

# A Skeptic's Conclusion

- The *model-based* clastic sequence stratigraphic paradigm was and is fatally flawed.

# Limitations of a Model-Based Sequence Paradigm

- A “sequence boundary” is a *conceptual* surface that is a composite of multiple physical stratigraphic surfaces.
- The composite fluvial incision surface is demonstrably not a single, regionally isochronous boundary.
- Basin paleogeography is a 3D mosaic of sediment dispersal systems that cannot be captured by 2D models.
  - Corollary: Clastic sediment supply rate and texture are not uniquely predictable by base level change history.
- The sequence model and terminology inadequately reflects the diversity of slope and basin facies.

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# **Three types of stratigraphic surfaces:**

## **■Physical surfaces**

Physical manifestation in the stratigraphic record--you can put your hammer on it.

Record physical processes and environment.

Reproducible by competent geoscientists.

## **■Geometric surfaces**

Defined by angular relationship between beds or reflections.

Record progressive deposition along erosional or non-depositional discontinuity

## **■Conceptual surfaces**

Ideals created in the minds of geoscientists to organize stratigraphy.

Have no objective reality; nature does not create them.

Operator, objective, data base, and paradigm dependent.

# **Physical stratigraphic surfaces:**

## **Fluvial entrenchment surface**

Valley cut  
Fluvial planation  
Interfluve exposure

## **Regressive ravinement surface**

Wave-cut ravinement  
Tidal ravinement

## **Transgressive ravinement surface**

Wave-cut ravinement  
Tidal ravinement

## **Shelf/slope starvation surface**

Condensed section

## **Shelf erosion (“deflation”) surface**

Mud bypass  
Marine current scour  
Tidal scour

## **Slope entrenchment surface**

Submarine canyon cut  
Mass-wasting surface  
Contour current scour

# **Geometric surfaces:**

- Downlap surface
- Onlap surface
- Toplap surface
- Etc.



# **Conceptual stratigraphic surfaces:**

**Correlative conformity**

**Maximum flooding surface**

= non-marine correlative conformity + transgressive ravinement surface + shelf starvation surface ± shelf erosion surface ± slope entrenchment surface + basinal condensed section

**Sequence boundary**

= fluvial entrenchment surface ± regressive ravinement surface ± slope entrenchment surface + marine correlative conformity

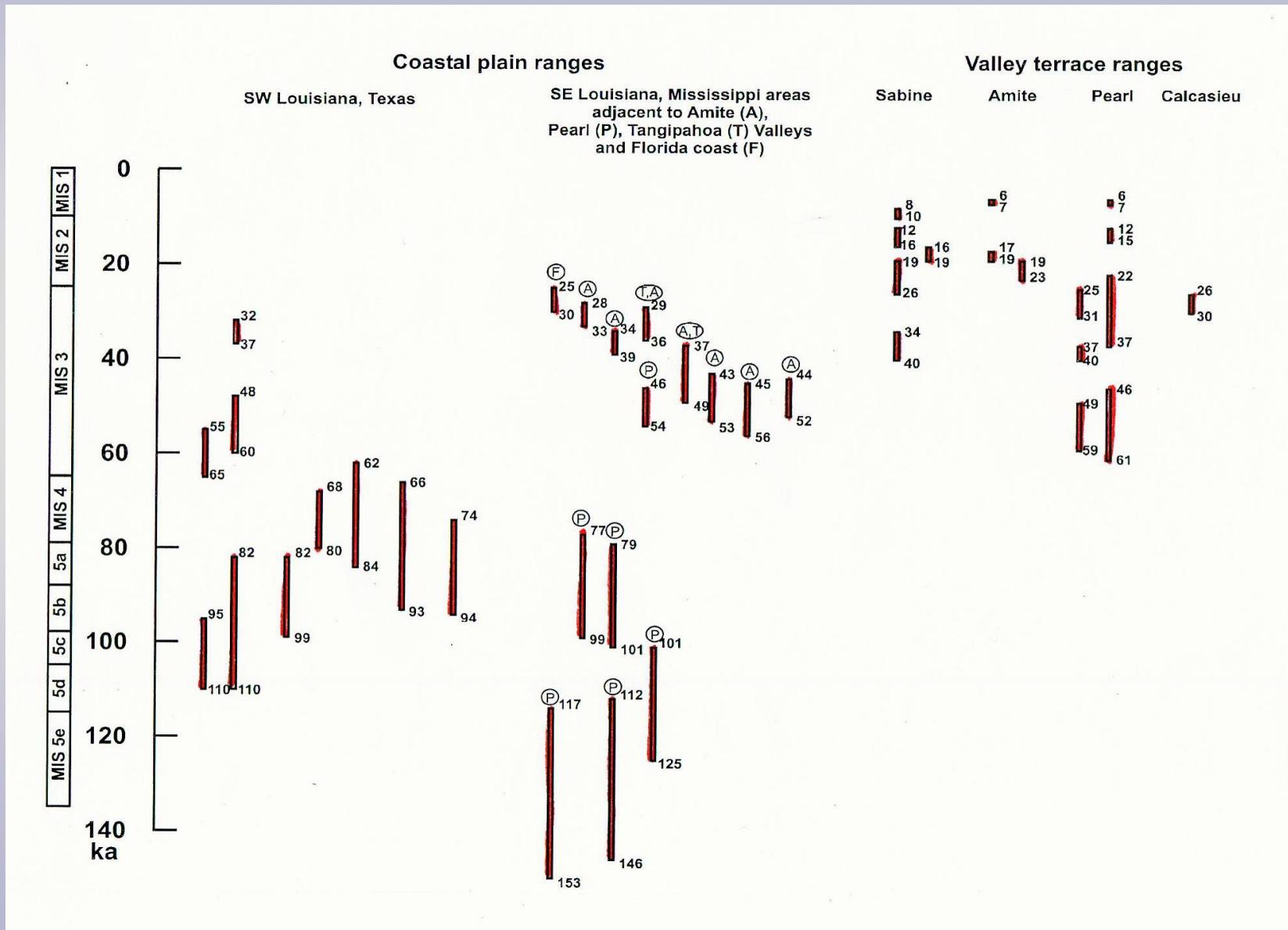
**+Maximum regressive surface, etc.**

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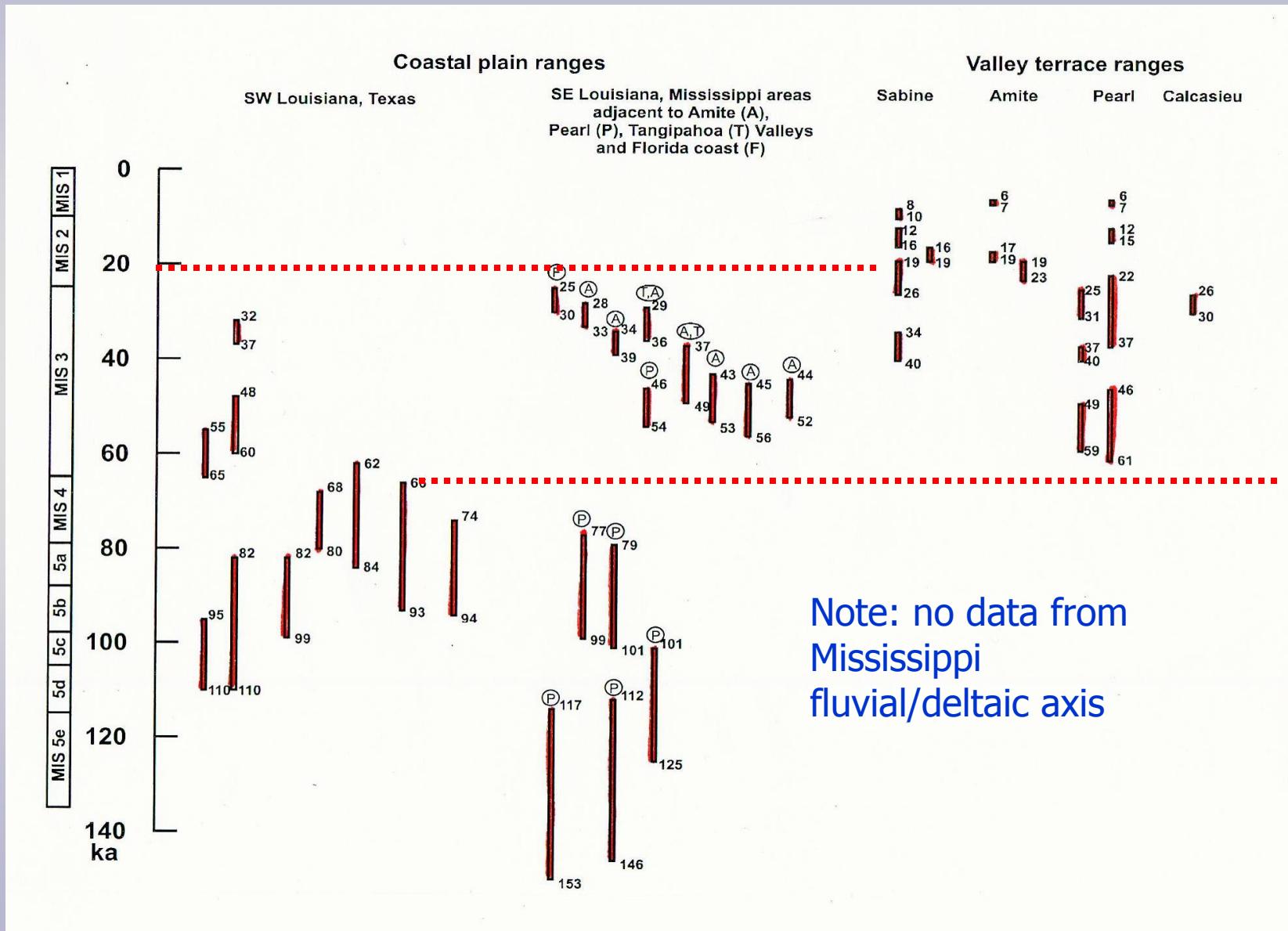
# Find the Pleistocene lowstand unconformity

Central Gulf coastal plain OSL and TL age data from Otvos, 2005



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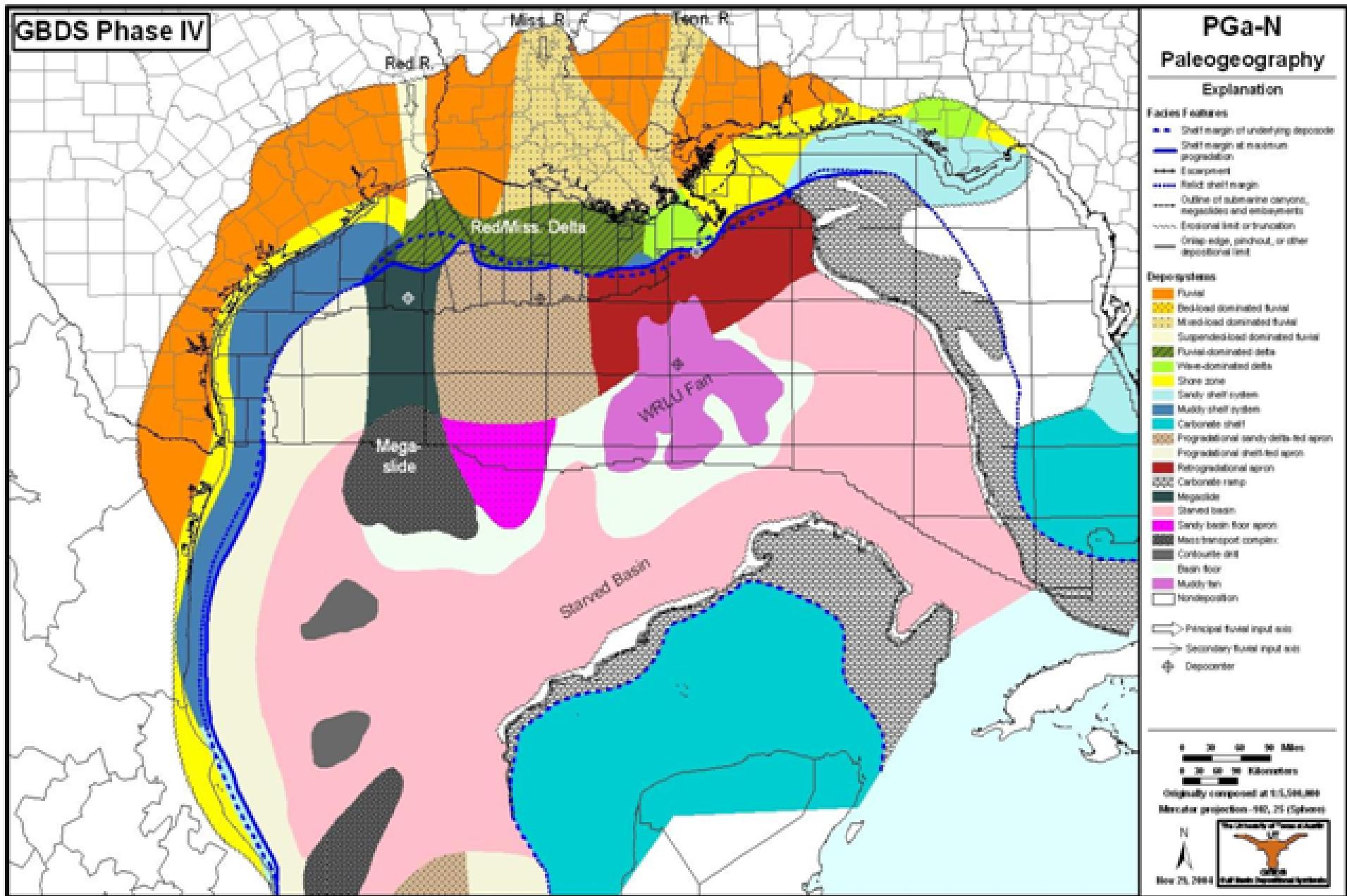
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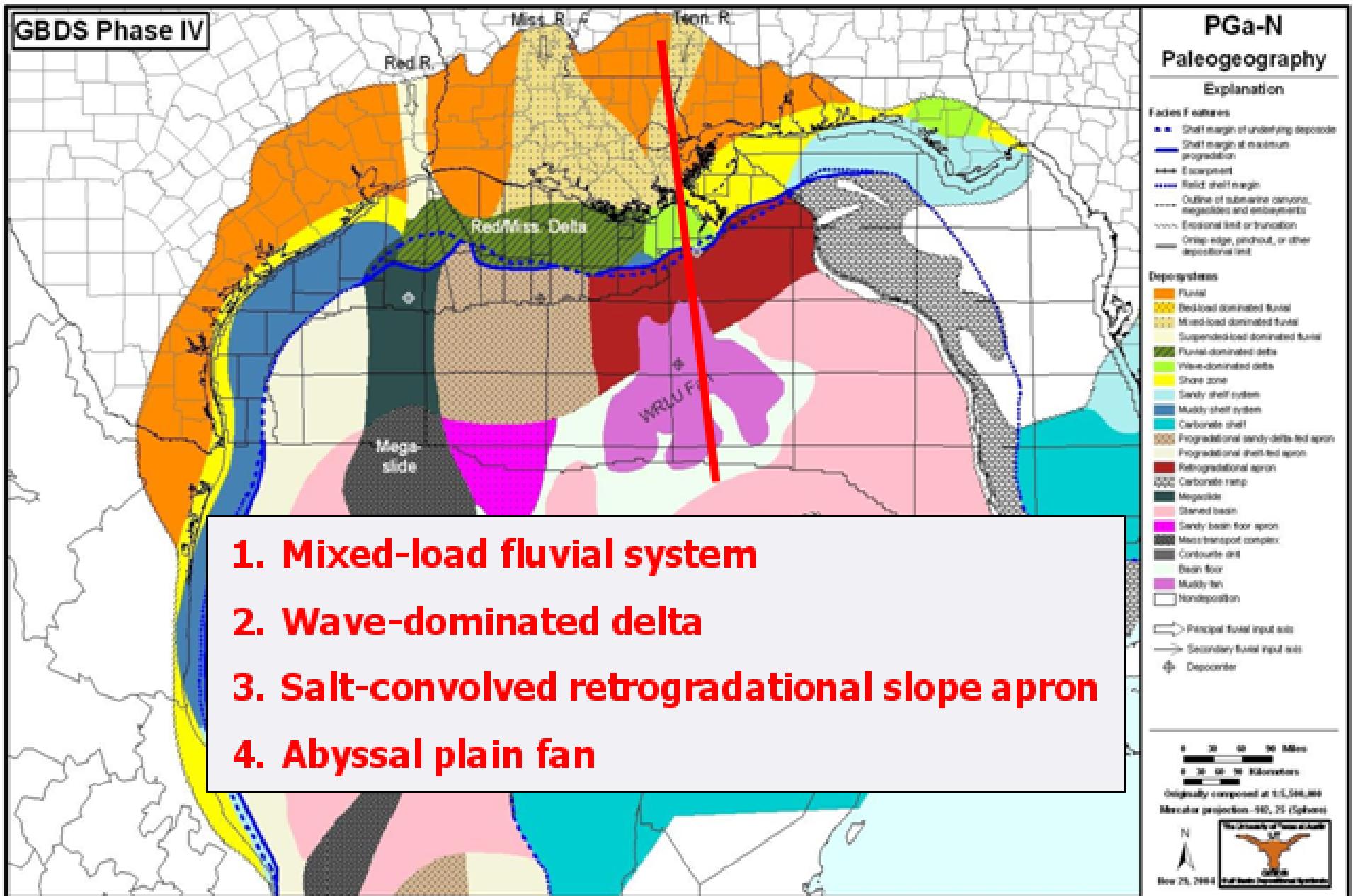
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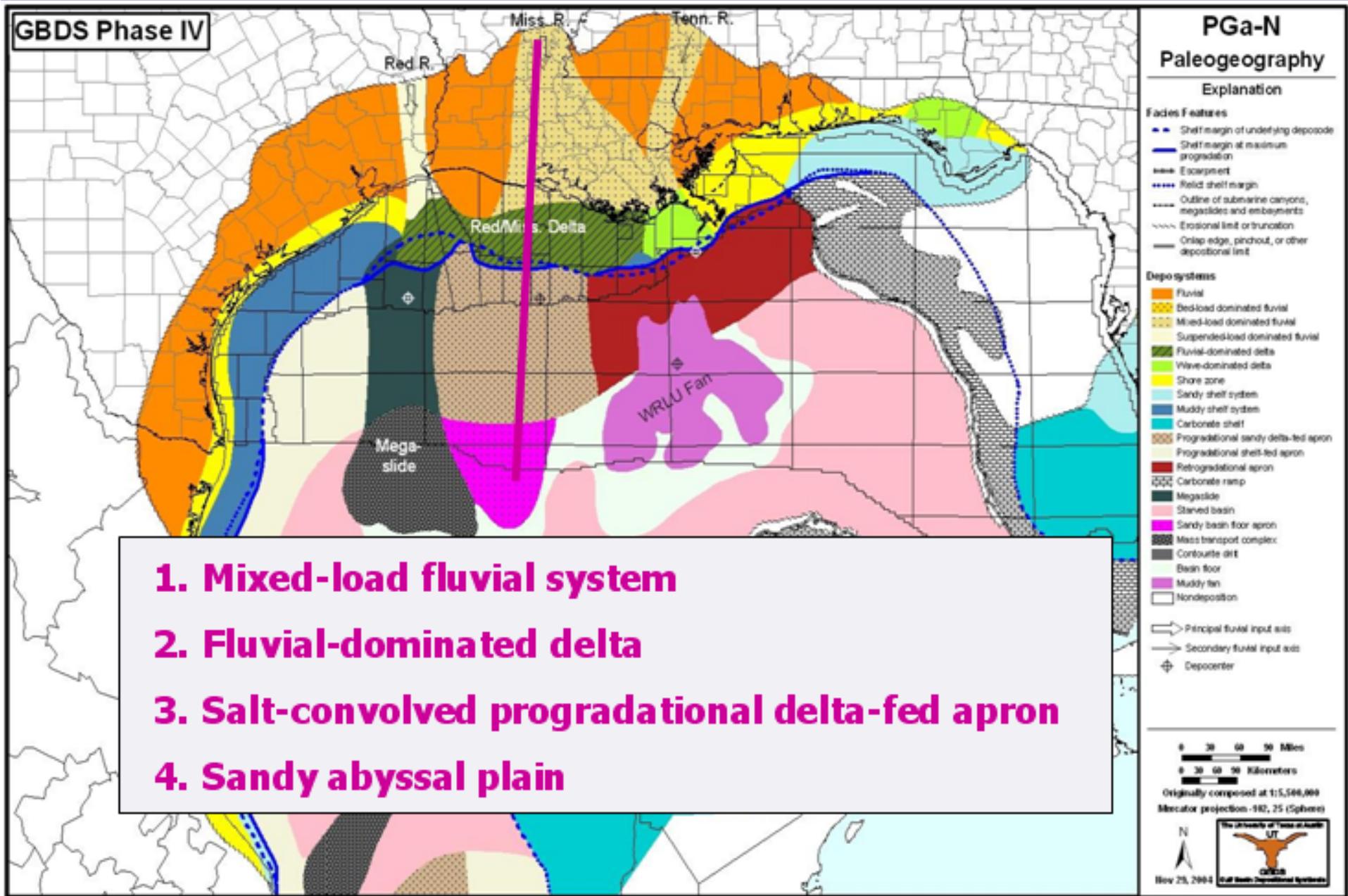
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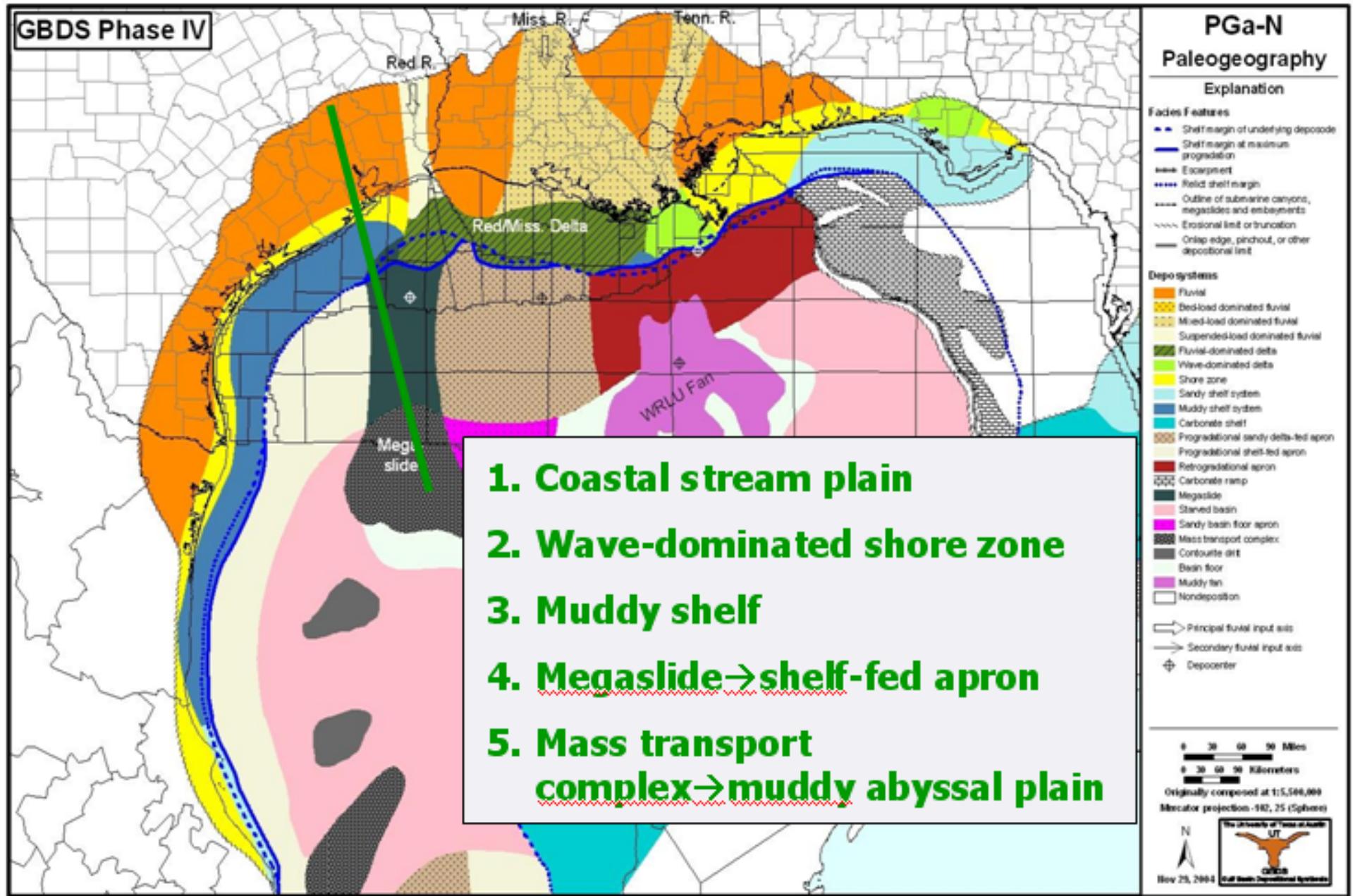
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# The Good Bits

- Recognition and integration of physical surfaces
- Parasequences and their stacking patterns
- Recognition/interpretation of stratal architecture