KARST LANDSCAPES

** Groundwater

* 2nd largest potential source of freshwater (22%)
* accumulates by ***percolation*** through the soil & rock
* how well it percolates is controlled by: ***Porosity & Permeability***

Porosity: The percentage of the total volume of a rock or soil that consists of pore space (spaces within a rock)

Permeability: Capacity of a material to transmit fluids or how well fluids will move through it

** water passes through the ***zone of aeration***, a **permeable layer;**
has a permeability rate > .01m/day

** collects in the ***zone of saturation***, which is above an **impermeable layer**
(rate < .01m/day)

* the ***water table*** is the upper limit of the zone of saturation

* this zone of saturation may be an ***unconfined aquifer***, with a
permeable layer above & an impermeable layer below

* or a ***confined aquifer*** which has an *impermeable layer above & below it,*
& is recharged in select places

* may develop other features:

* ***artesian well:*** A flow of water onto the surface *under pressure from a confined aquifer*

* ***spring:*** A surface flow of water that emerges from underground, not under pressure from underground, *not under pressure from an unconfined aquifer*

* ***stream:*** water flowing on the surface, in a watercourse, where the water table

is above the surface; permanent or temporary

* ***thermal springs & geysers:*** water heated to high T°'s; usually associated with recent volcanic activity

* ***ground subsidence:*** If groundwater is removed in large quantities, surface may react by sinking to fill the new space

*** **KARST**: a type of landscape associated with the chemical erosion of soluble ***limestone*** ($CaCO_3$ rich) or dolomite ($CaMg[CO_3]_2$)

* Water is a key ingredient; no water, no limestone=no karst

* May occur at the surface, or below

** **Basic Process:**

* ***Carbonation***:
- * the H_2CO_3 dissolves the Ca in the limestone forming Ca^{+2} ions
- * a solution is formed of these ions & water
- * as long as the solution stays ***unsaturated***, the ions remain dissolved
- * with addition of more & more Ca^{+2} ions solution becomes ***saturated*** or even ***supersaturated***, & a ***precipitate*** may form

* What affects this process?

** the **amount of CO2 in the water** affects the strength of the carbonic acid, which affects the rate of dissolution;

* More CO2 = stronger acid = more dissolved limestone

*** Temperature, Mixing Effect, Flow-Rate, Climate

** Key Factor: **Amount of CO2 in the water.**

* Most **CO_2** comes from the ***soil.***

atmosphere	.03%	CO_2 by volume
snow	.1%	CO_2 by volume
soil	1-3%	CO_2 by volume

*** **KARST Landforms**

** Common **Surface** Karst Landscapes

* ***Doline* karst**: Areas of numerous ***dolines*** *or sinkholes*; small, closed depressions caused by removal of material from below the surface; up to 1 mile in size

  * most widely distributed type
  * various types of *dolines*: solution, collapse, suffosion, subsidence
  * up to 1 mile in size
  * ***uvala*** = 2 or more *dolines* which have coalesced into one

  EX: s Indiana, cent. Kentucky & Tennessee, n Florida

* ***Cockpit Karst***: Areas of small depressions surrounded by 5 towers or cones, forming a *star-shaped pattern*

  EX: Jamaica, Puerto Rico

* ***Cone & Tower Karst:*** similar to *cockpit karst*, but with steeper-sided towers, small depressions, & usually not star-shaped patterns

  EX: Belize, Cuba, S Mainland China, Indonesia

* ***Fluviokarst***: a landscape of deranged drainage, ***blind valleys***, large springs, or most any running water system in limestone formation areas; EX: e U.S.

  * also includes such features as *dry valleys & semi-blind valleys*,
  * also areas of **sinking or disappearing streams** with *swallow holes* (cave openings)

* ***Polje Karst***: Large, closed depressions often filled with sediment & susceptible to flooding, 1-5 km wide & up to 60 km long

  * water flows across the ***polje*** floor, disappearing into a ***ponor*** (*swallow hole*)

  EX: found on Adriatic Coast of Slovenia, Croatia, & adjacent countries

* ***Labyrinth Karst:*** intersecting solution corridors & canyons;

  * can be several miles long