# An introduction to gypsum & the plants that call it home

# What is it?

- calcium sulfate dihydrate - $CaSo_4 \cdot 2H_2O$
- crystalline forms - selenite and satin spar
- soft, fairly water-solube


cobalt123 @flickr


meganpru @flickr

# What is it?

when exposed, usually occurs as gypseous clay with occasional masses of selenite or satin spar; less often as gypsum sand


# How does it form?

- evaporite!
- evaporation of salt-rich water leads to deposition of soluble minerals

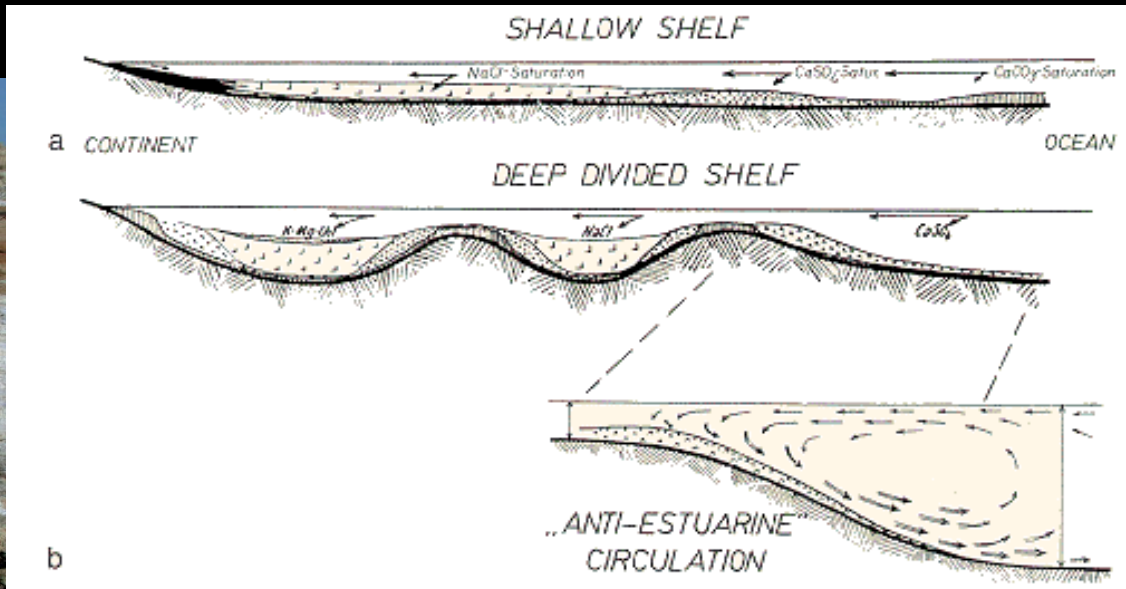
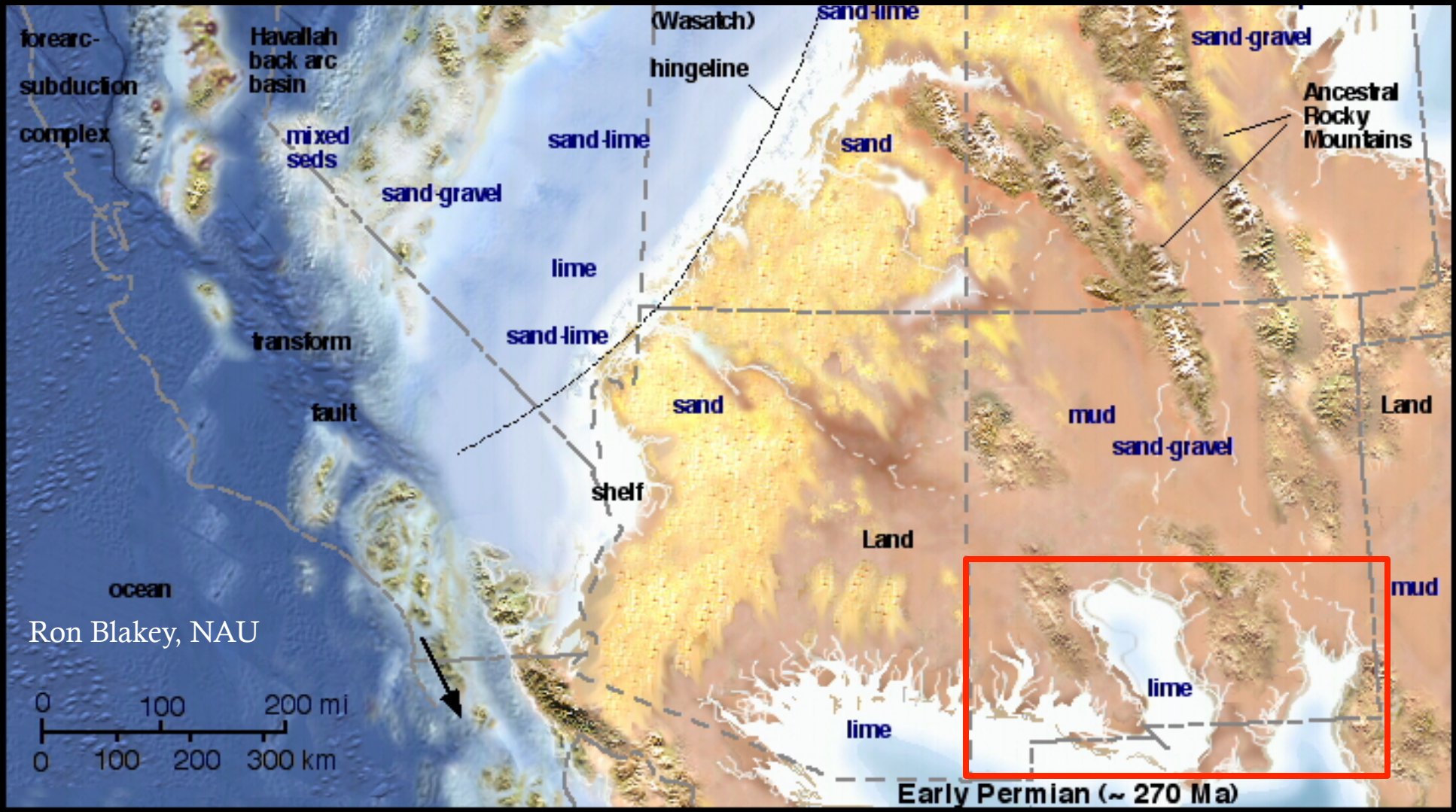




**Fig. 3.11.** Possible models for marine evaporite formation. **a** Serial fractionation in very shallow and extended basins. Saturation of different salts is reached in a series ocean to land. Terrigenous particles may be supplied from land. Recent example: Adshi-darja Lagoon attached to the Caspian Sea by Kara Bogaz Inlet (chemical conditions there are not fully comparable with open sea). **b** Serial fractionation and differential preservation in deeper basins divided by sills. Saturation of differents salts is reached in a series shallow to deep water. *Detail* Only gypsum is precipitated near the sill. Halite saturation is not reached, because brine sinks down to the basin escaping further evaporation. Sill depths can be considerably reduced by carbonate and/or gypsum precipitation. No Recent example known. [G. Richter-Bernburg, 1955, Dtsch. Geol. Ges. 105 [4]: 59]

# How does it form?

- in southern New Mexico, gypsum is mostly in the Yeso Formation;
- shallow coastal ocean waters ca. 280-270 million years ago (Permian)



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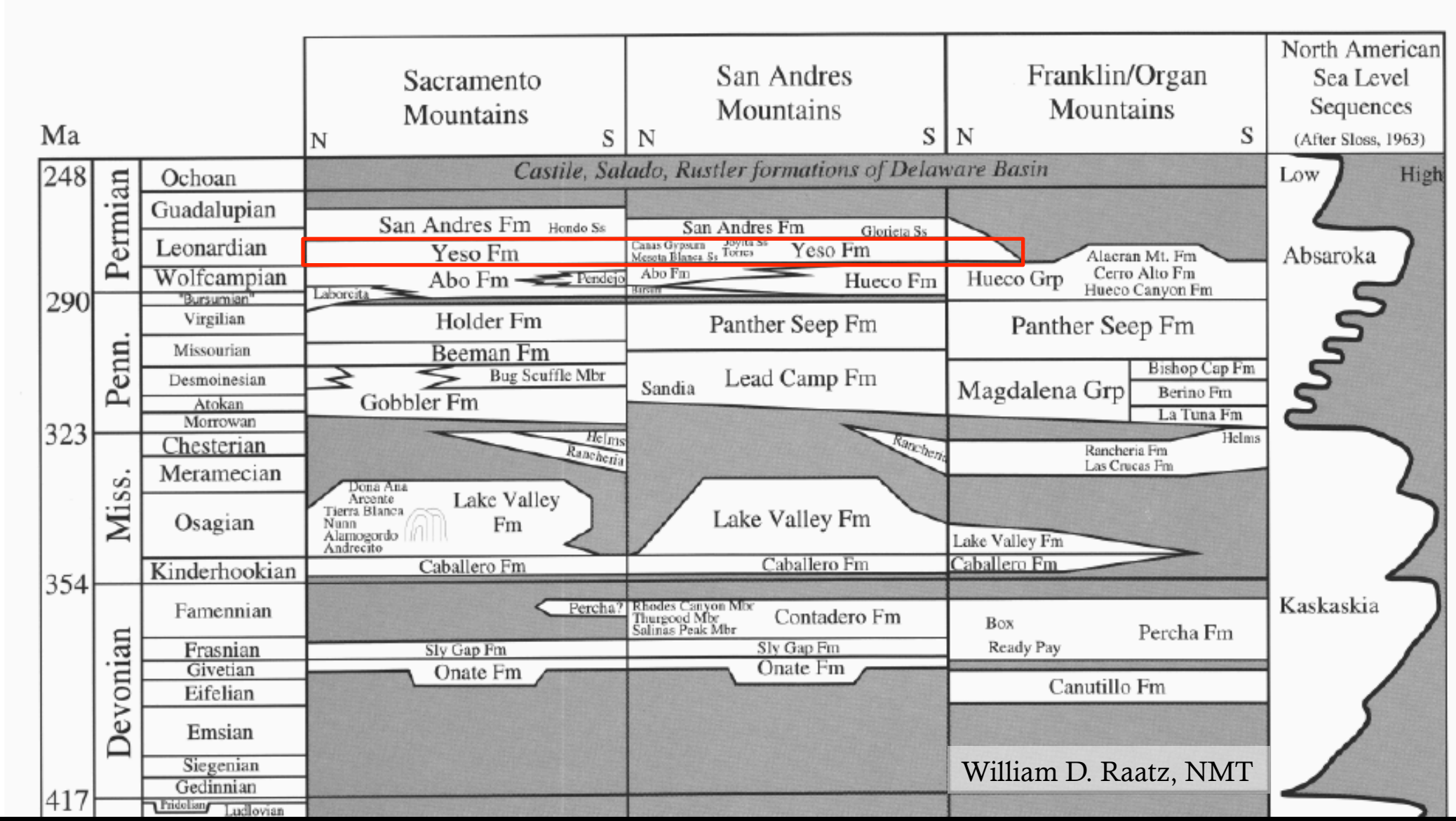

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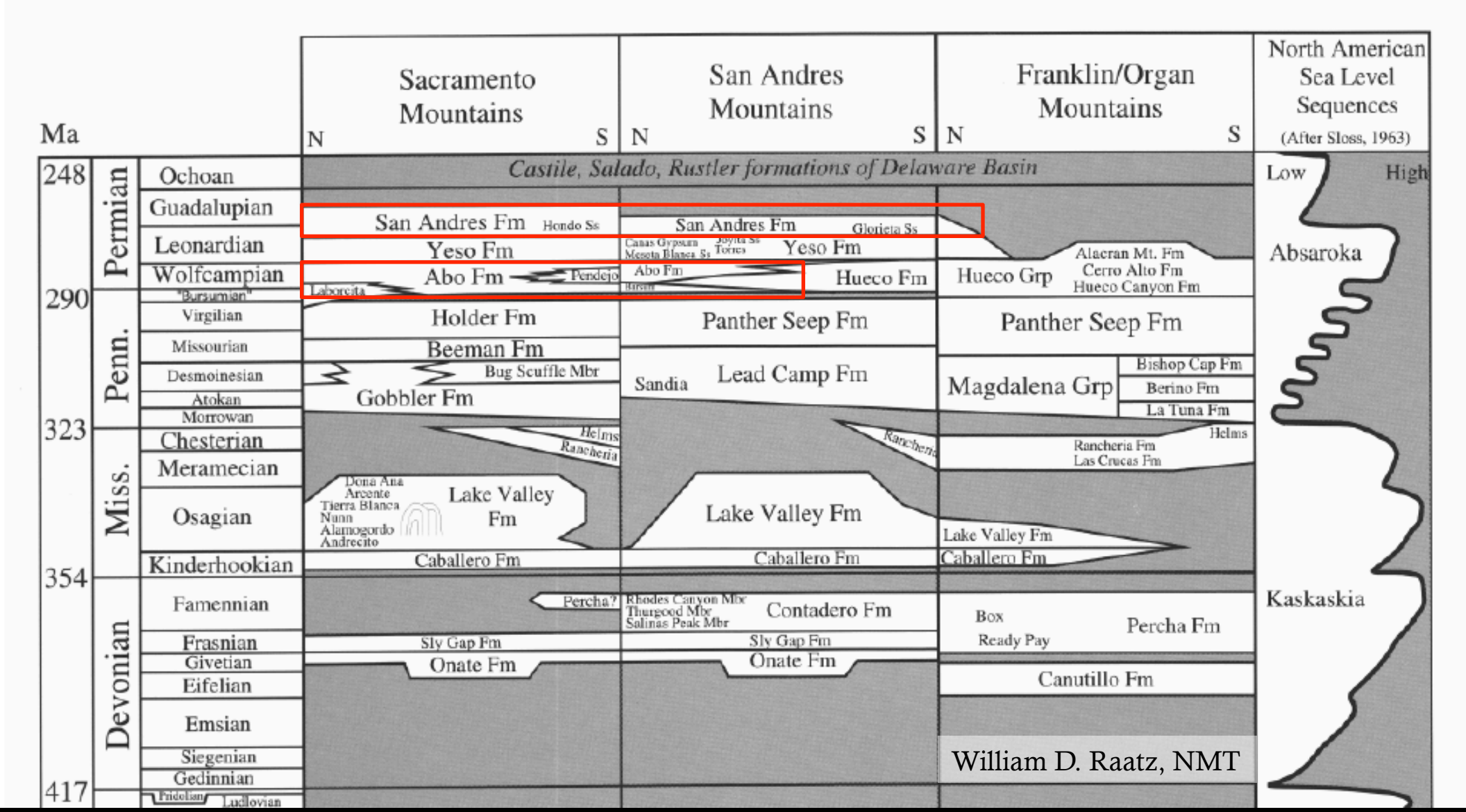
- usually between the San Andres Formation & Abo Formation



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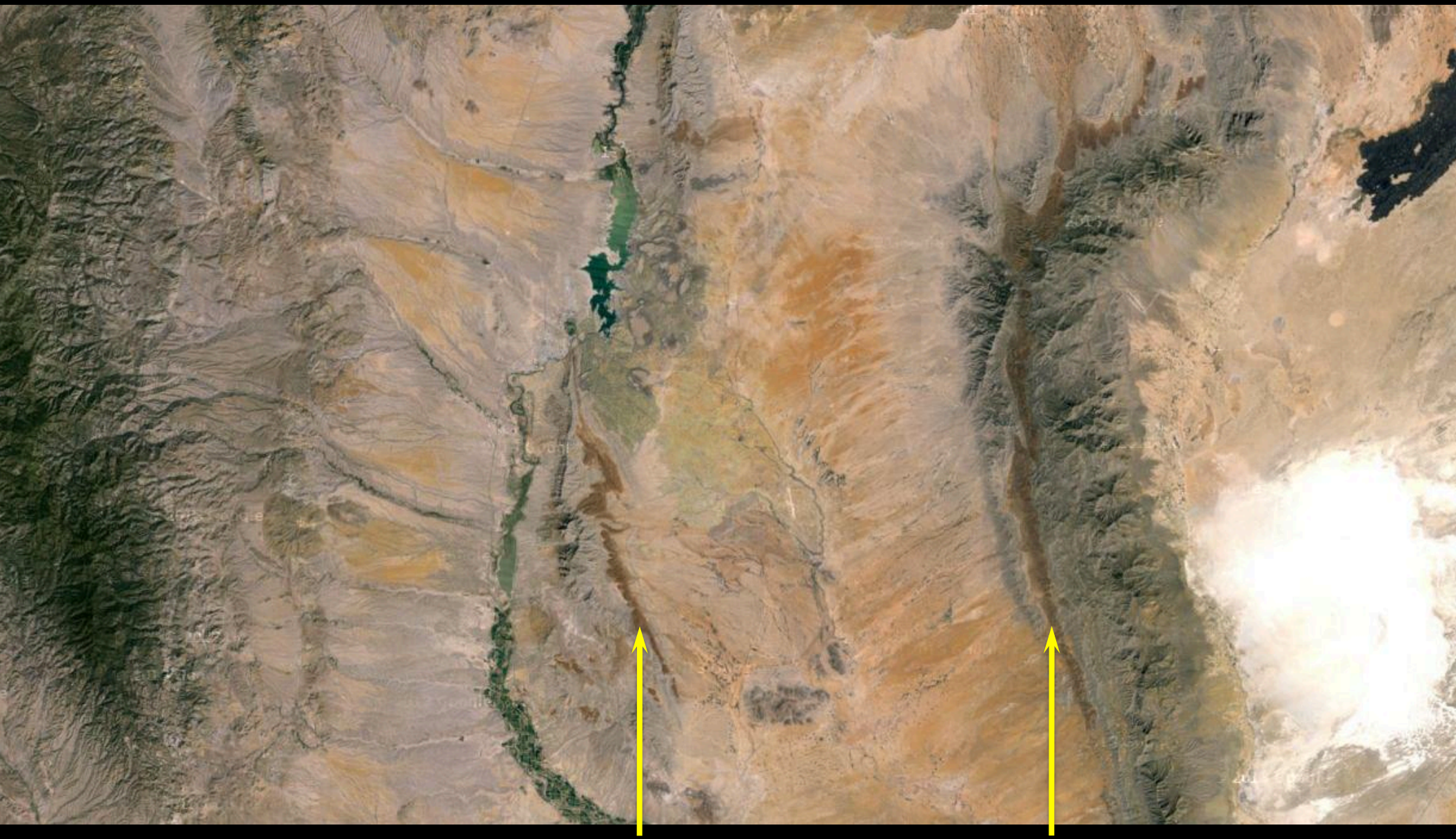

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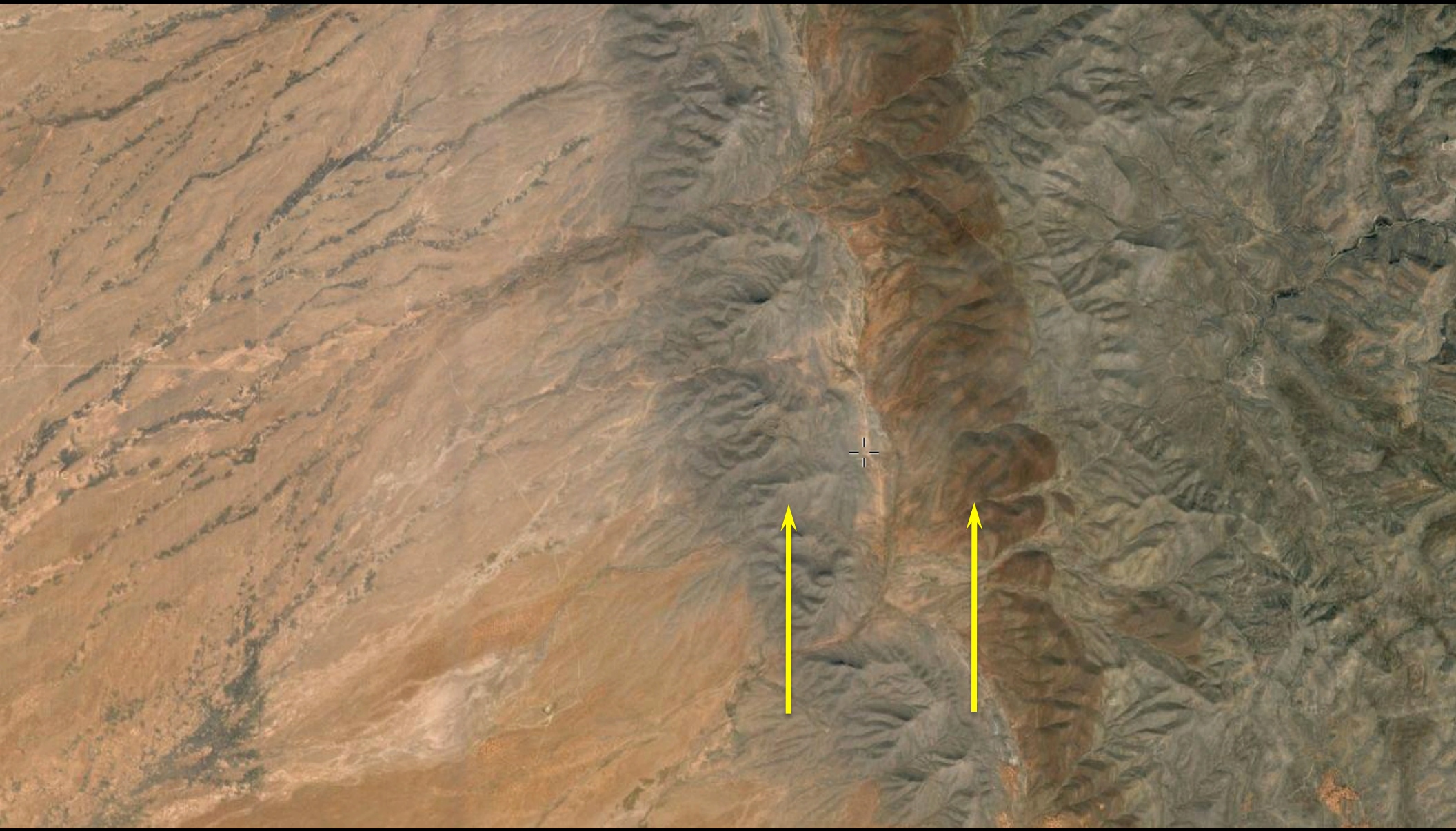

# Where is it?

- gypsum shows up nicely on shortwave infrared satellite imagery

visible light

shortware infrared (7 4 3)

# Where is it?

- here, anything below the Yeso Fm. is buried under sediment…

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- because it is water-soluble, gypsum is often dissolved and carried away, sometimes accumulating in closed basins

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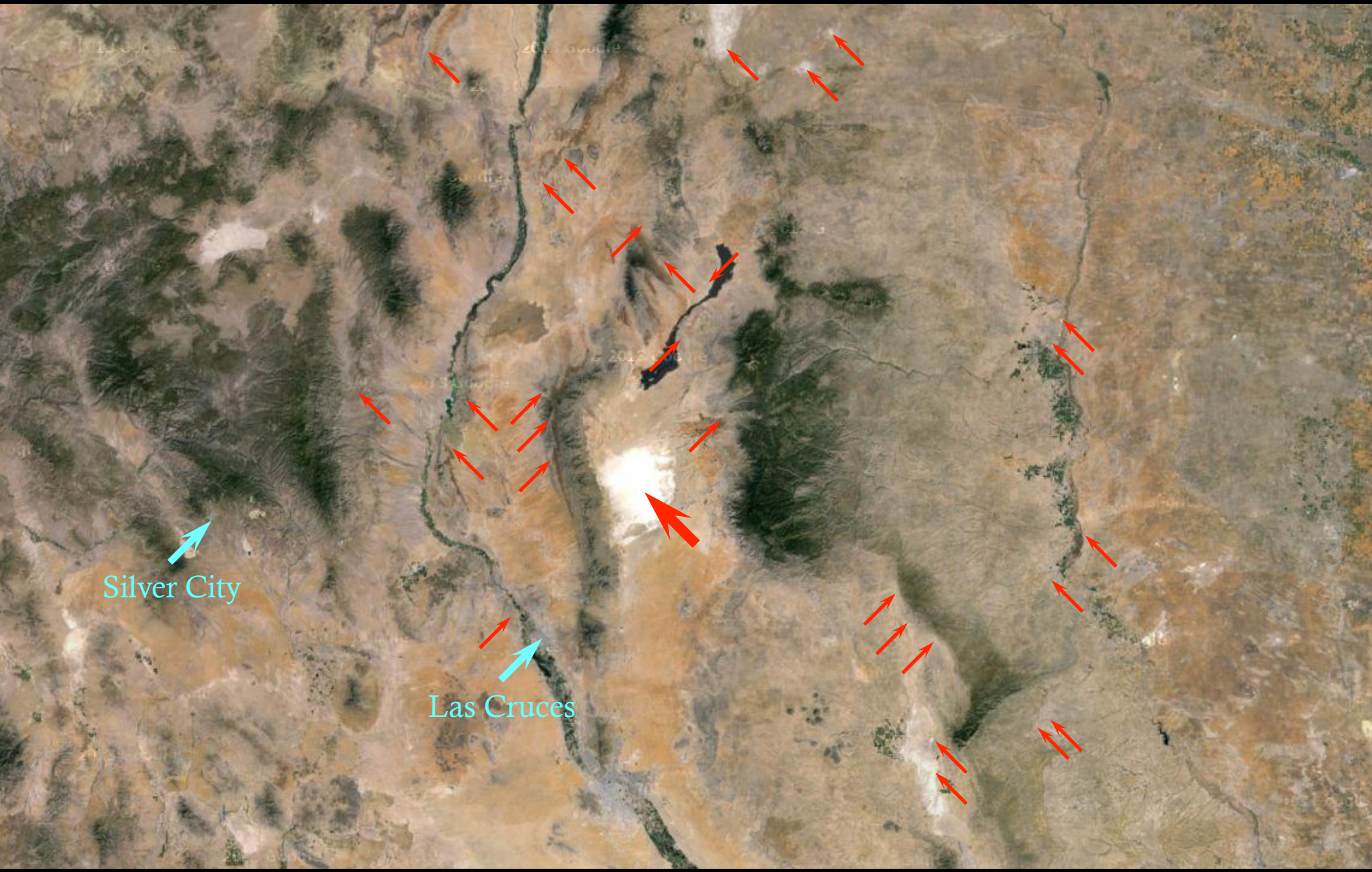

# Gypsum habitats

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- we also have one of the smaller ones (OK, it's actually in Texas; west side of Guadalupe Mts. Nat. Park)

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# Why is gypsum challenging for plants?

- physical soil properties: impermeable soil crusts

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- physical soil properties: or soil movement…

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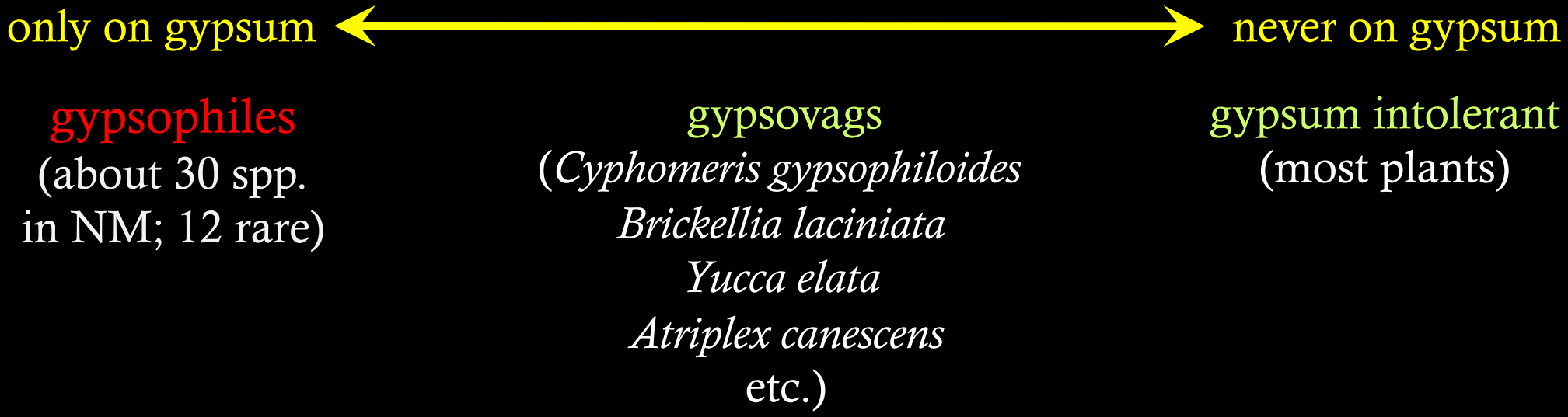
- chemical soil properties - $CaSo_4 \cdot 2H_2O$:
  - low nutrient availability
  - sulfate ions - $So_4^{2-}$ - are toxic in high concentrations
  - various salts (NaCl, KCl, etc.) usually also present in/near evaporites

# Gypsum endemism

- many plants have evolved to tolerate gypsum
- because gypsum occurs in small, isolated patches, these are often narrowly distributed & rare!



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*Mentzelia humilis* var. *guadalupensis* (Guadalupe stickleaf), Loasaceae

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*Acleisanthes lancoleolata* (lance-leaf moonpod), Nyctaginacae

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# Other reasons gypsum is cool…

- of the ca. 30 gypsophiles in NM - 8 were named in the last 25 years!

Sivinski, R.C. and M.O. Howard. 2011. A new species of *Linum* from the northern Chihuahuan Desert. Phytoneuron 2011-33: 1–7. Mailed 28 June.

## A NEW SPECIES OF *LINUM* (LINACEAE) FROM THE NORTHERN CHIHUAHUAN DESERT

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**ABSTRACT**

A new species, **Linum allredii** R.C. Sivinski & M.O. Howard, is described from gypsum substrates in the Yeso Hills of the northern Chihuahuan Desert in New Mexico and Texas. It is distinguished from its closest relative, *Linum puberulum*, by its suffrutescent habit, glabrous upper stems and upper leaves, and yellow petal bases.

**KEY WORDS**: Linaceae, *Linum*, Chihuahuan Desert, gypsophile.

# Other reasons gypsum is cool… entertaining botanists


*Nerisyrenia hypercorax*!

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# Want to see more gypsum?

- go outside!
- or watch Plants Are Cool, Too!
- http://www.youtube.com/user/PlantsAreCoolToo