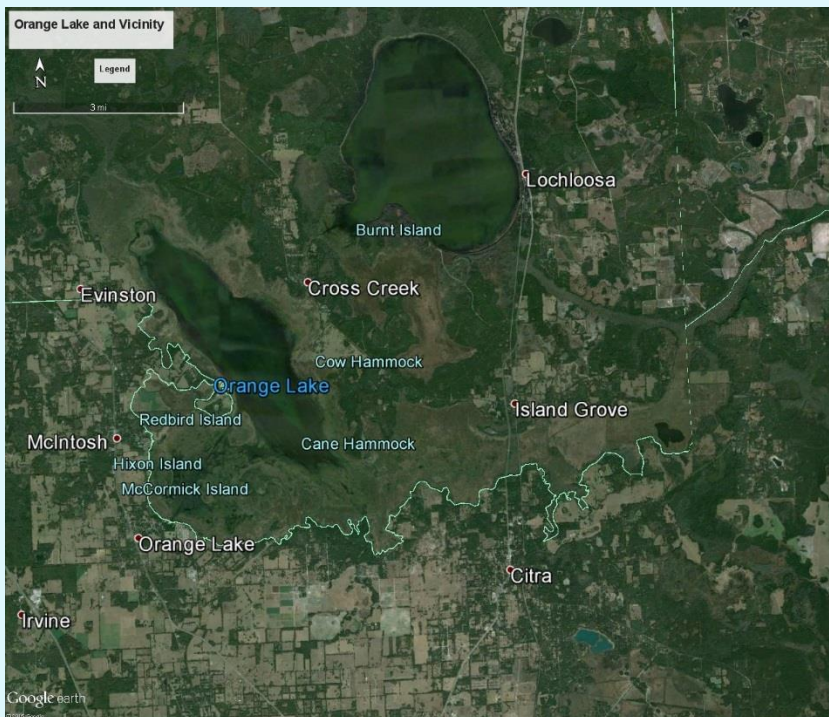




Florida Department of Environmental Protection Florida Geological Survey



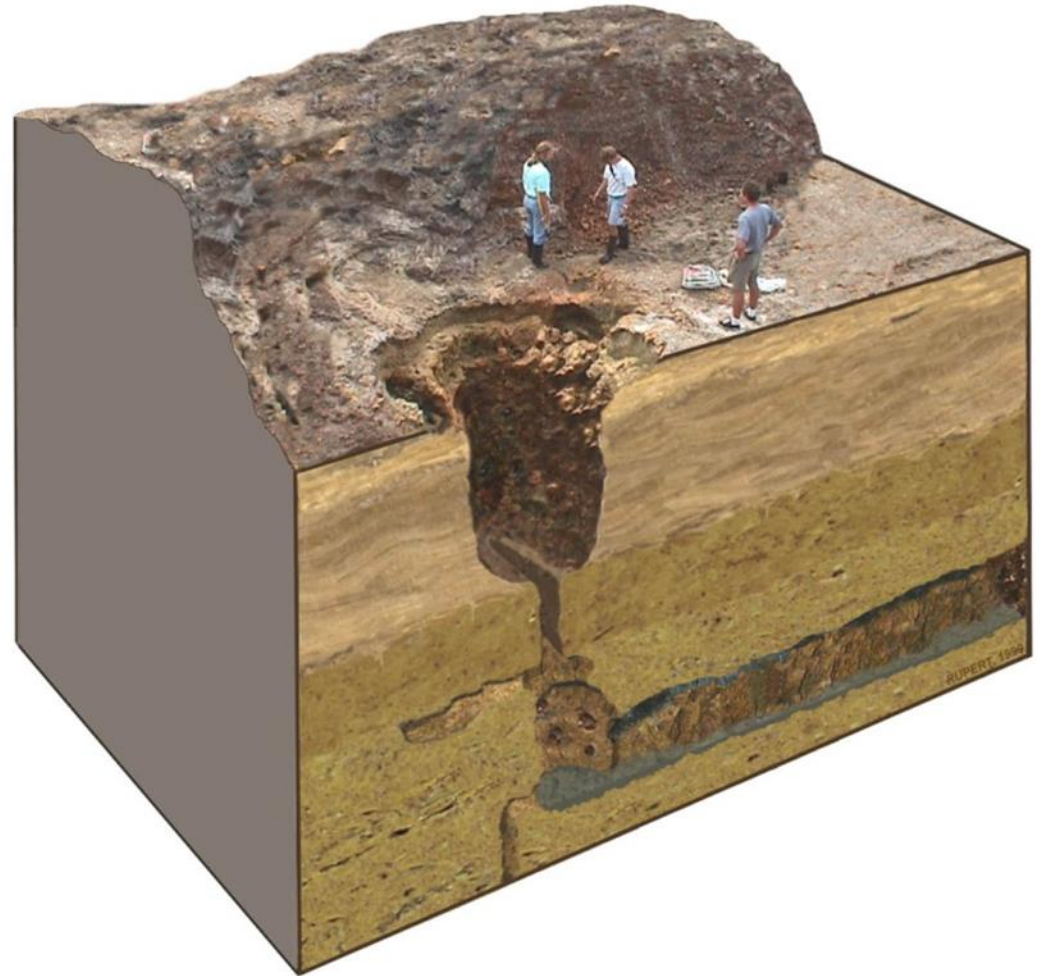
Florida's Karst Geology

Orange Creek Basin Interagency
Working Group Public Workshop,
November 5th, 2015

Harley Means, P.G.
Assistant State Geologist
Florida Geological Survey

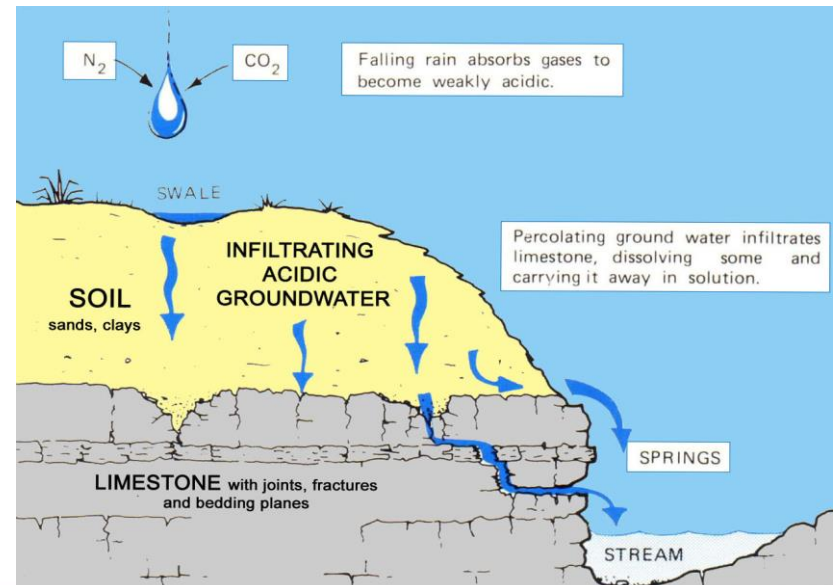


Karst – a type of topography that is formed on limestone, gypsum and other rocks by dissolution, and that is characterized by sinkholes caves and underground drainage (Bates and Jackson, 1987)



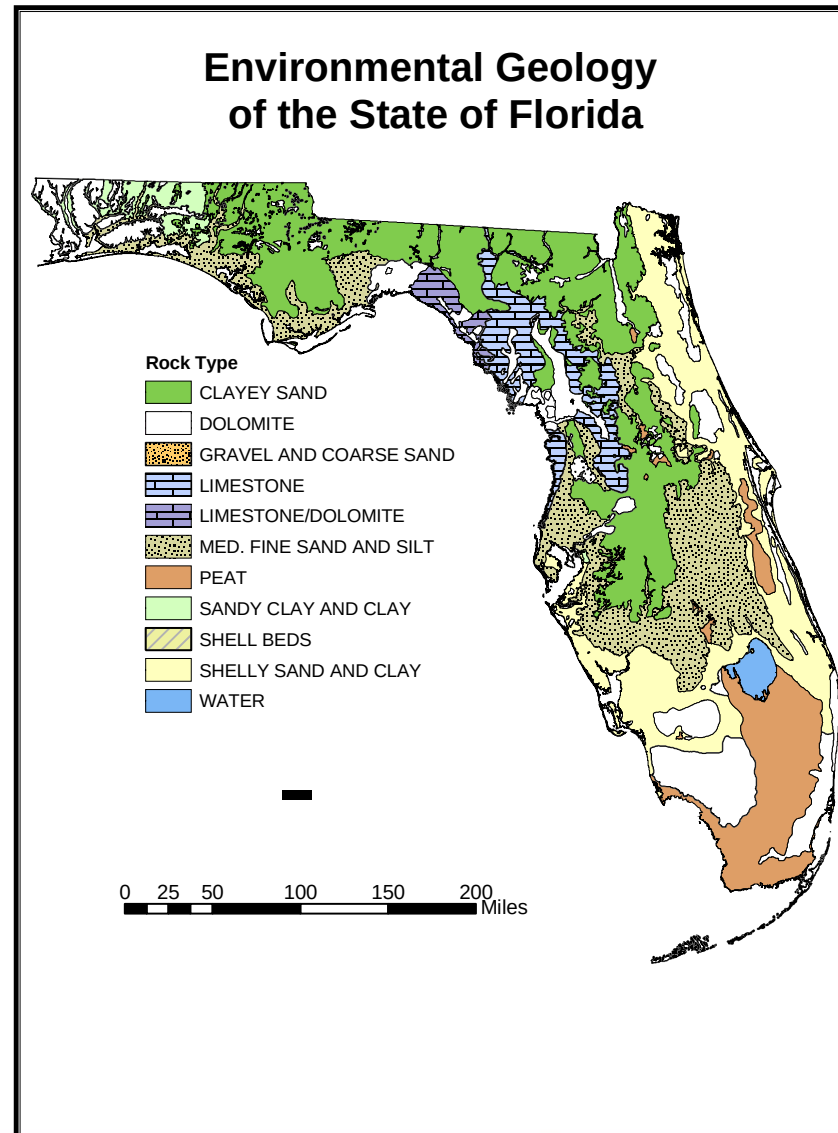
How does karst form?

- As rainwater falls through the atmosphere it picks up carbon dioxide and becomes slightly acidic.
- The slightly acidic rainwater becomes more acidic as it moves through soil.
- Limestone, which underlies all of Florida and parts of Georgia, is dissolved by the acidic water. This creates pore space including cavities, caves and conduits.





Limestone underlies all of Florida – the depth to the limestone varies.



How does the acidic water get into the rocks?





Carbonate rocks are porous and permeable!





Fracture pattern in Florida



Enlarged fracture



Karst distribution in the U.S.

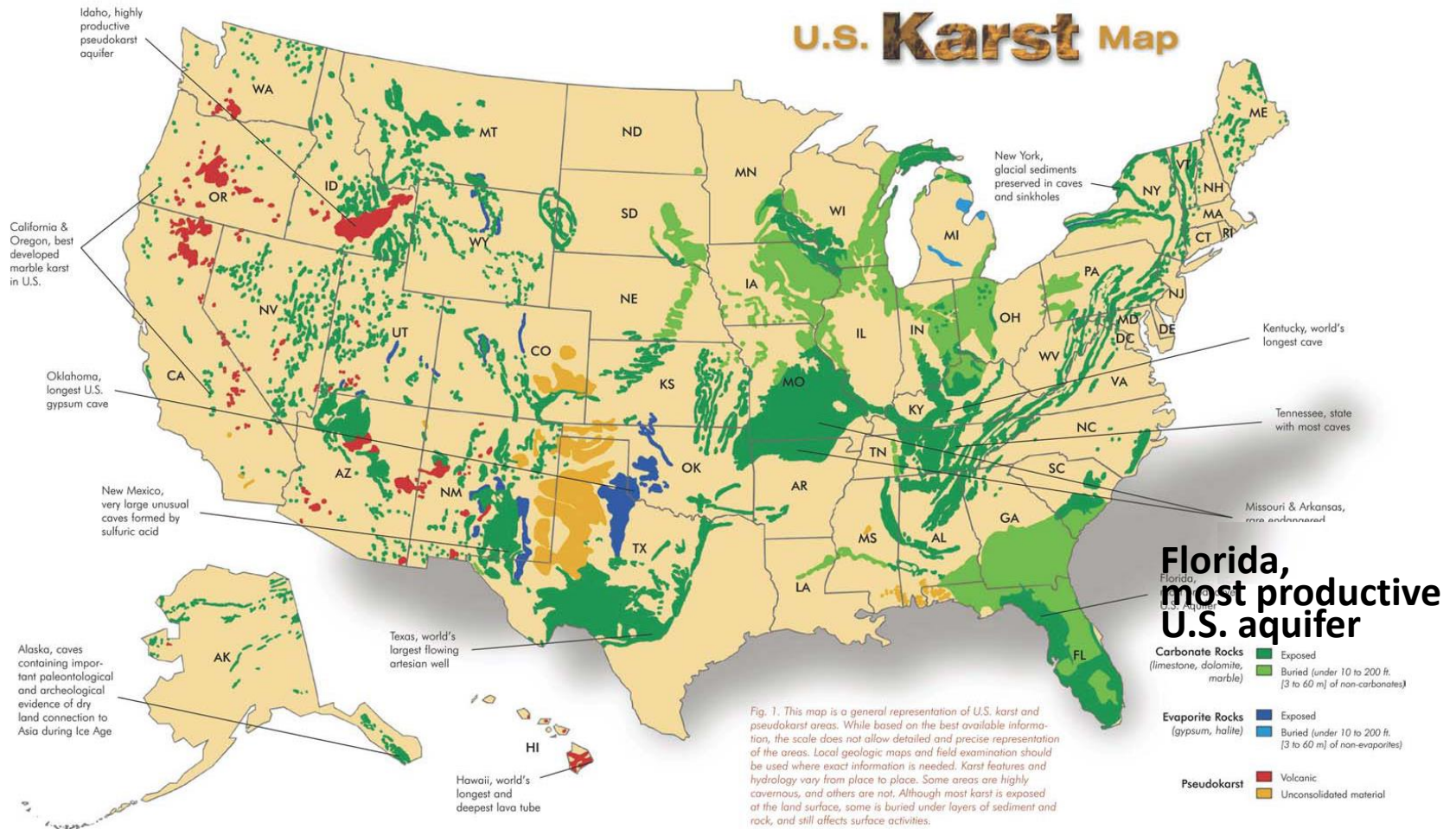


Figure 3: Karst map of the US published by AGI (Veni *et al.* 2001).



Florida's karst features



SINKHOLES

Numerous caves – air and water filled

Over 1000 known springs

**33 first magnitude springs
(100cfs or more), more than
any other state**

**Sinkhole Lakes (like Orange
Lake)**

Karst topography



Winter Park Sinkhole

Karst topography



Distribution of karst features

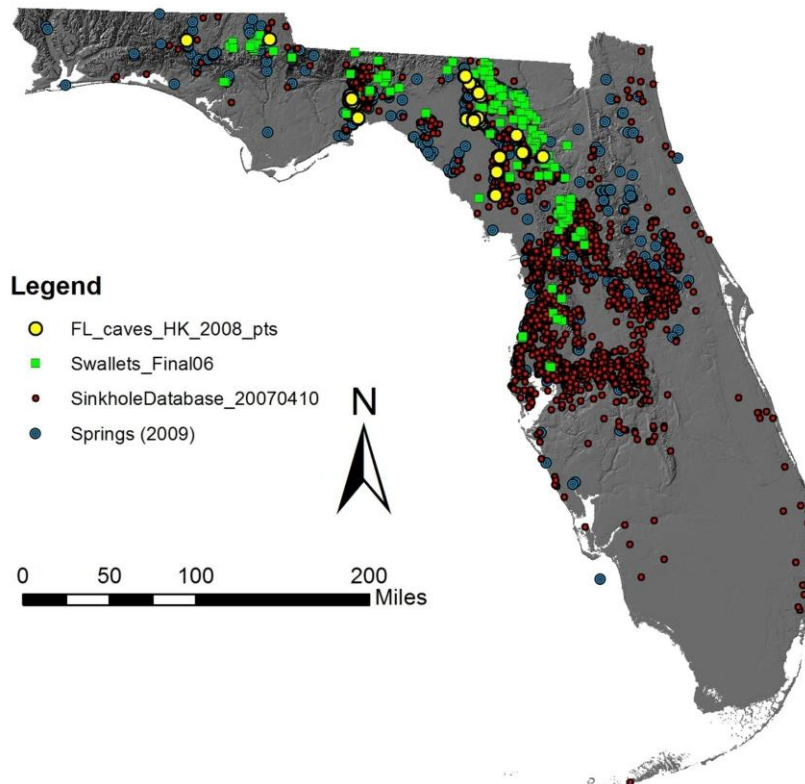
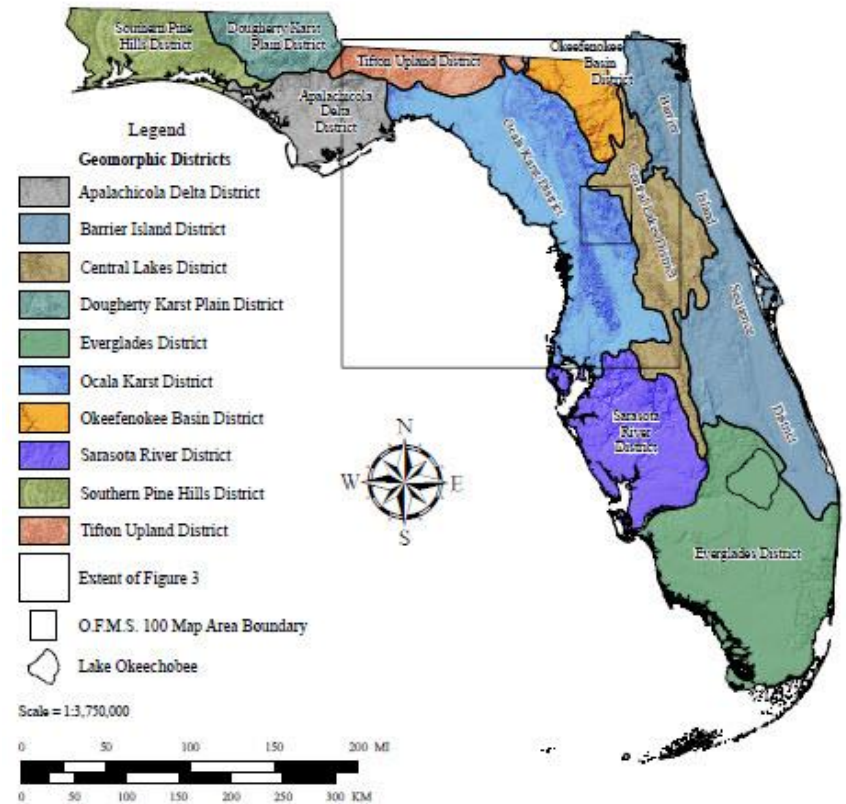


Figure 2. Geomorphic Districts (modified from Scott, 2005).



Because of karst we have....

One of the most productive
aquifer systems in the world:
The Floridan aquifer system!

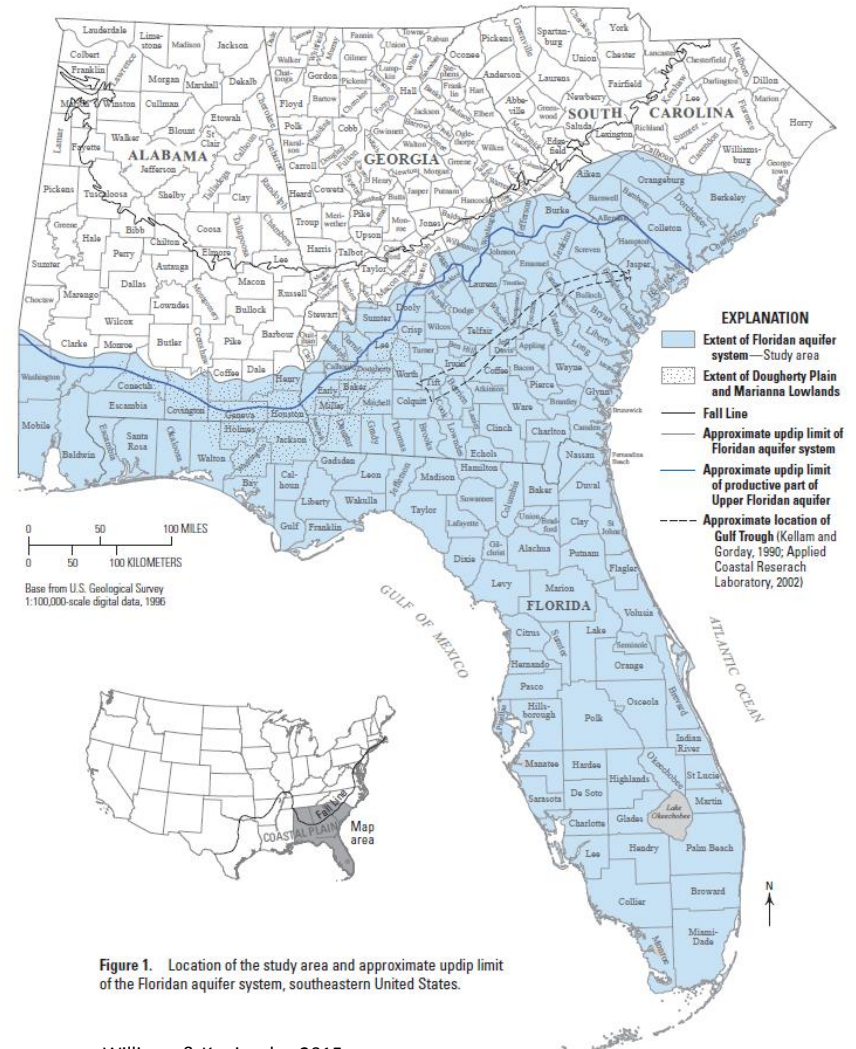
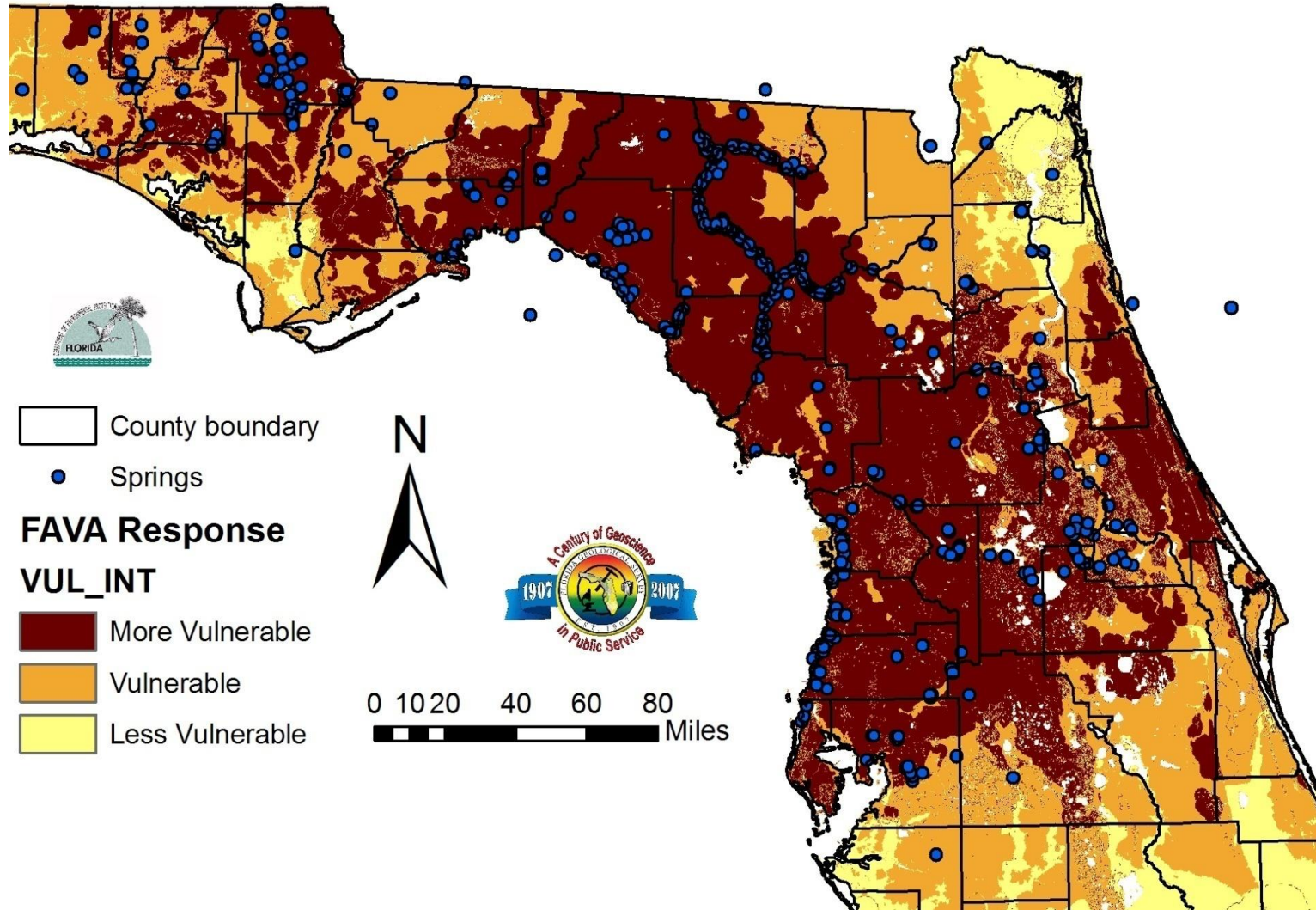


Figure 1. Location of the study area and approximate updip limit of the Floridan aquifer system, southeastern United States.

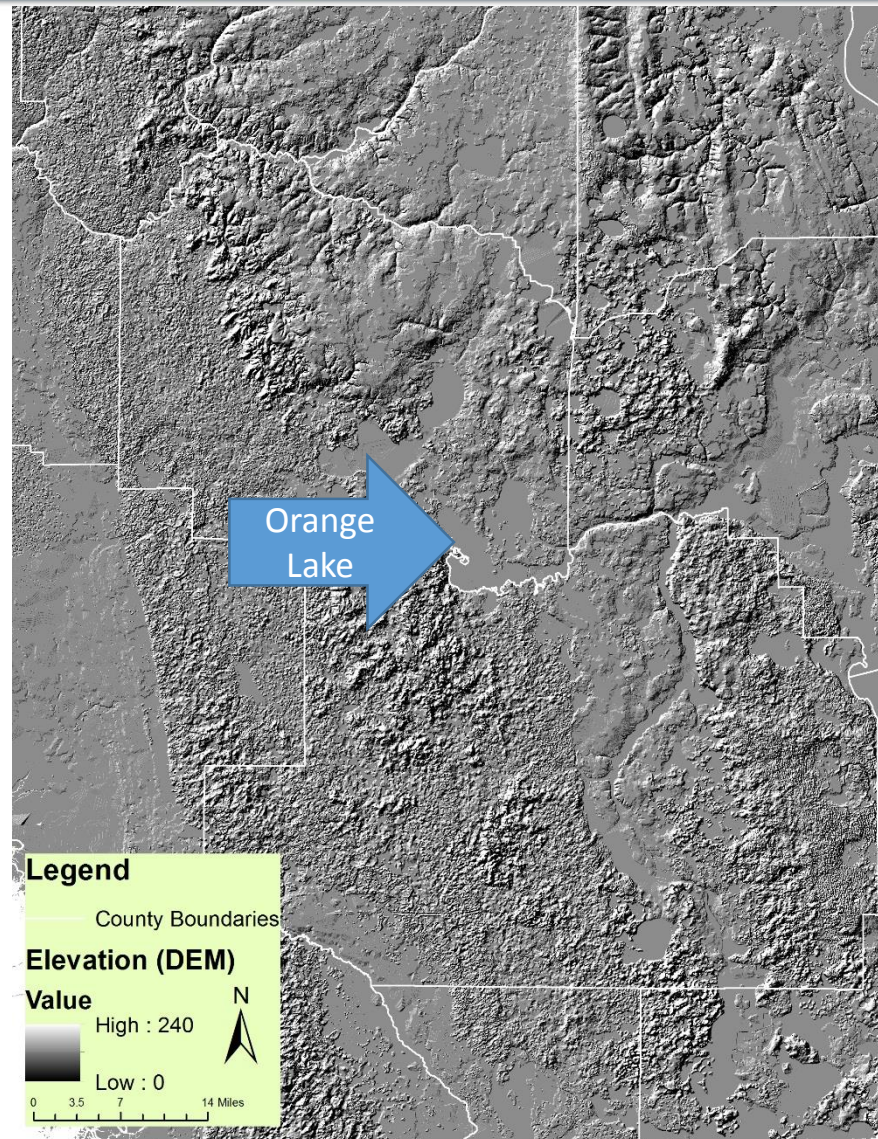
Williams & Kuniansky, 2015

Aquifer vulnerability

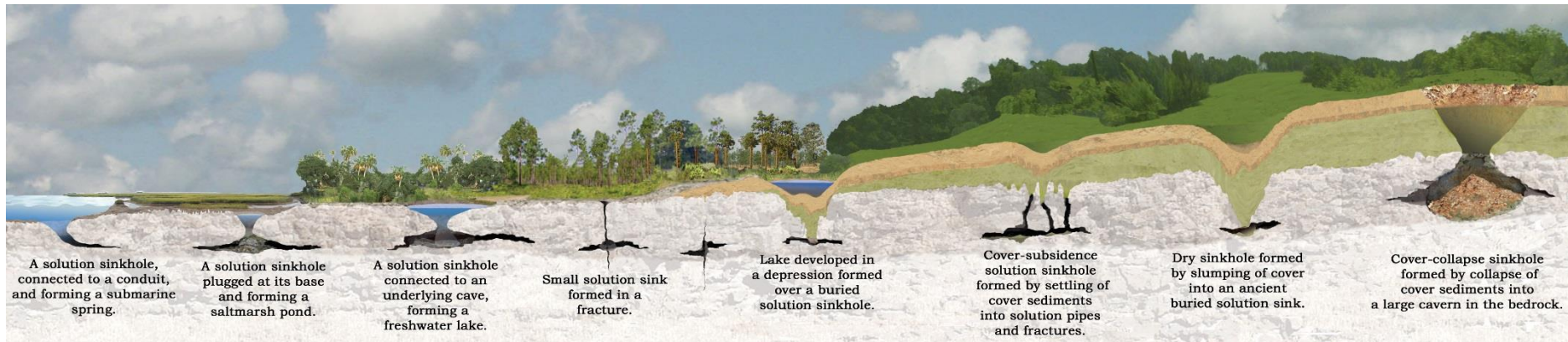




Karst topography locally

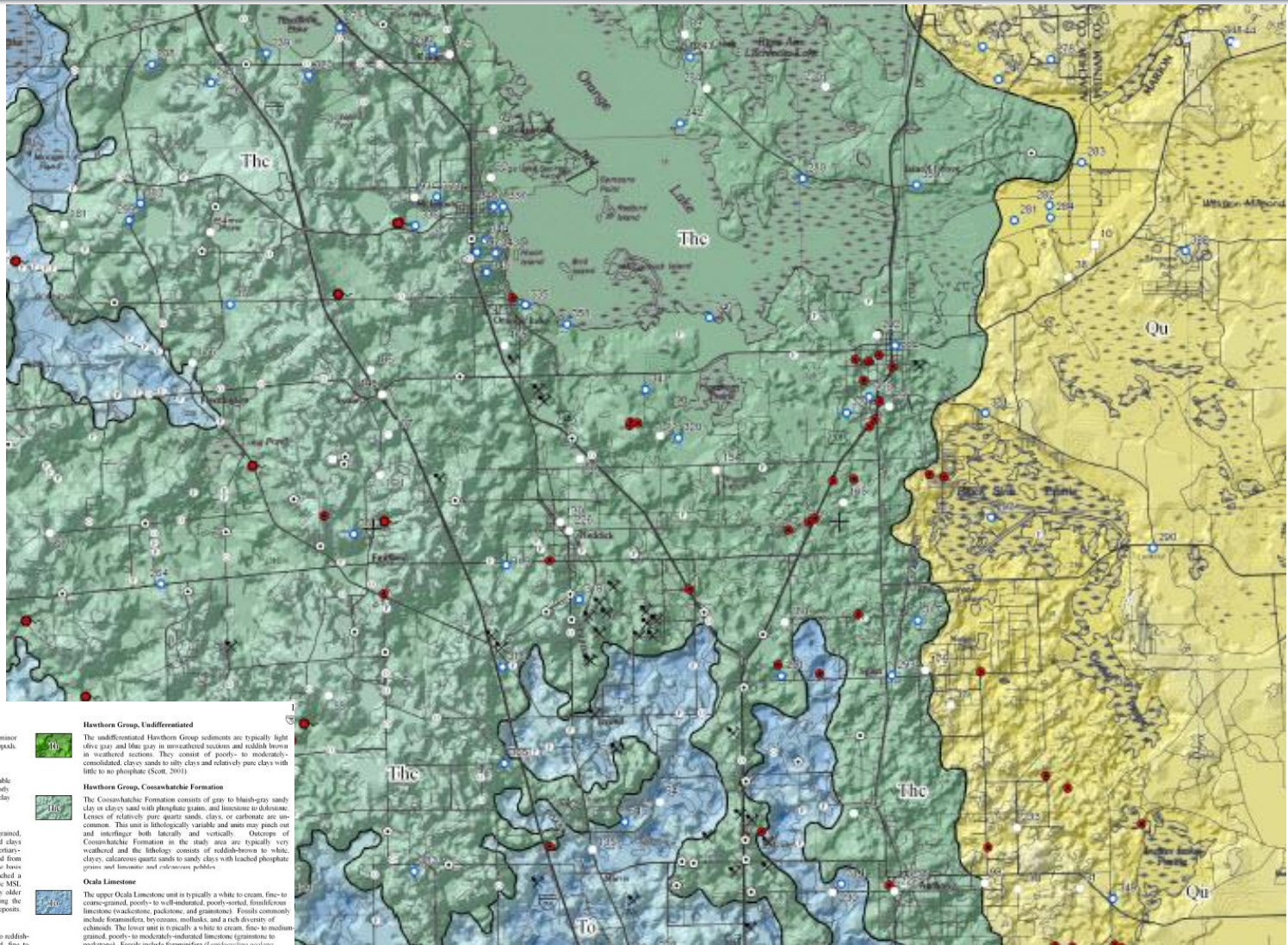


Karst lakes



Karst lakes can form when sinkhole activity creates a depression in the land surface (basin). Over time these basins can enlarge and sinkholes can coalesce to form large basins like Orange Lake. The sinkhole, or sinkholes, in the bed of the lake provide a direct connection to the underlying aquifer. Most of Florida's 7800 fresh water lakes are Karst lakes.

Local geology



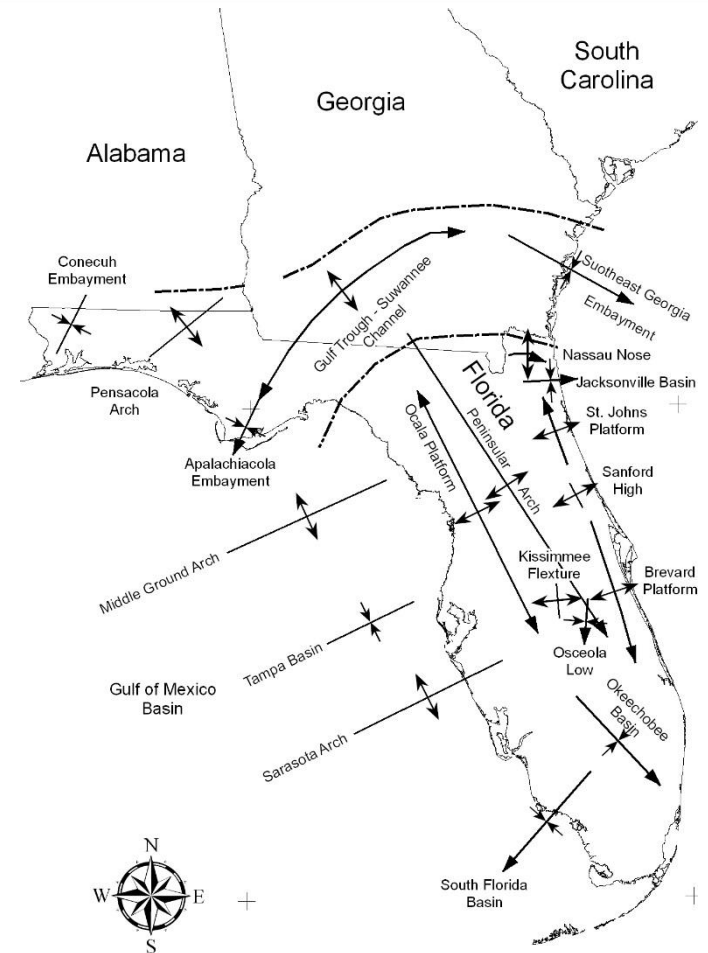
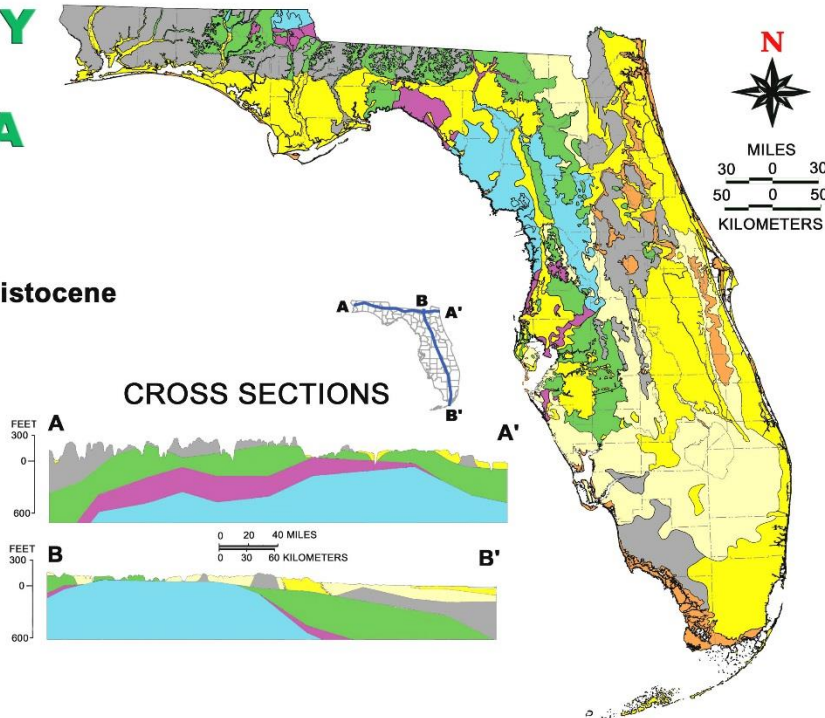


Eocene Ocala Limestone near the surface

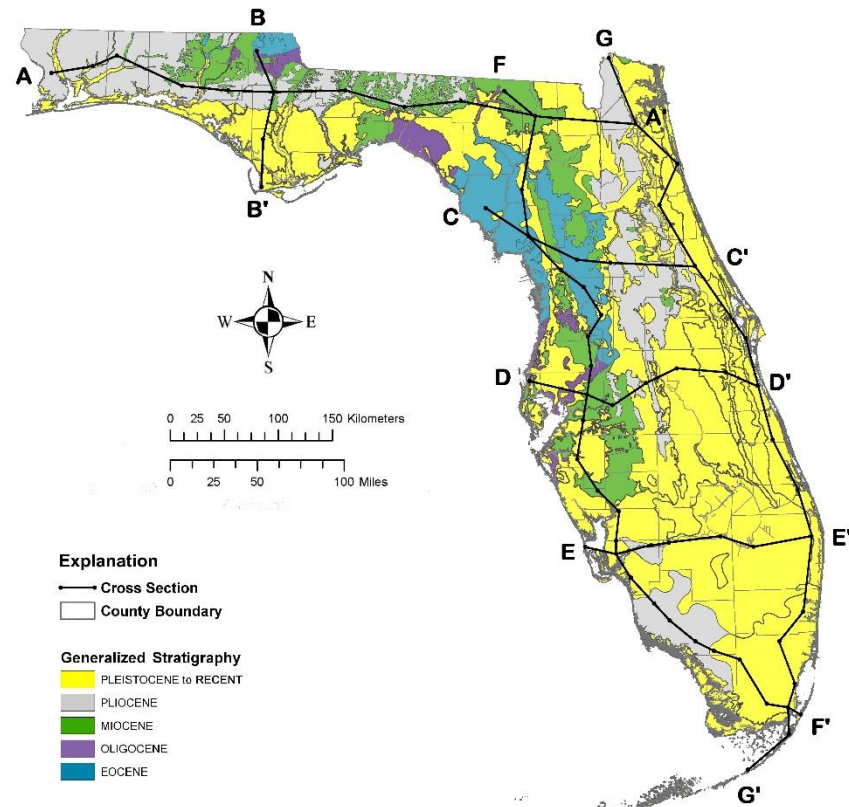
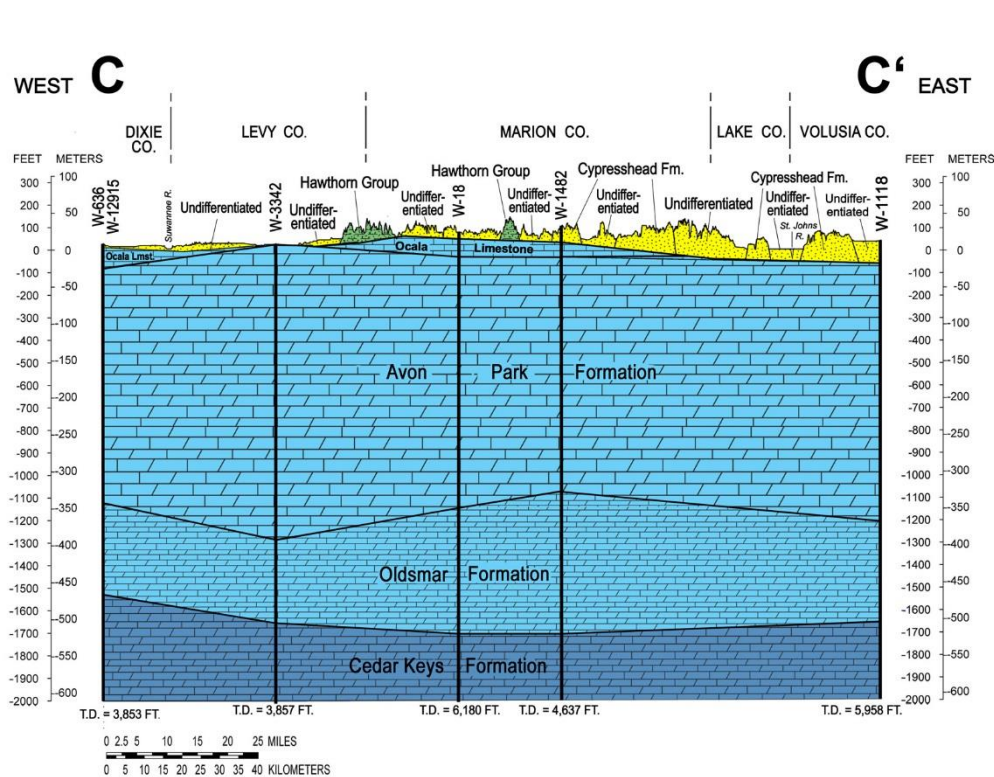


GEOLOGY OF FLORIDA

- Holocene
- Pleistocene
- Pliocene/Pleistocene
- Pliocene
- Miocene
- Oligocene
- Eocene



Cross section





Recap



- Karst refers to landforms that form when geologic materials near the surface dissolve over geologic time.
- Acidic rainwater infiltrating our limestone bedrock is responsible for dissolution.
- The features created by this process, called karst features, include sinkholes, springs, caves, lake basins and other solution features.
- Florida has large areas that were modified by karst processes.
- Because of karst Florida sits on top of one of the most productive aquifer systems in the world – the Floridan aquifer system.
- Because of karst our aquifers are vulnerable to contamination from surface activities.
- Alachua and Marion counties have numerous karst features.
- This is due, in part, to the proximity of the Ocala Arch and the depth to limestone.



Questions?



<http://www.dep.state.fl.us/geology/geologictopics/sinkhole.htm>

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