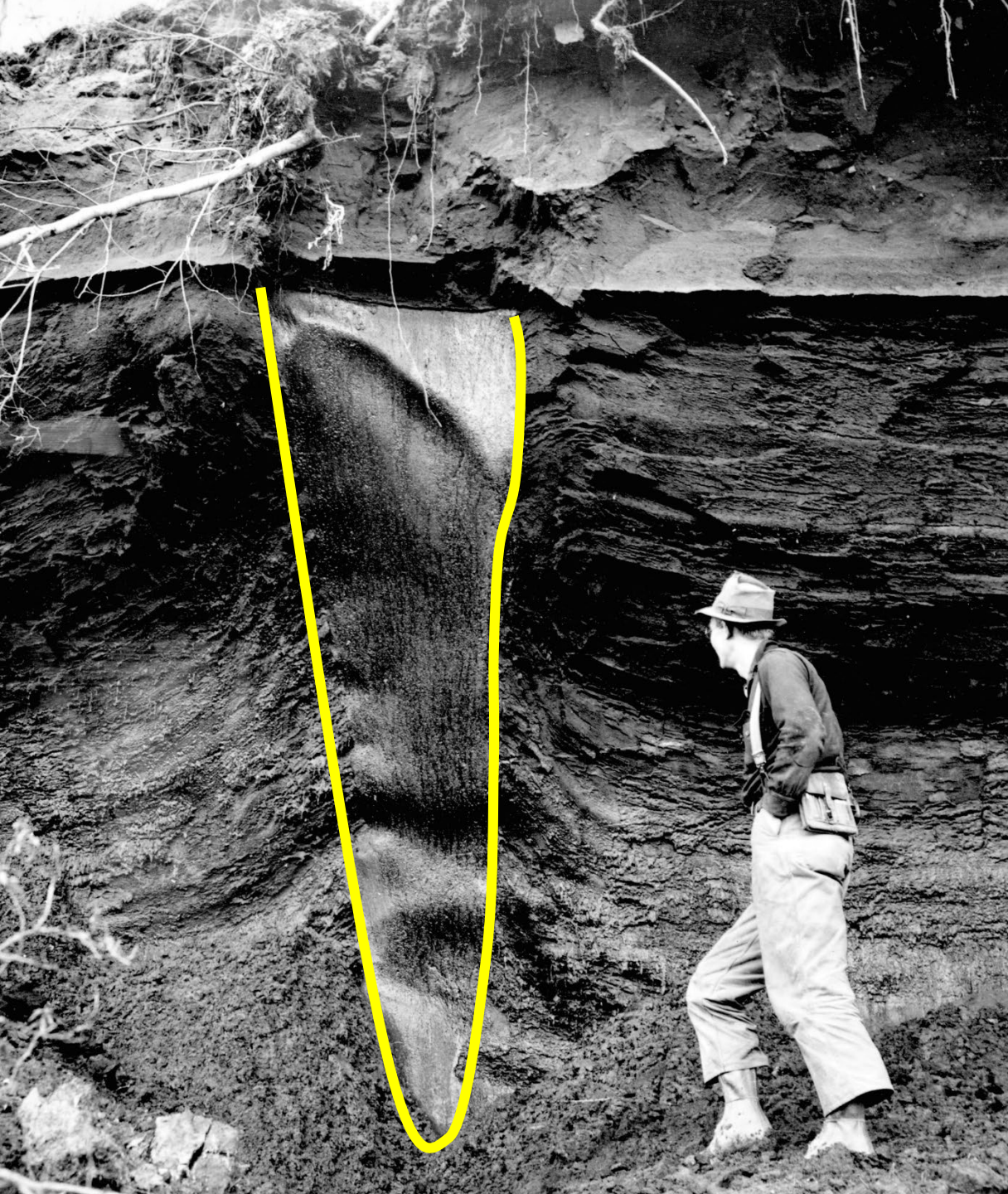
Iowan Surface soil profile in south Cedar Falls photo by Jim Walters



**scattered
glacial boulders**

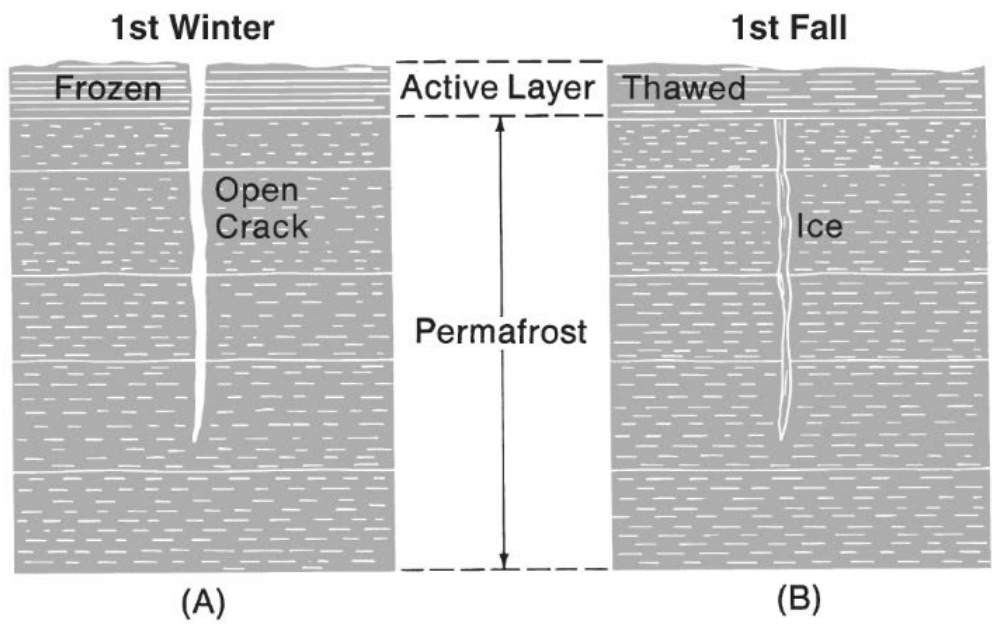






Permafrost

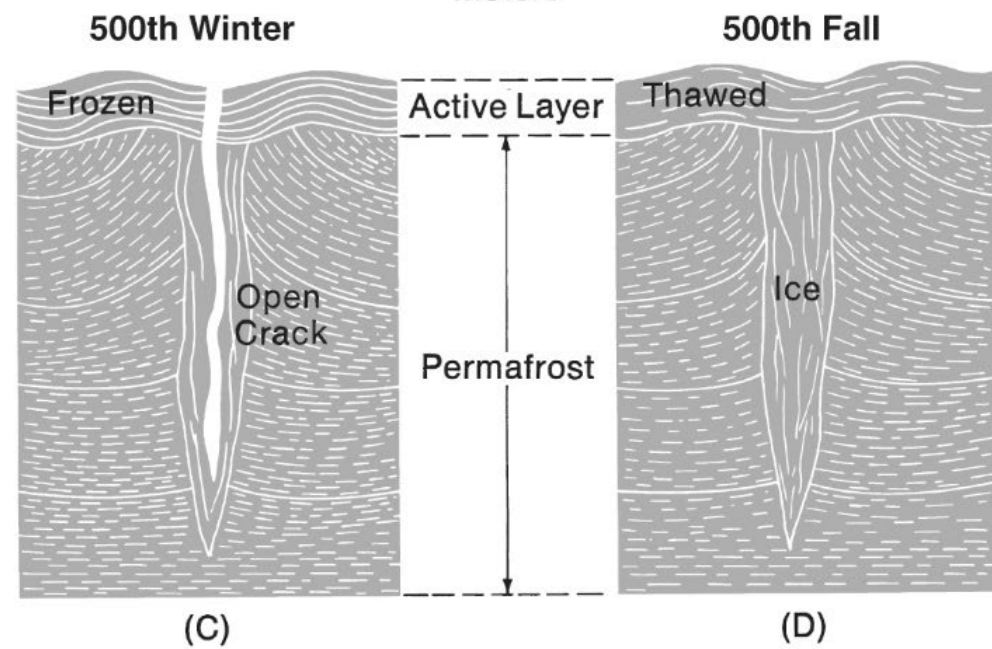
Or **cryotic soil** is at or below the freezing point of water $0\text{ }^{\circ}\text{C}$ ($32\text{ }^{\circ}\text{F}$) for two or more years. Most permafrost is located in high [latitudes](#) (i.e. land close to the North and South poles), but **alpine permafrost** may exist at high [altitudes](#) in much lower latitudes



(A)

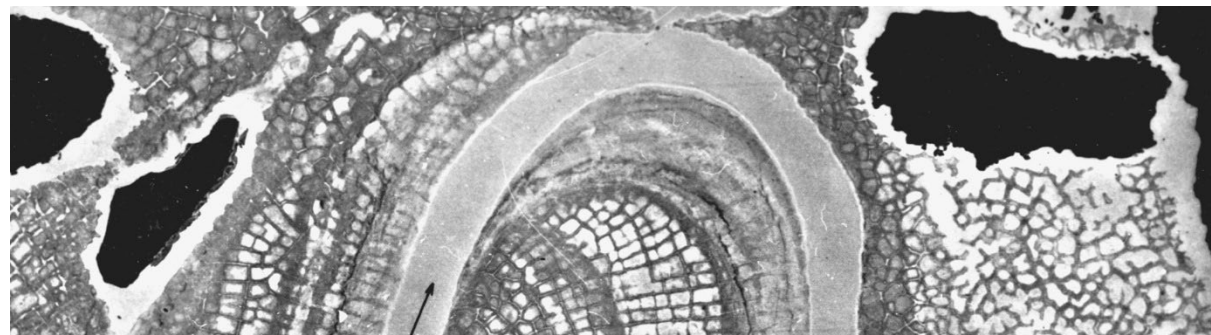
(B)

0 2
meters



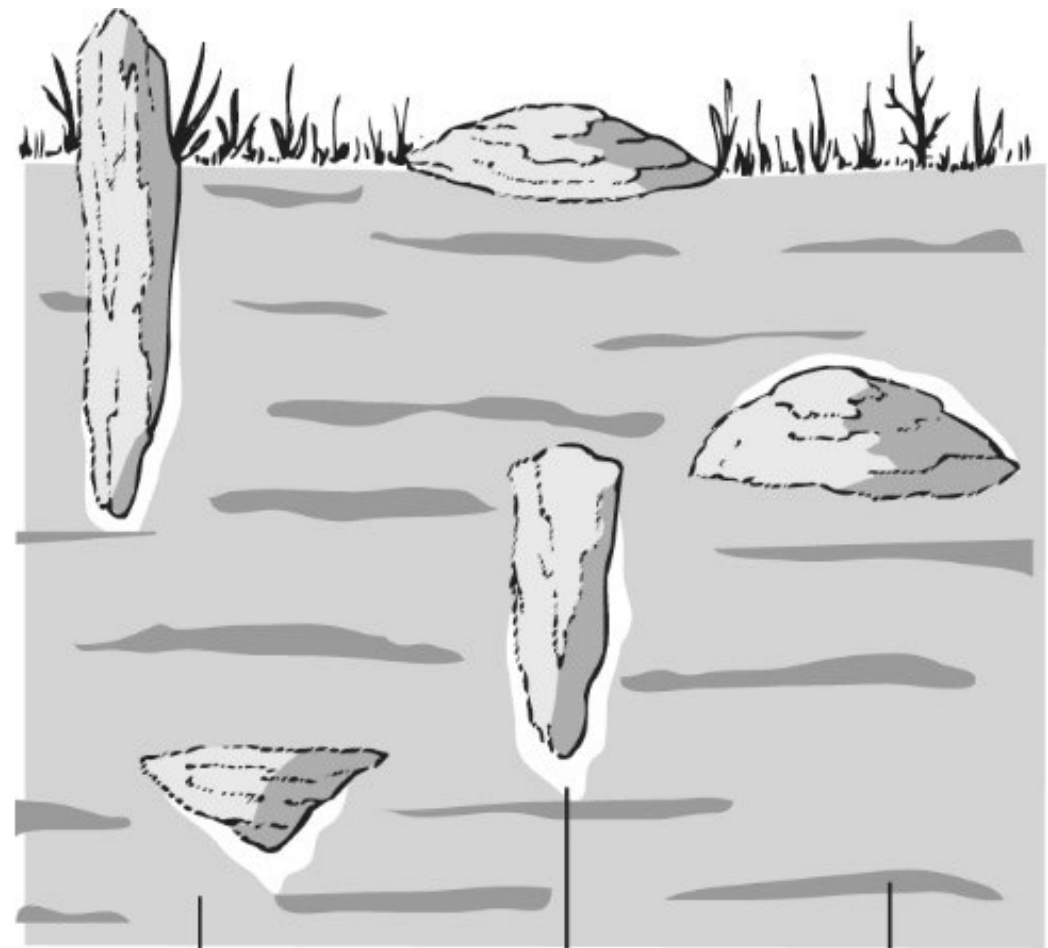
(C)

(D)





Frost Sorting



S = frozen silt

V = voids

I = ice layers

Low relief = low exposure = hard to observe

- Extensive drilling, soil geomorphology, paleosols and chronology lead to current interpretations
- lowan Drift Surface vs. lowan Erosion Surface

