A Systematic Approach To Geothermal Power Classification

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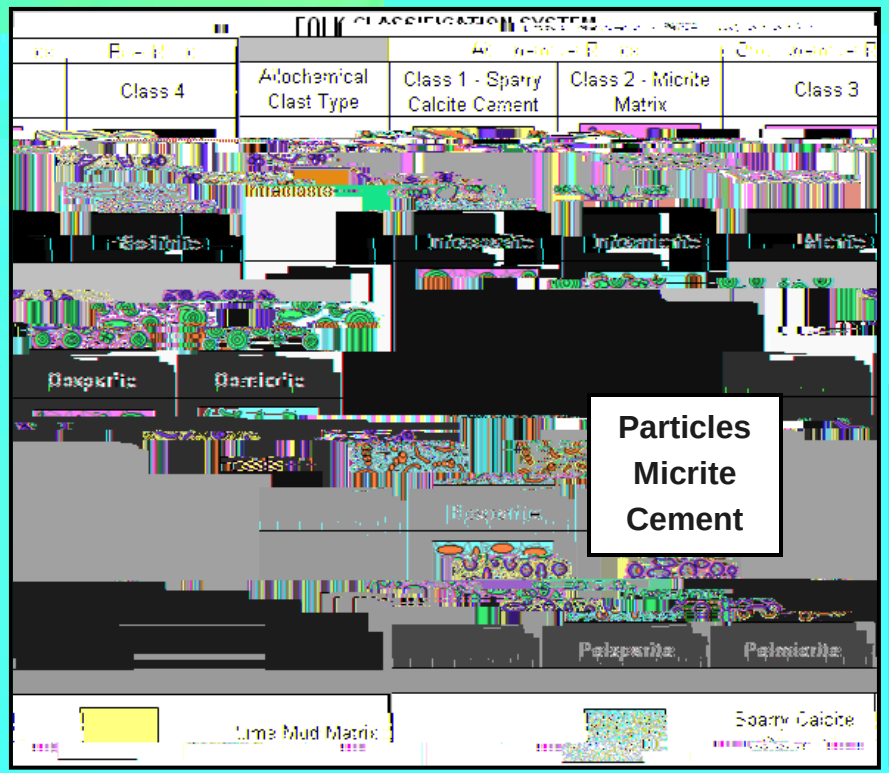
Presentation Overview

- Multiple Classifications – Geology Example
- Historic Geothermal Classifications
- New Classification Rationale
- Proposed Power Classification
  - Five Categories
- Geologic Environment / Feature
  - Plate Margin Environment – 9 Features
  - Intraplate Environment – 5 Features
- Conclusions

Geology Classification Examples

Classification = systematic arrangement in groups or categories according to established criteria.

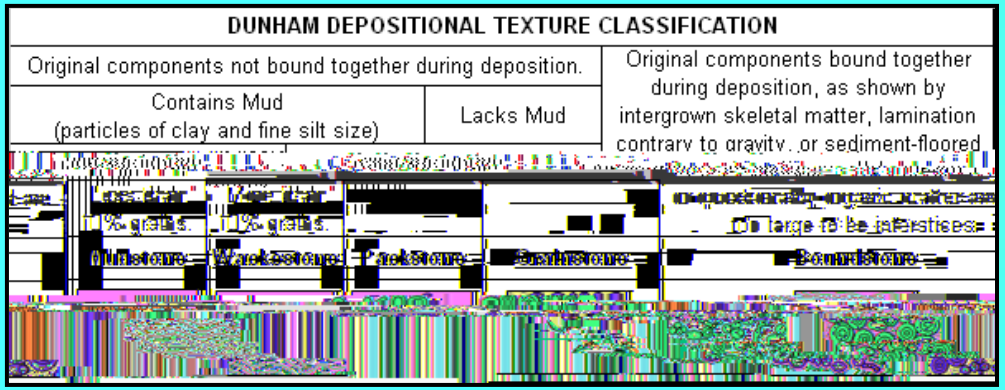
Multiple classification systems can be developed to describe the same object or process.



Microscope thin section description.

Limestone Classifications

Hand specimen and in outcrop.

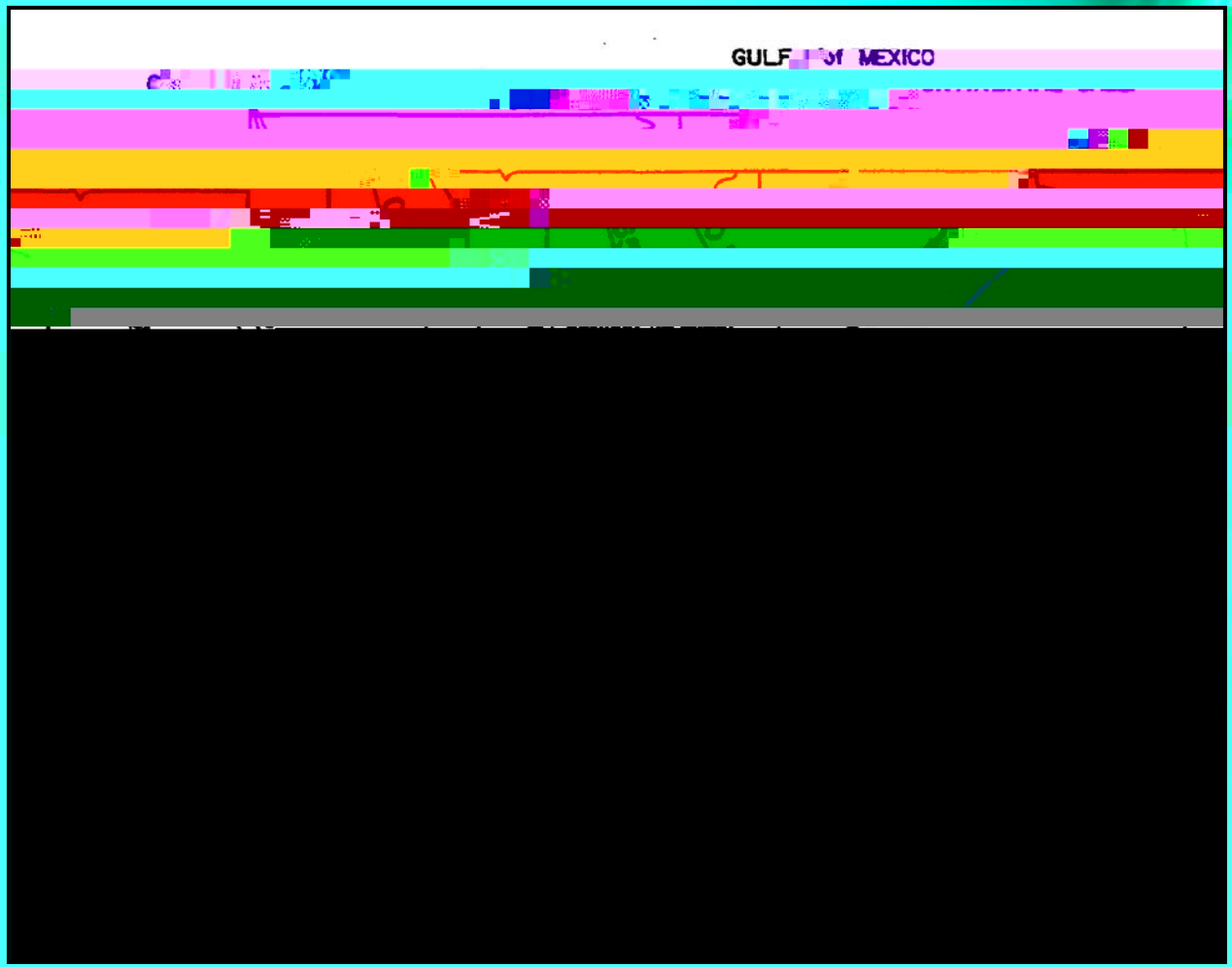


Texture & Grain Size

Company Discussion

Geothermal from sedimentary basins:

1 –



Proposed Power Classification

Five Distinct Categories

1 – Geologic Environment
- A) Plate Margin
- B) Intraplate

2 – Geologic Feature

3 – Crustal Heat Source

4 – Resource Category

5 – Rock Type

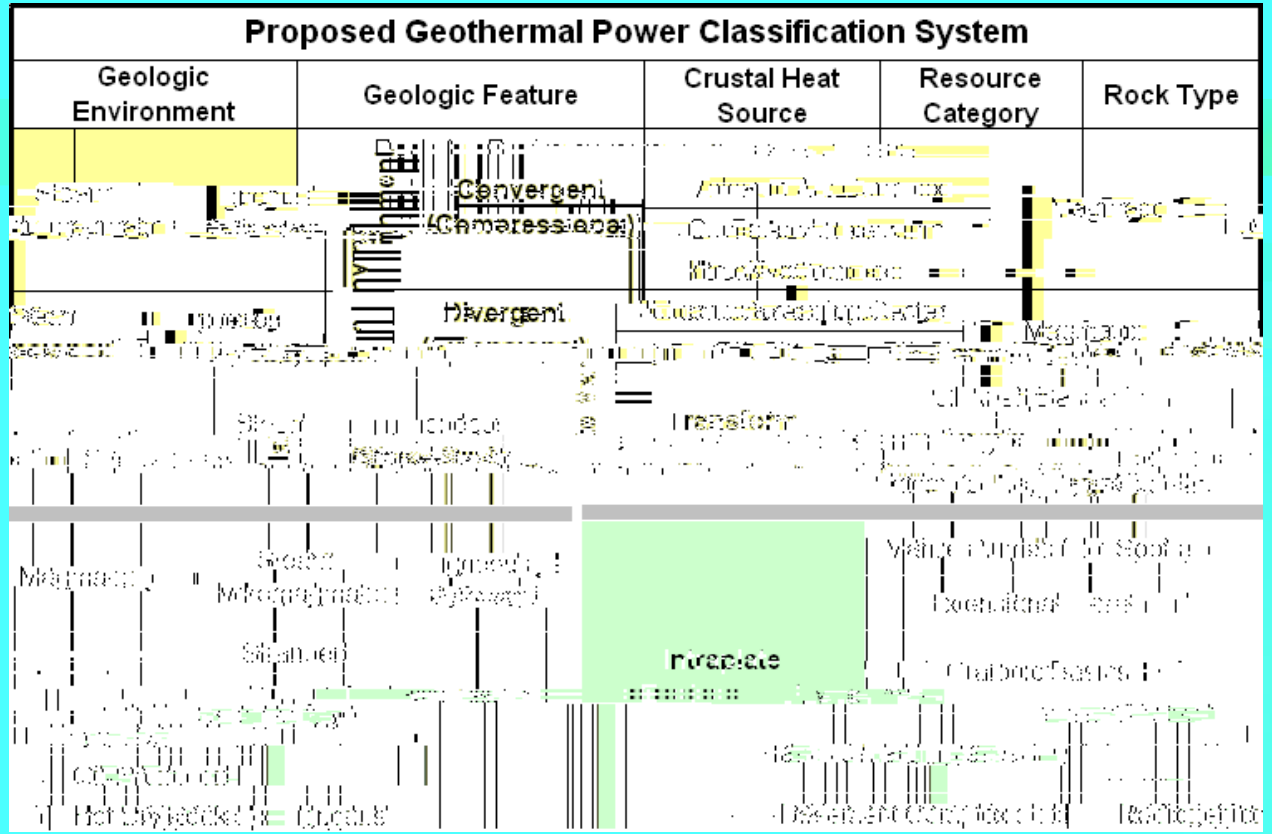
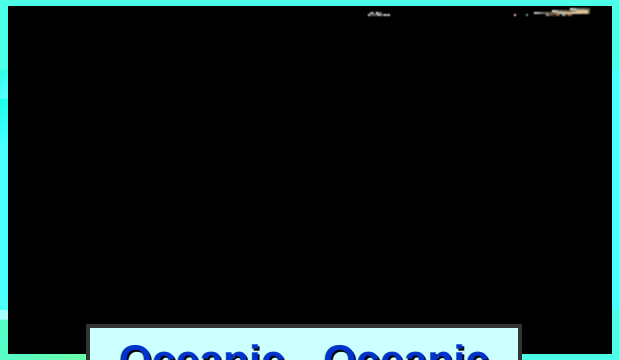


Plate Margin – Convergent (Compression)

Images from: University of Michigan



Oceanic - Oceanic

Marianas; Japan

Basaltic
Andesitic

Oceanic - Continental

Andes; Cascades

Andesitic
Dacite
Rhyolite

Continent -

Himalayas

Andesitic
Dacite
Rhyolite

Rock type data from:
San Diego State University
&
"Volcanology and Geothermal Energy"

Summary Table

Magma Type	Solidified Rock	Chemical Composition	Temperature	Viscosity	Gas Content
Low	Basalt	45-55 SiO_2 %, high in Fe, Mg, Ca, low in K, Na	1000 - 1200 °C	Low	Low
Intermediate	Andesitic Andesite	55-65 SiO_2 %, intermediate in Fe, Mg, Ca, Na, K	800 - 1000 °C	Intermediate	Intermediate
High	Rhyolitic Rhyolite	65-75 SiO_2 %, low in Fe, Mg, Ca, high in K, Na	650 - 800 °C	High	High

Table from: Tulane University

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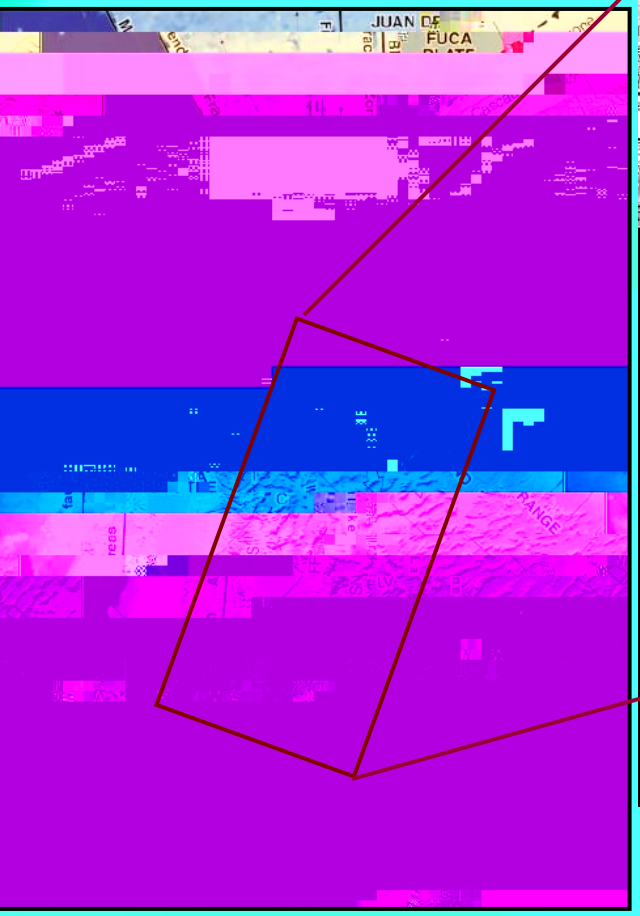
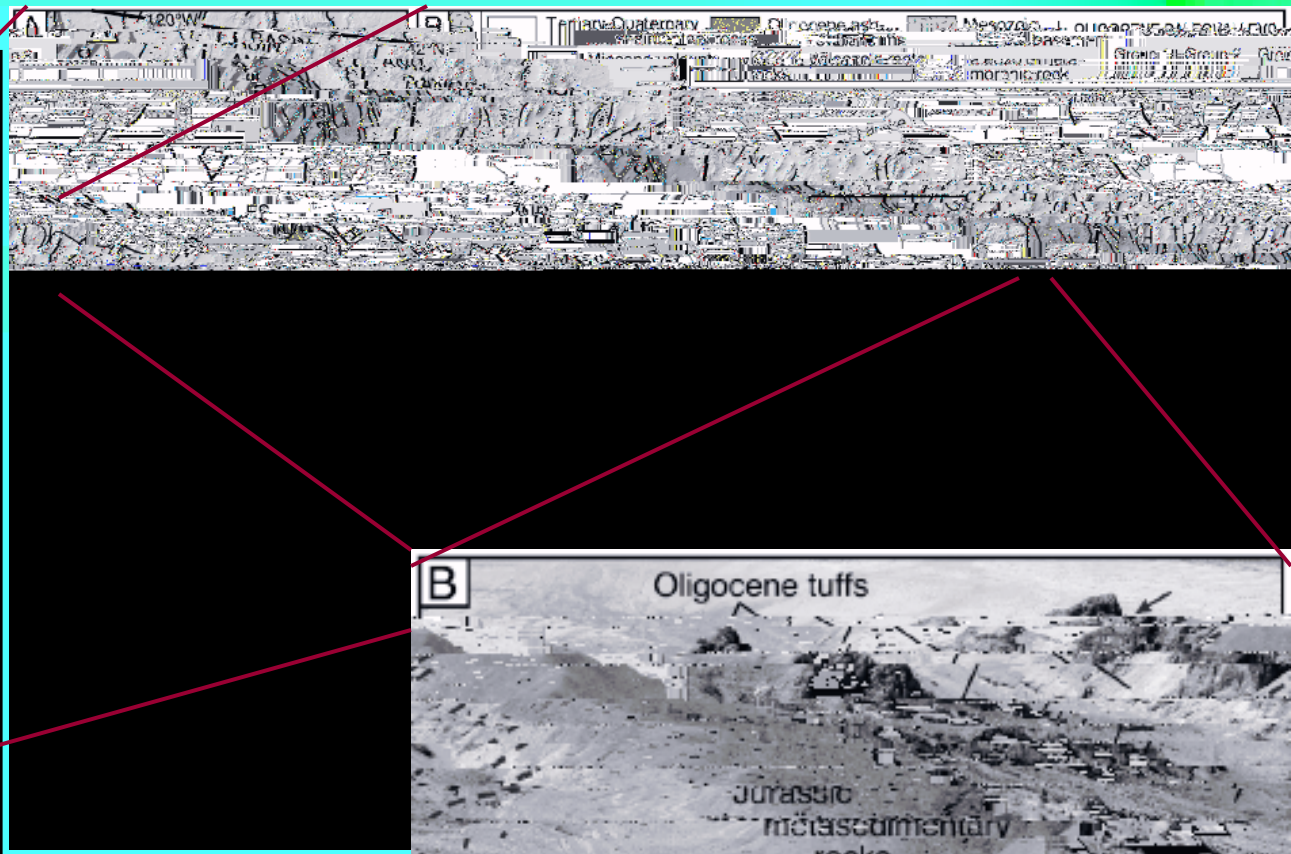
Pli61-.MC .61450 168 cmn 0 0 SCN0 0 m.n

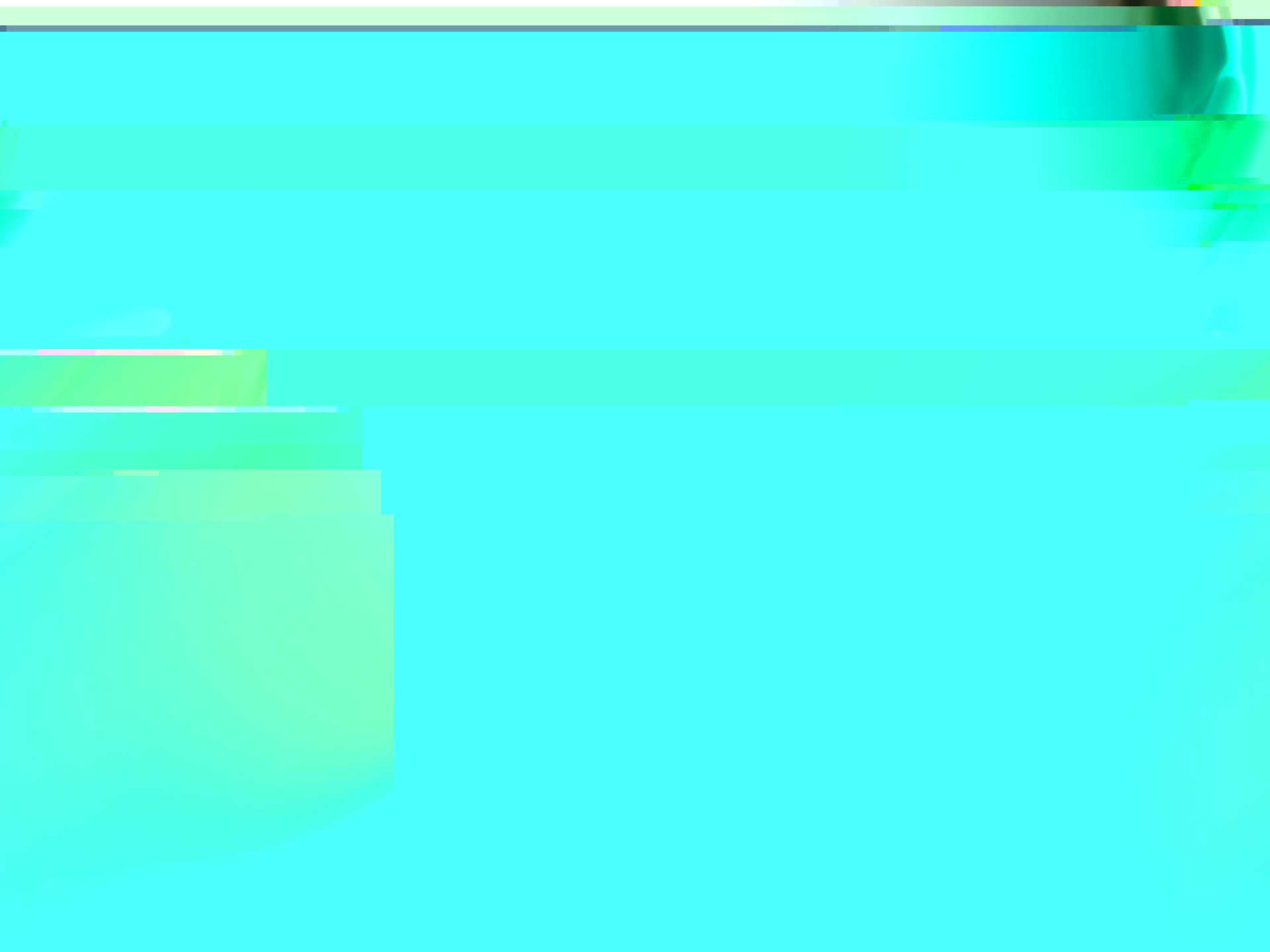
Transtension / Volcanic

Faulds, Henry, & Hinz, 2005, GSA

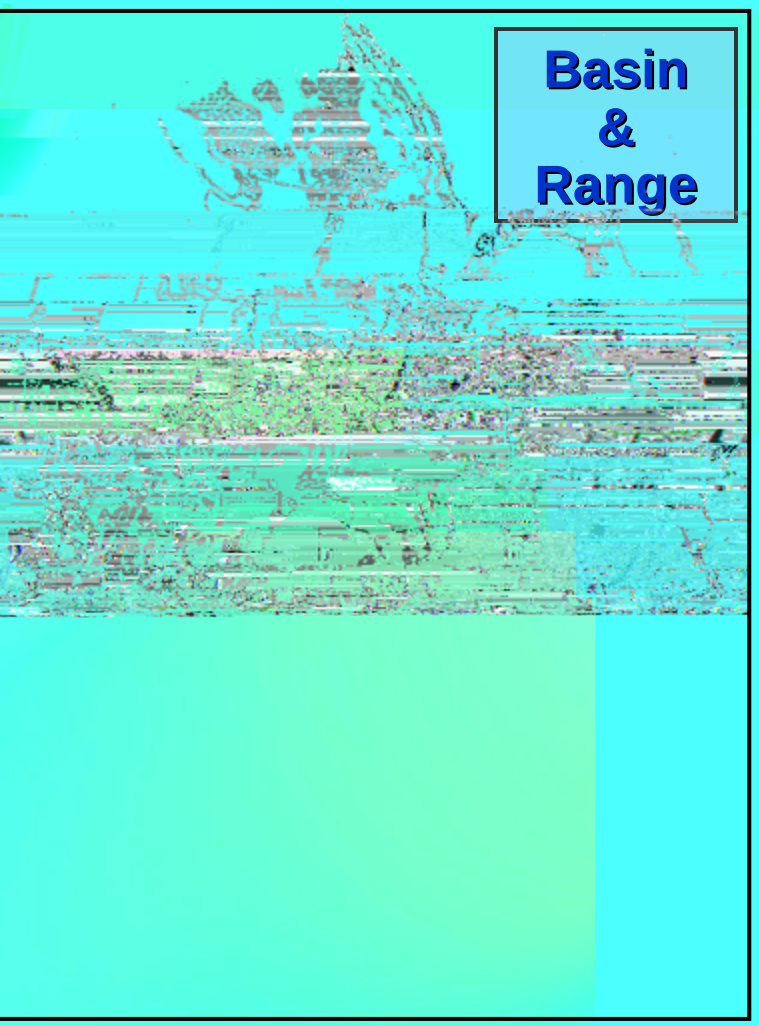




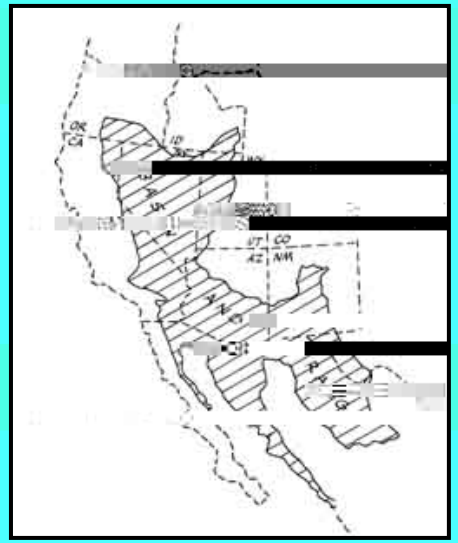
Unruh, Humphrey, & Barron, 2003, GSA



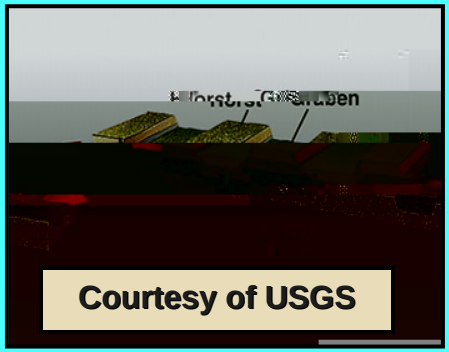
Intraplate – Extensional Terrain

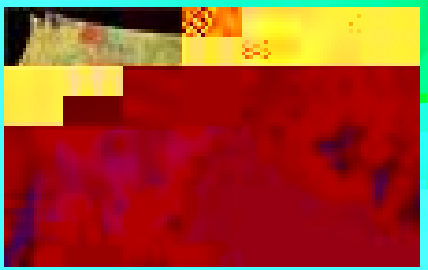


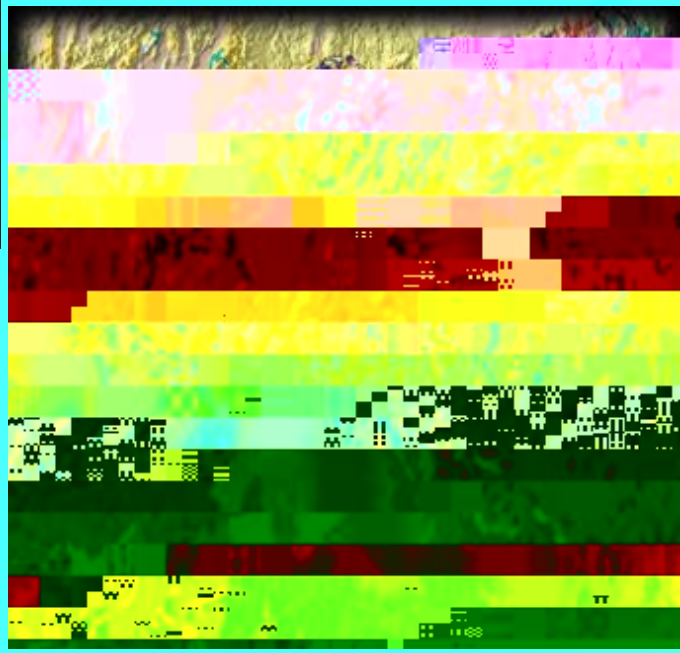
http://www.colorado.edu/GeolSci/Resources/WUSTectonics/CoreComplex/5700.html



Basaltic
To
Rhyolitic







Basin and Range