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science for a changing world

Karst:

What is it? Where is it? Why should we care?

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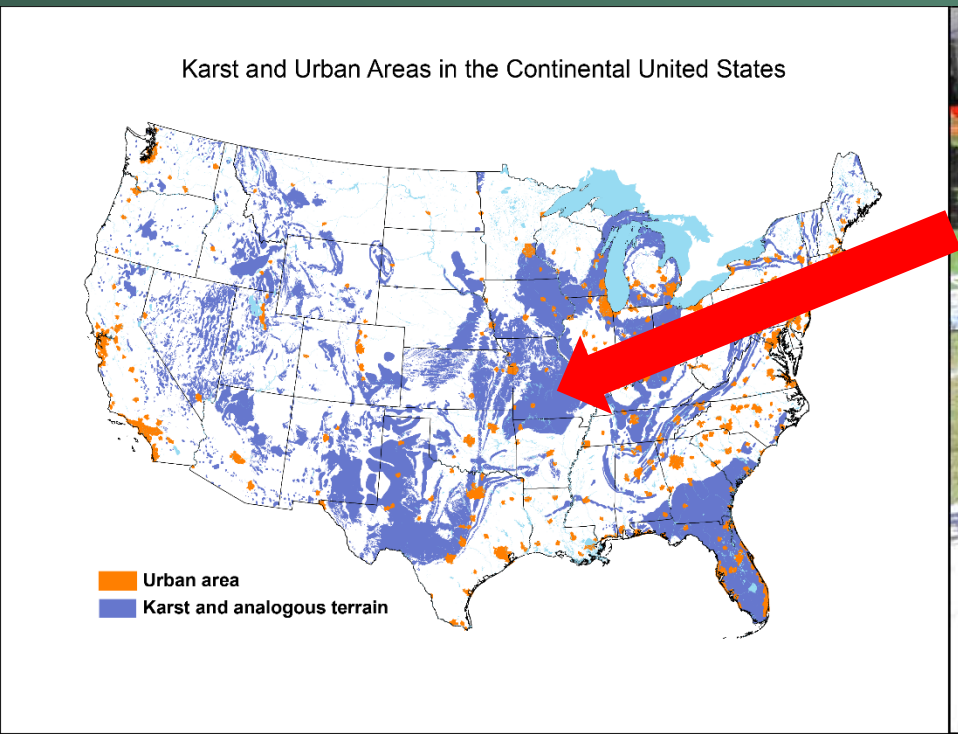

What is karst?

- A landscape with natural voids in the subsurface resulting from rock dissolution
- Karst features: Caves, sinkholes, underground streams, and springs

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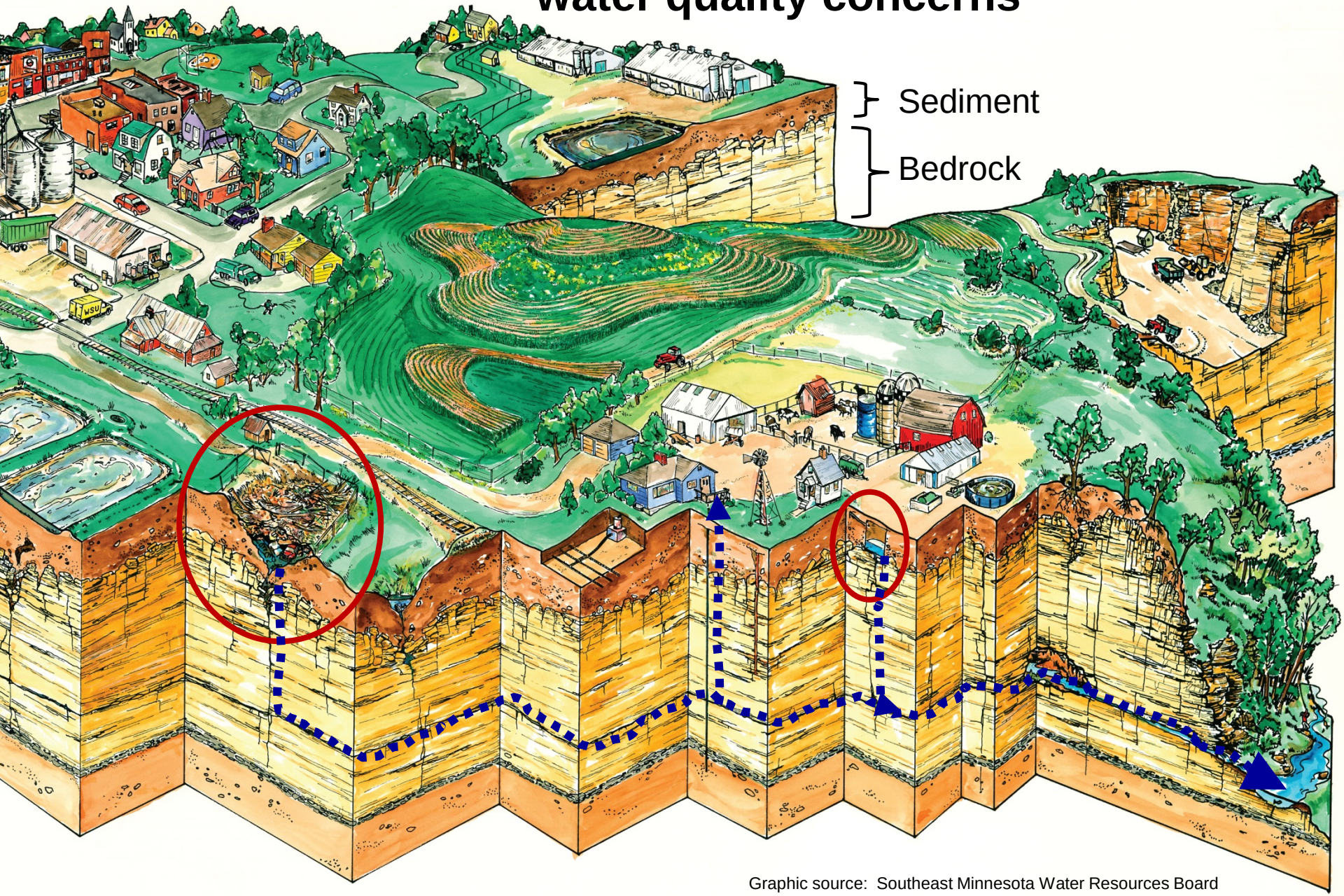
Typical midwestern karst terrain and water quality concerns



Graphic source: Southeast Minnesota Water Resources Board

Geologic map of soluble rocks in the contiguous United States

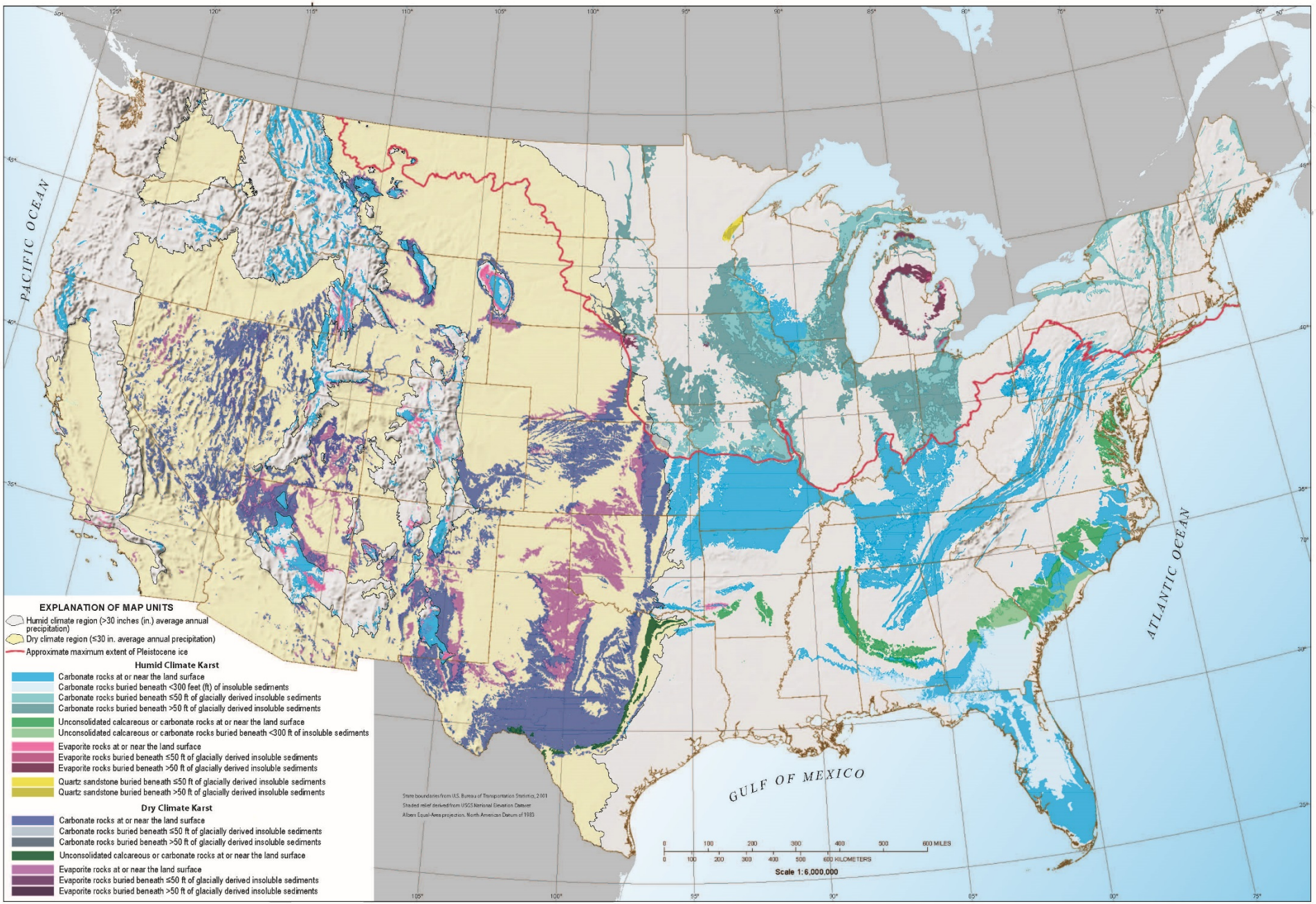
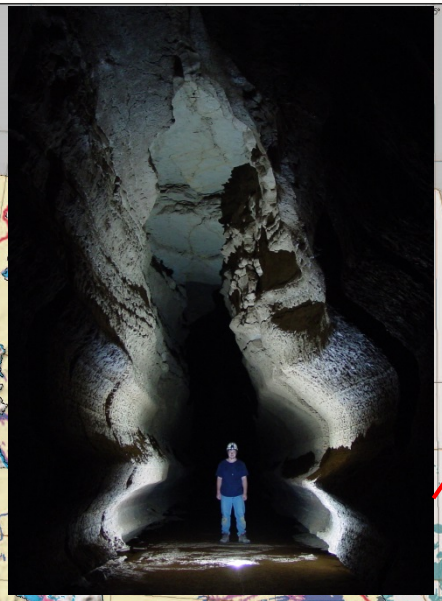


Figure 1. Karst and potential karst areas in soluble rocks in the contiguous United States.

Weary and Doctor, 2014, USGS Open File Report 2014-1156, https://pubs.usgs.gov/of/2014/1156/

Geologic map of soluble rocks in the contiguous United States



Weary and Doctor, 2014, USGS Open File Report 2014-1156, https://pubs.usgs.gov/of/2014/1156/

Areas with known and potential pseudokarst features (lava tubes and piping caves)

Volcanic pseudokarst

Piping pseudokarst

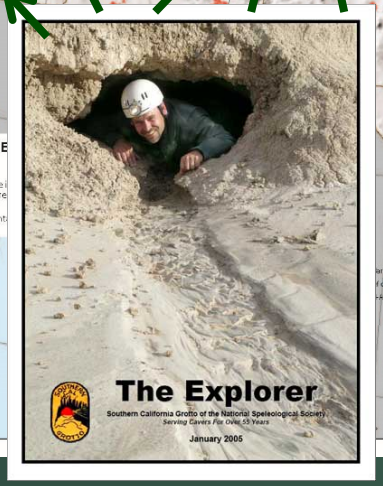
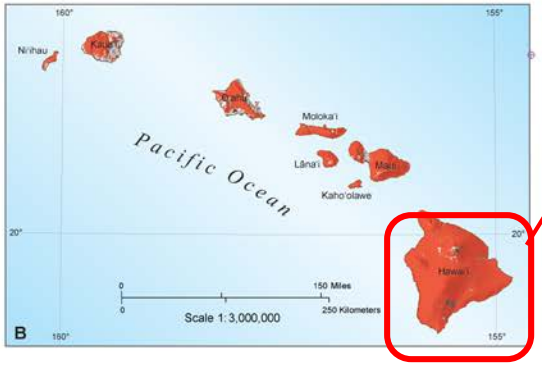


Figure 4. Areas having potential for development of pseudokarst features in the contiguous United States.

Weary and Doctor, 2014, USGS Open File Report 2014-1156, https://pubs.usgs.gov/of/2014/1156/



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Areas of potential thermokarst in Alaska and lava tubes in Hawaii.

Weary and Doctor, 2014, USGS Open File Report 2014-1156, https://pubs.usgs.gov/of/2014/1156/

Areas with known and potential evaporite karst features (surface and subsurface)

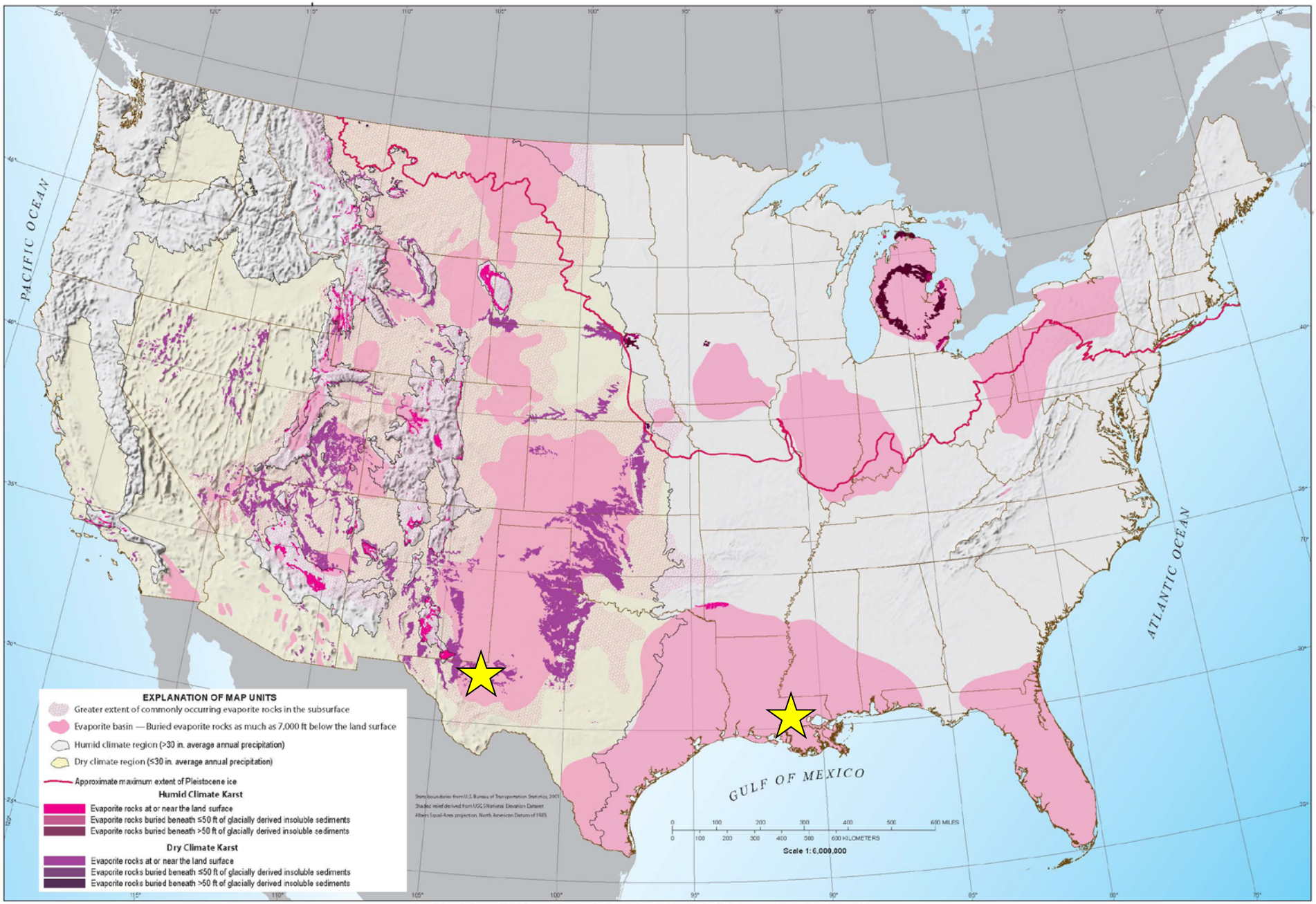

Figure 3. Areas underlain by evaporite rocks at various depths up to 7,000 ft below the land surface in the contiguous United States.

Weary and Doctor, 2014, USGS Open File Report 2014-1156, https://pubs.usgs.gov/of/2014/1156/

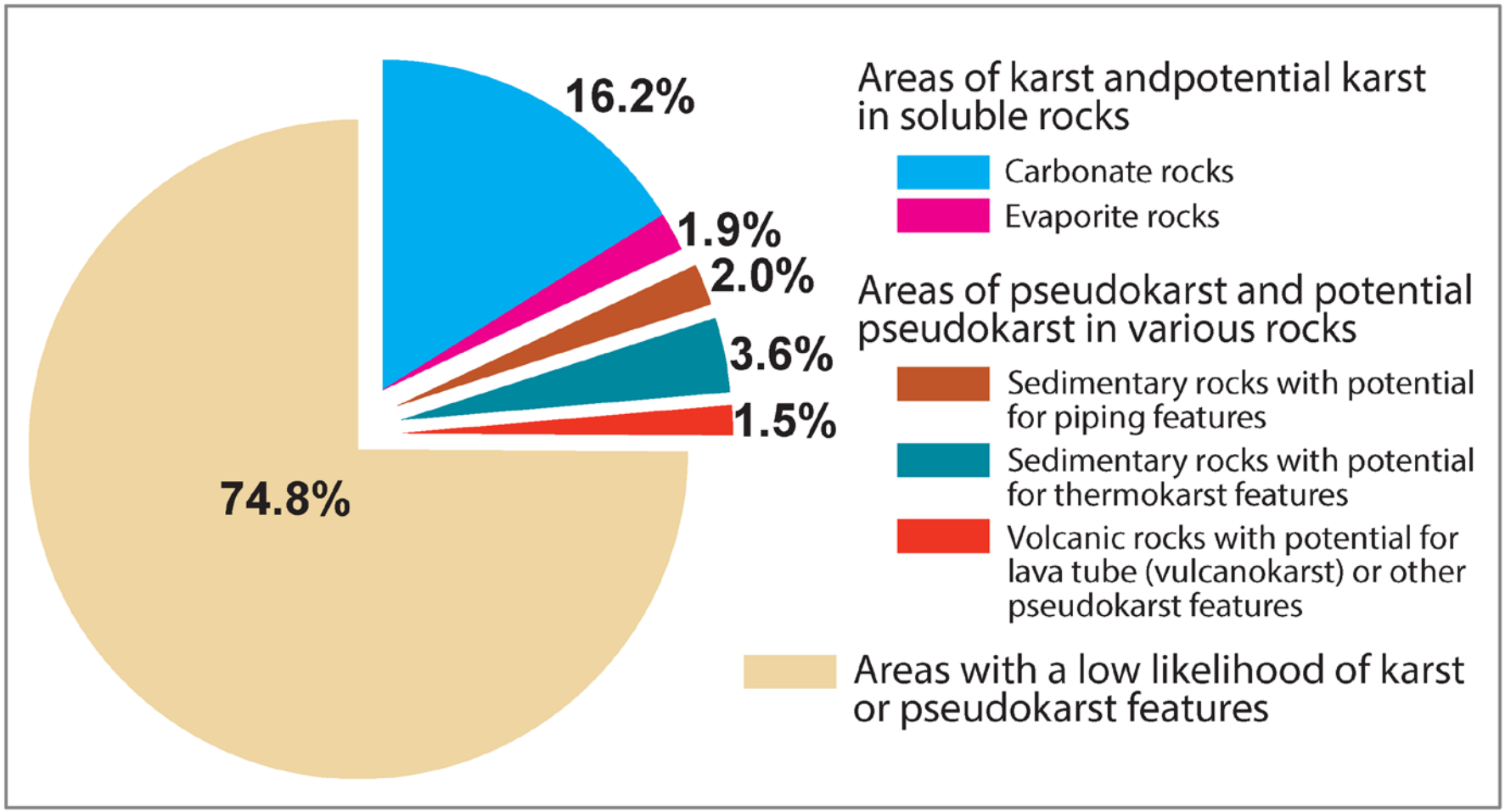

Figure 6. Chart showing proportion of the area of the 50 United States underlain by rocks and sediments having karst or pseudokarst features or a potential for them.

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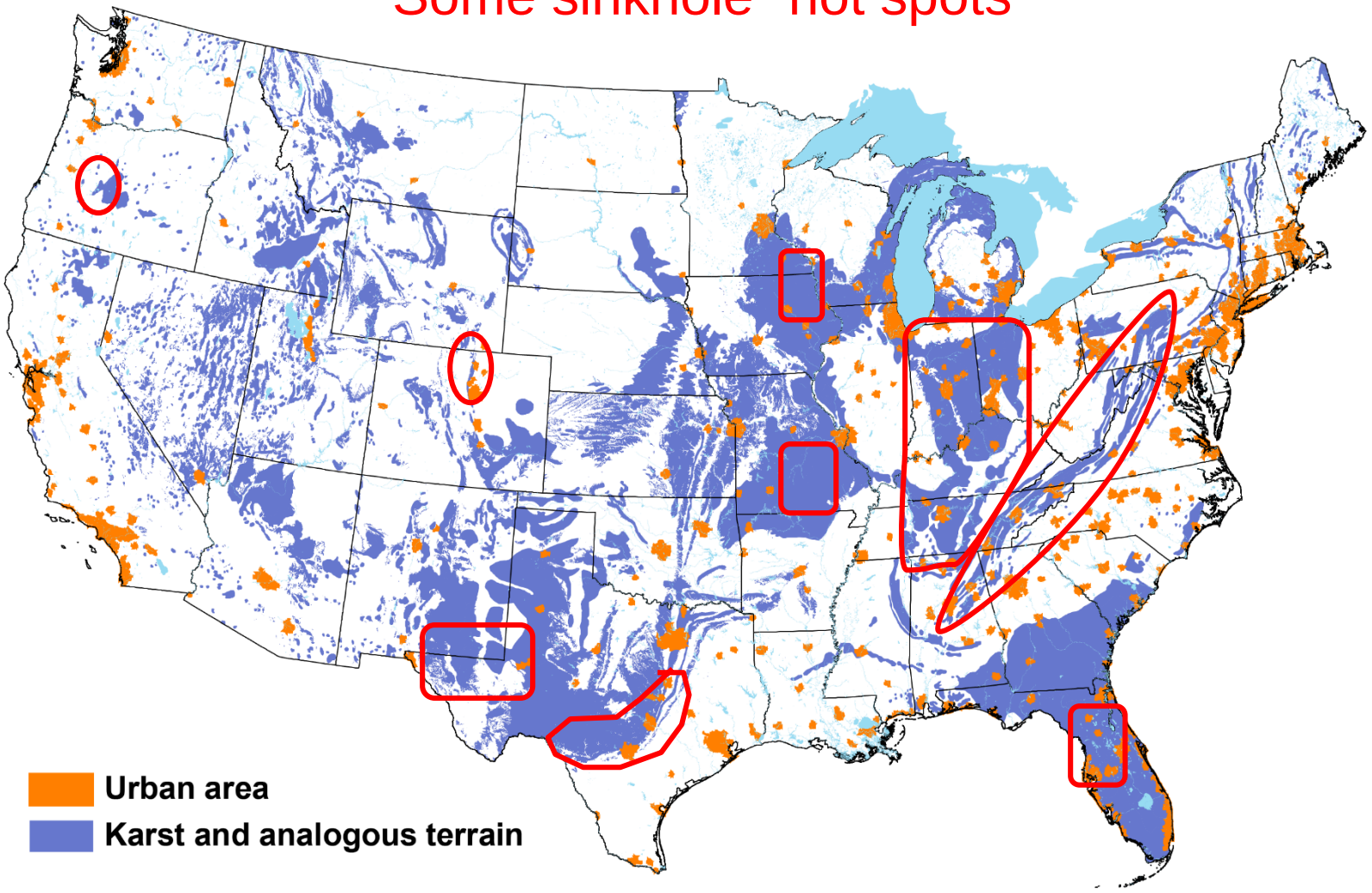
Weary and Doctor, 2014, USGS Open File Report 2014-1156, https://pubs.usgs.gov/of/2014/1156/

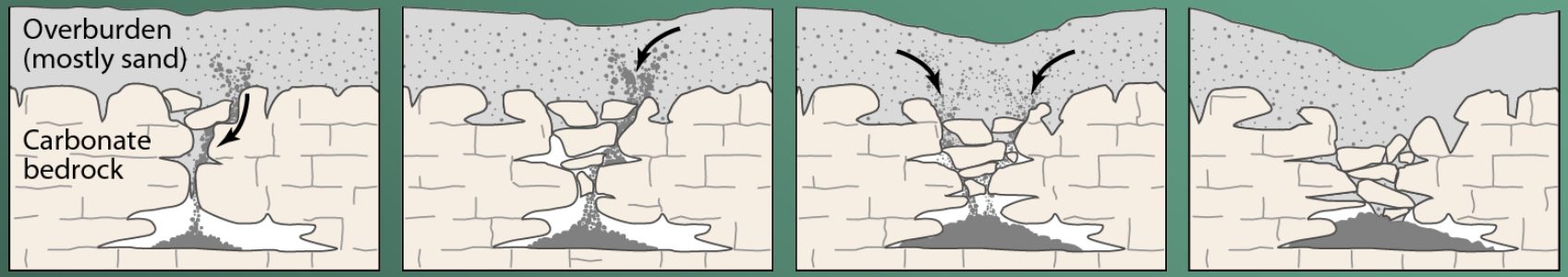
Karst and Urban Areas in the Continental United States

Some sinkhole “hot spots”

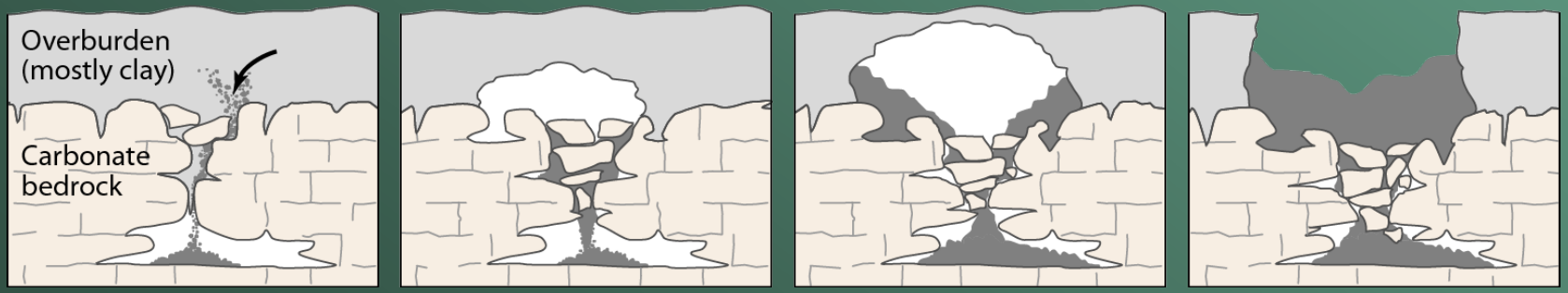


Sinkholes: how do they form?

Gradual formation (*suffosional sinkholes*)



Sudden formation (*cover-collapse sinkholes*)



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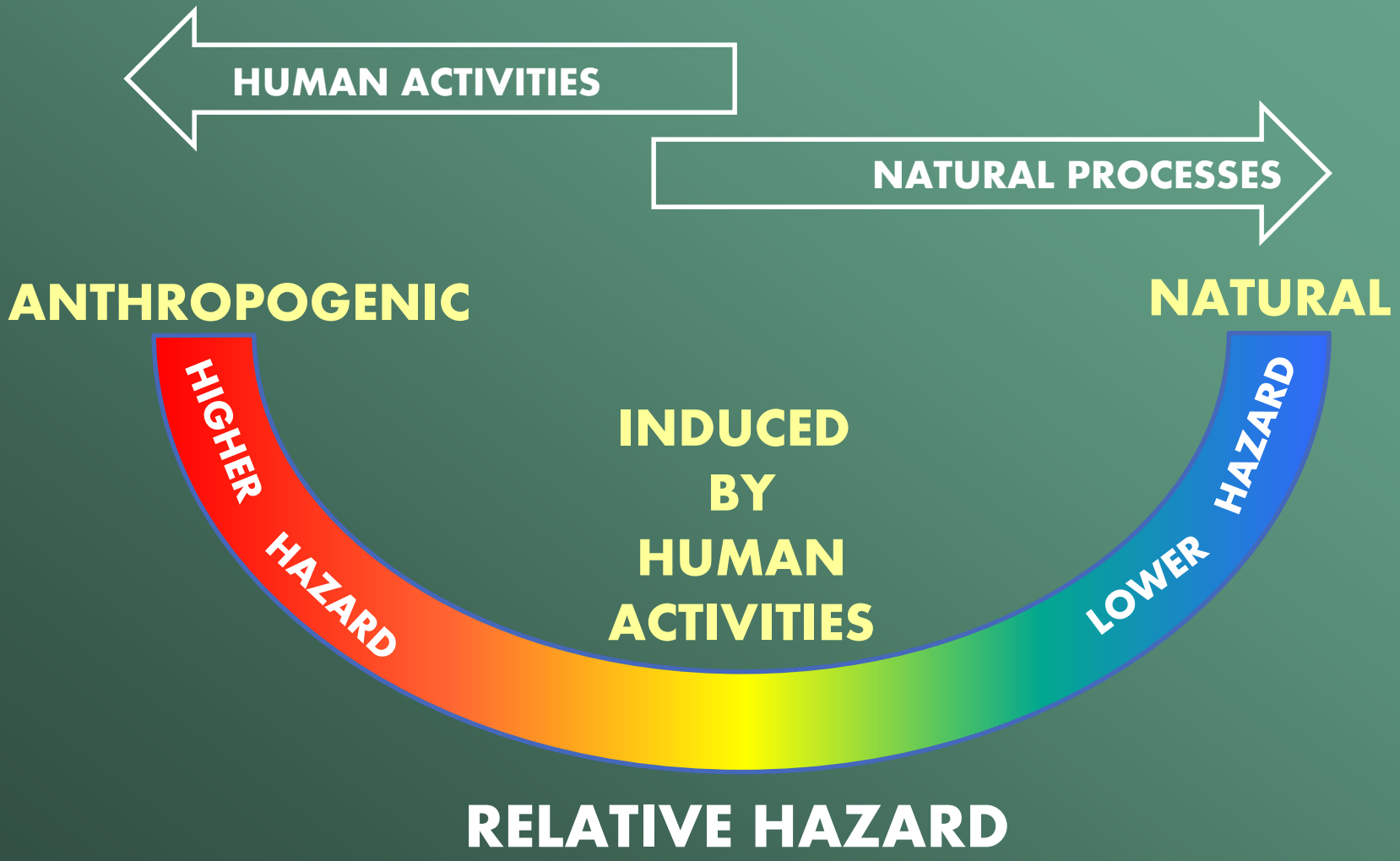
Modified from Tihansky, USGS Circular 1182, 1999

Sinkholes: what causes them?



Natural cave collapse: Devil's Sinkhole, Texas

Photo Credit: Alan B. Cobb (http://www.tcmacaves.org)

Cave collapse: Corvette Museum, Kentucky

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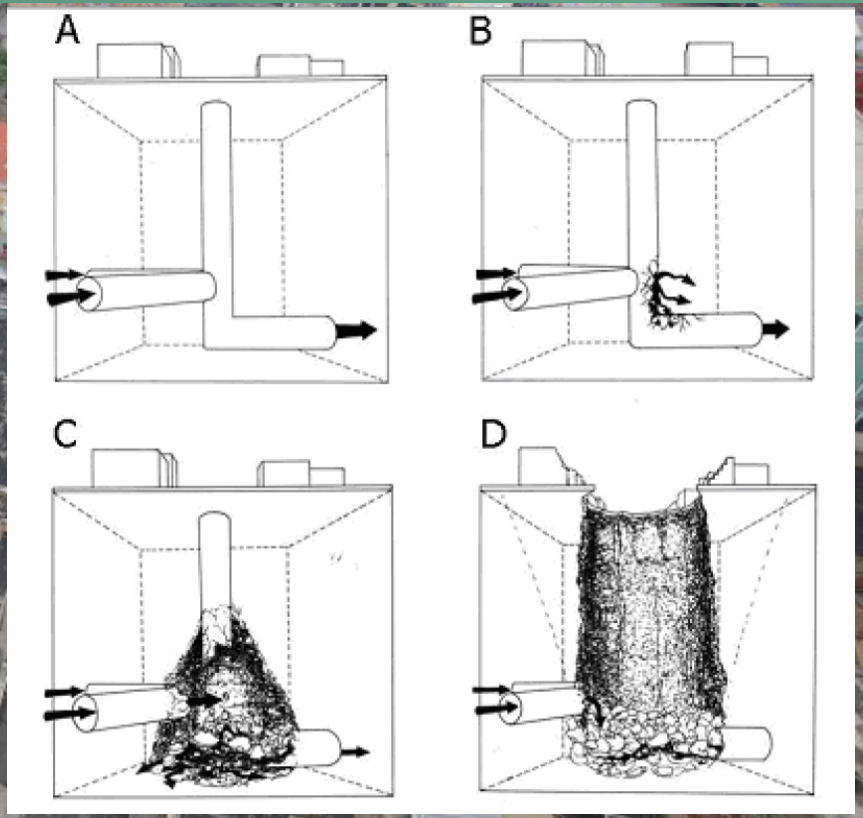
Photos courtesy of Jason Polk

Infrastructure collapse: Guatemala City, 2010



Stormwater basin collapse: Frederick, MD

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Photos: Dan Doctor, USGS

The "Sinkhole Spectrum"

HUMAN ACTIVITIES

NATURAL PROCESSES

ANTHROPOGENIC

NATURAL

HIGHER

LOWER

RELATIVE MANAGEABILITY

INDUCED