KARST PROCESSES

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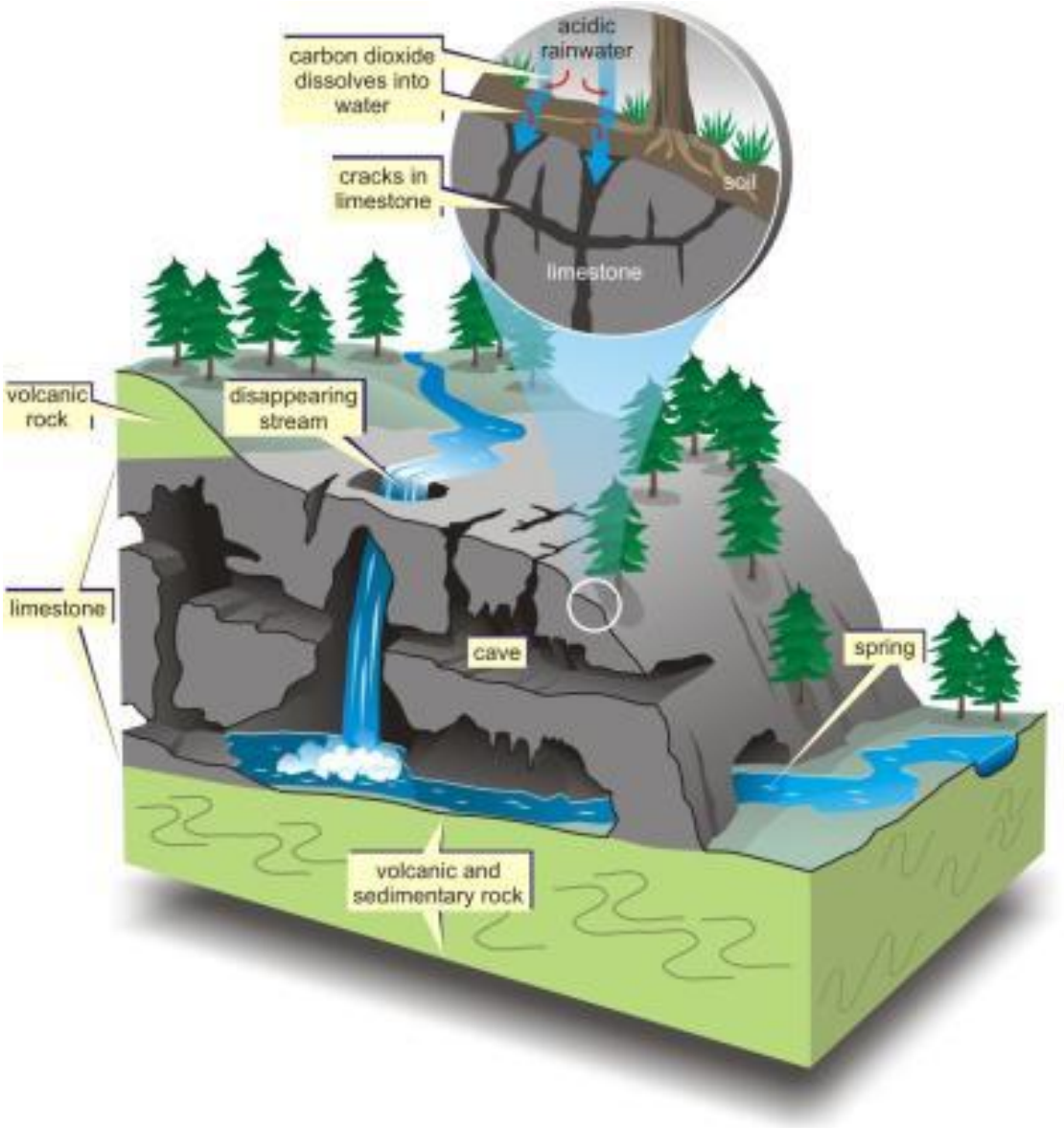
Karst evolution depends particularly on the time available for process evolution and on the **geographical** and **geological** conditions of the exposure of the rock. The longer the time, the higher the **hydraulic gradient** and the larger the amount of solvent water entering the karst system, the more evolved is the karst. In general, stratigraphic discontinuities directly influence the intensity and extent of **karstification**. Unconformities influence the stratigraphy of the karst through the time-span that is available for **subaerial processes**. The end of karstification can also be viewed from various perspectives. The definite end occurs at the moment when the host rock, together with its karst phenomena, has completely been **eroded/denuded**. Karst forms of individual evolution stages (cycles) can also be destroyed by **erosion, denudation** and **abrasion** without the necessity of the destruction of the whole succession of karst rocks. Temporary and/or final interruption of the karstification process can be caused by the "**fossilisation**" of the existing karst phenomena due to loss of hydrological activity. The shorter the **time** available for karstification, the greater is the likelihood that karst phenomena are preserved in the stratigraphic record. While products of short-lived karstification on shallow carbonate platforms can be preserved by **deposition** during a immediately succeeding sea-level rise, products of more pronounced karstification can be destroyed by various geomorphological processes.

Karst are defined as terrain with distinctive characteristics of relief and drainage arising primarily from a higher degree of rock solubility in natural water than is found elsewhere.



Resisting Framework

Lithology - Limestones show great variability due to their formation.

- A limestone is a rock containing at least 50% carbonate mineral.

- The two most common carbonate minerals in limestone are a low magnesium (1-4%) calcite and dolomite.

- The purer the limestone is with respect to calcite, the greater tendency to form karst.

- Dolomites and evaporites such as gypsum and halite are also prone to karstification.

Porosity and Permeability

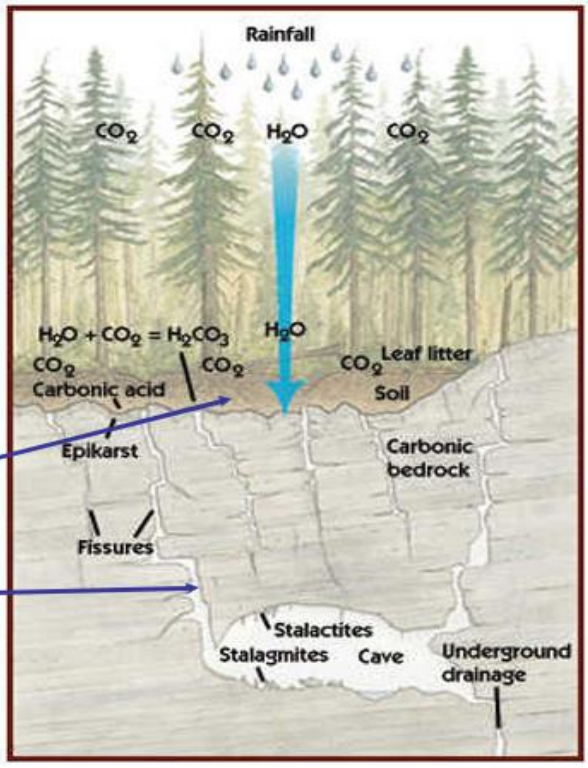
$P=(V_V/V)X100$

where P is porosity,

V_v is volume of voids, and V is total volume of material

Two types of porosity:

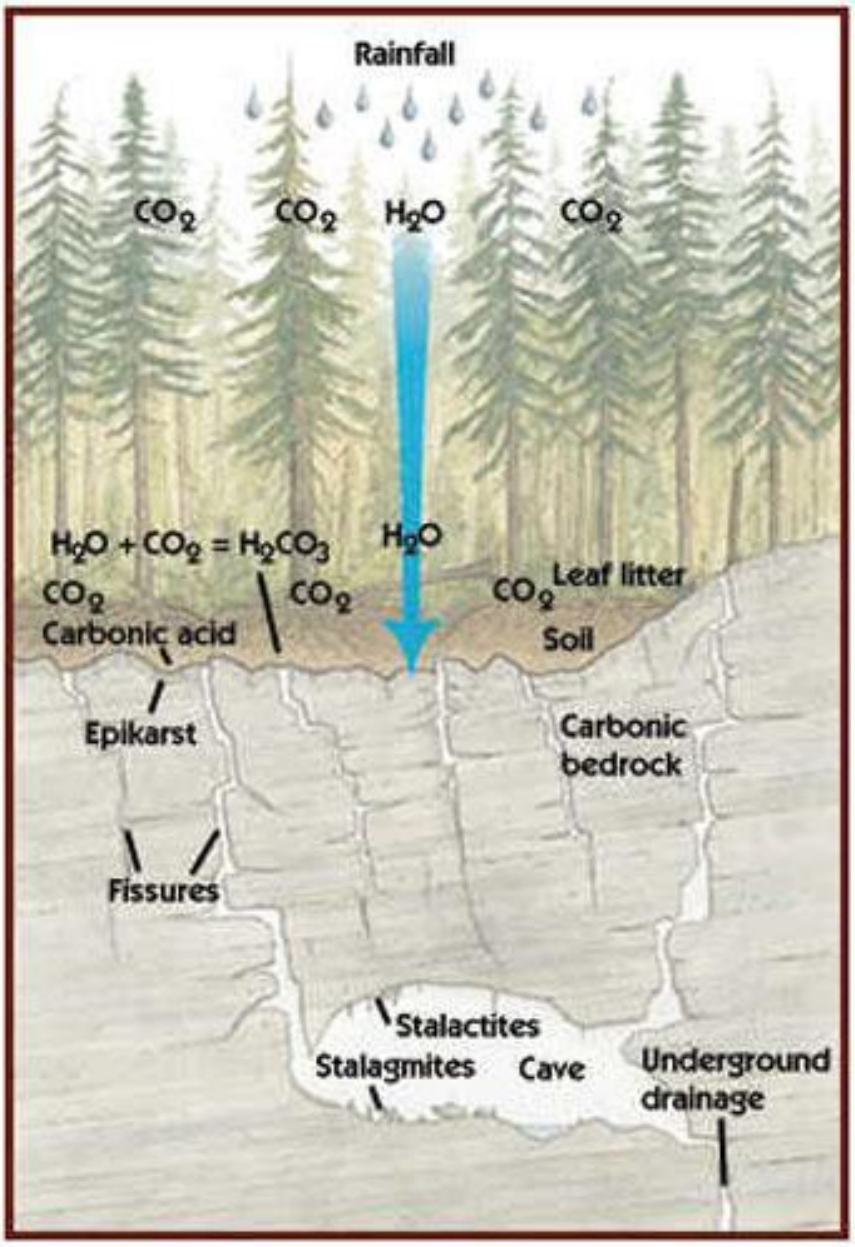
- **Primary porosity**
- **Secondary porosity**



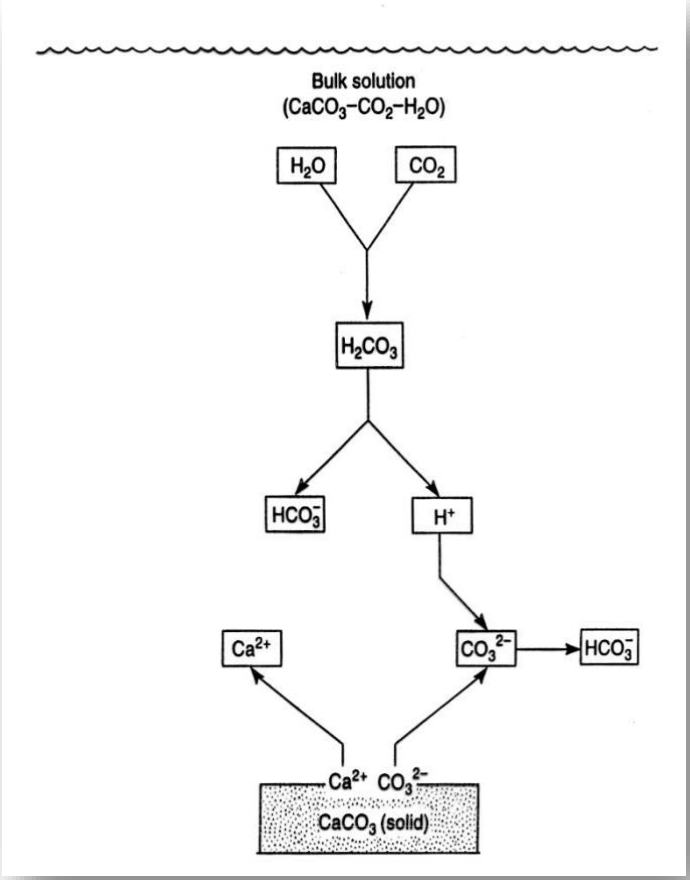
Secondary Porosity

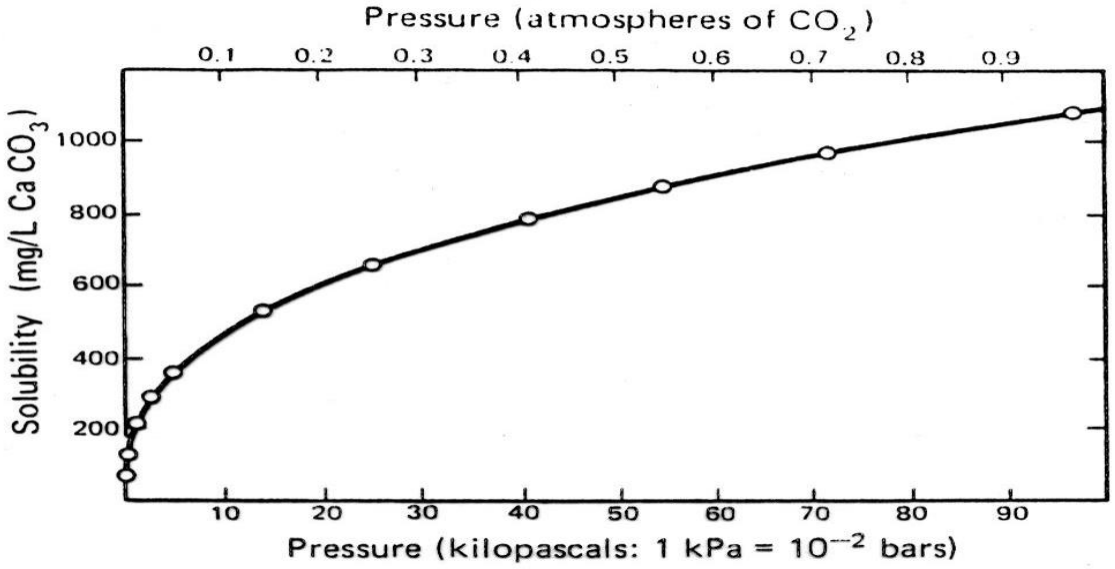
Driving Mechanics and Controls

Climate, Vegetation, and Biogenic CO_2



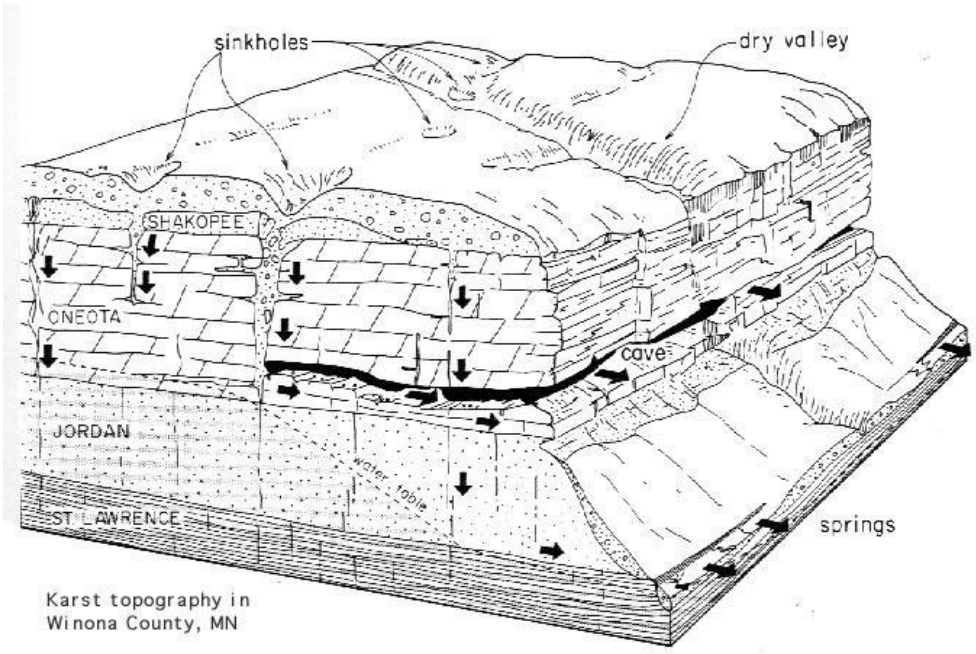
The Solution Process



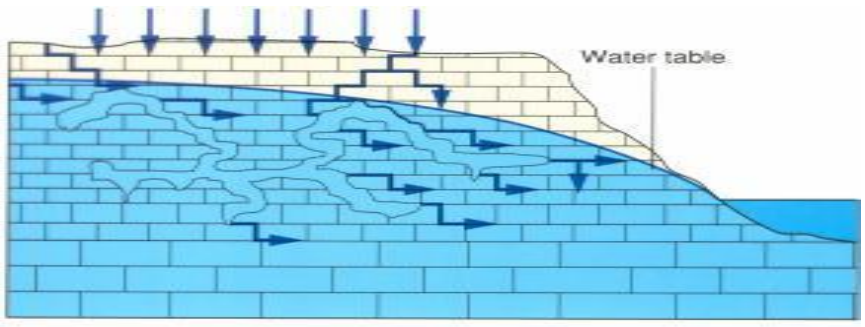


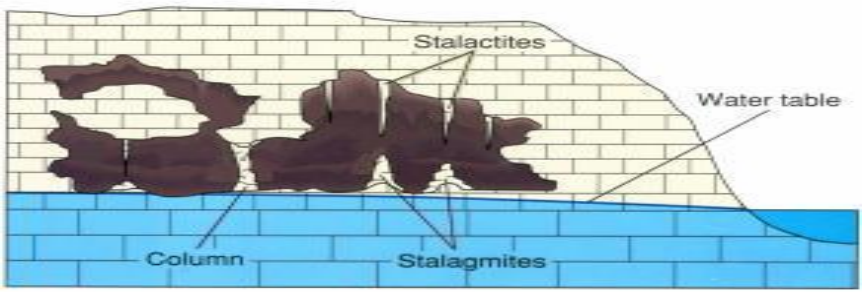
Surface Flow - Rivers lose water when some of the flow descends into **swallow holes or swallets**

Karst Aquifers and Groundwater



Karst topography in
Winona County, MN





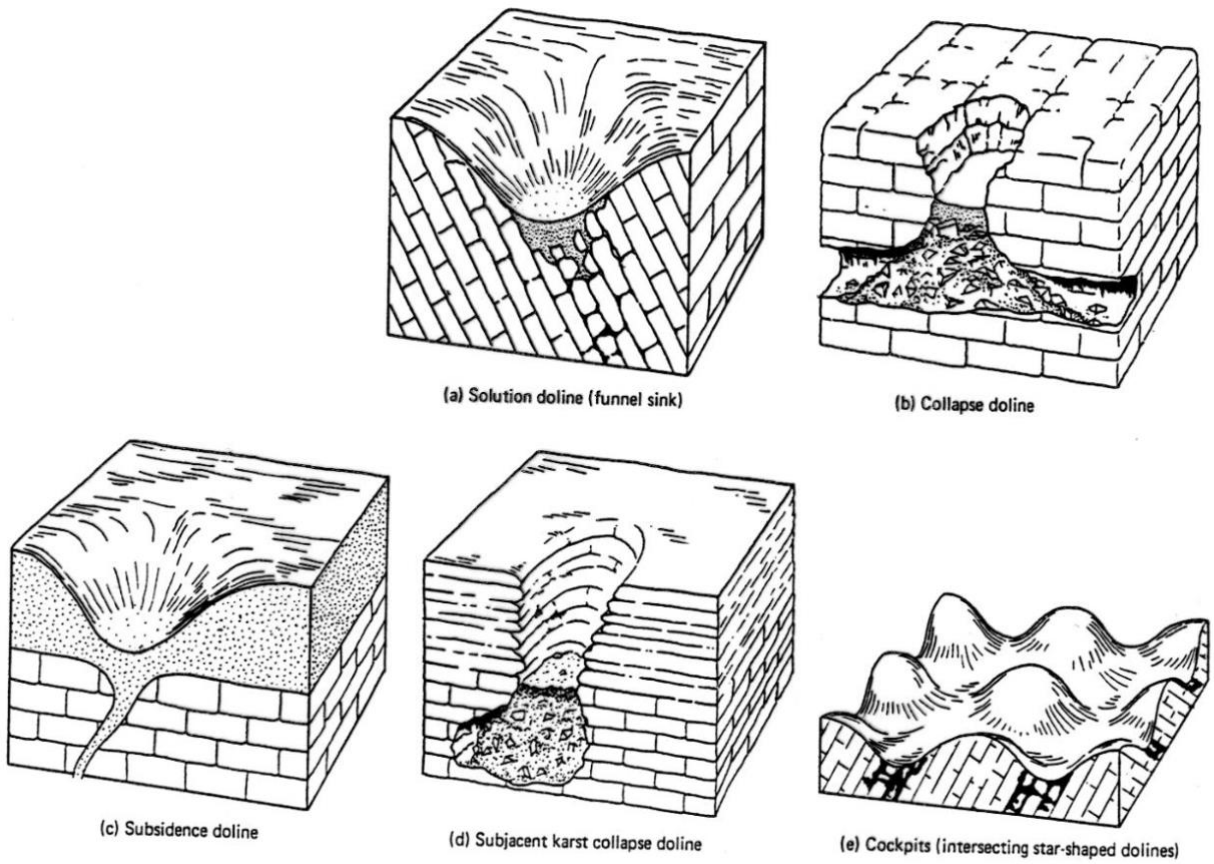
Surface and Groundwater Connection

Shafts

Springs

Closed Depressions – Dolines

- **Solutional**
- **Collapse**
- **Subsidence**



SELECTED REFERENCES

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- Howells, M.F (2007). British Regional Geology: Wales. Keyworth, Nottingham: British Geological survey.