A Systematic Approach To Geothermal Power Classification

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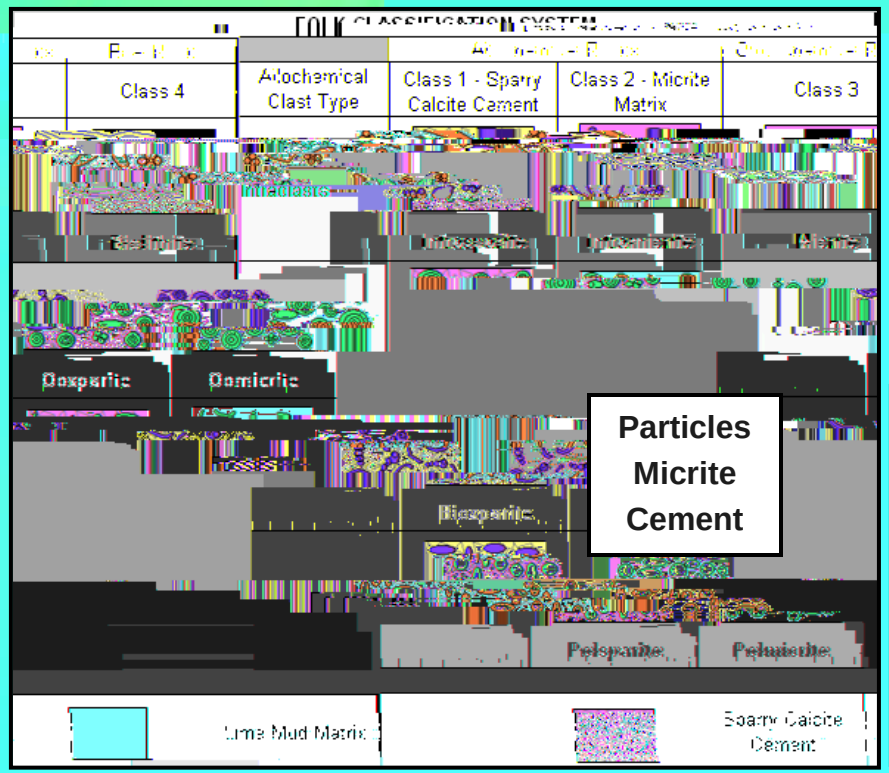
Presentation Overview

- 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.

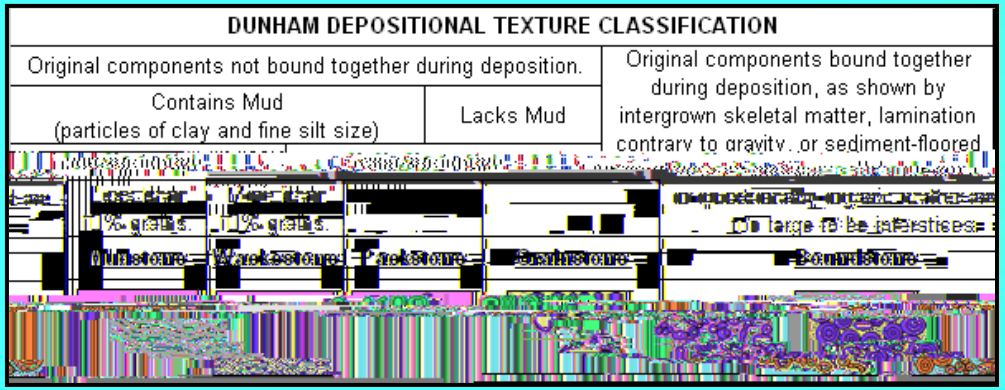


Particles
Micrite
Cement

Microscope thin section description.

← **Limestone Classifications**

↓ **Hand specimen and in outcrop.**

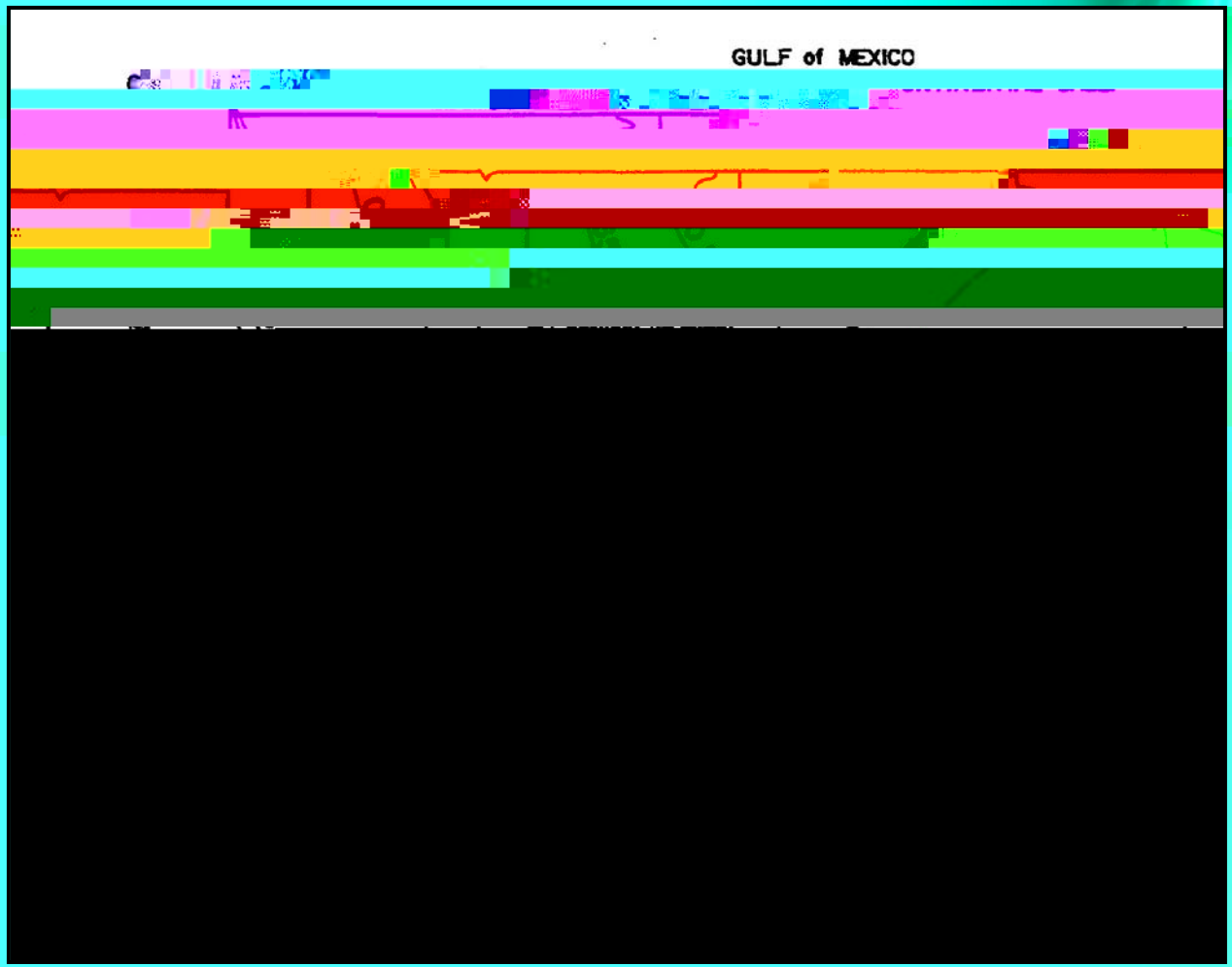


Texture & Grain Size

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

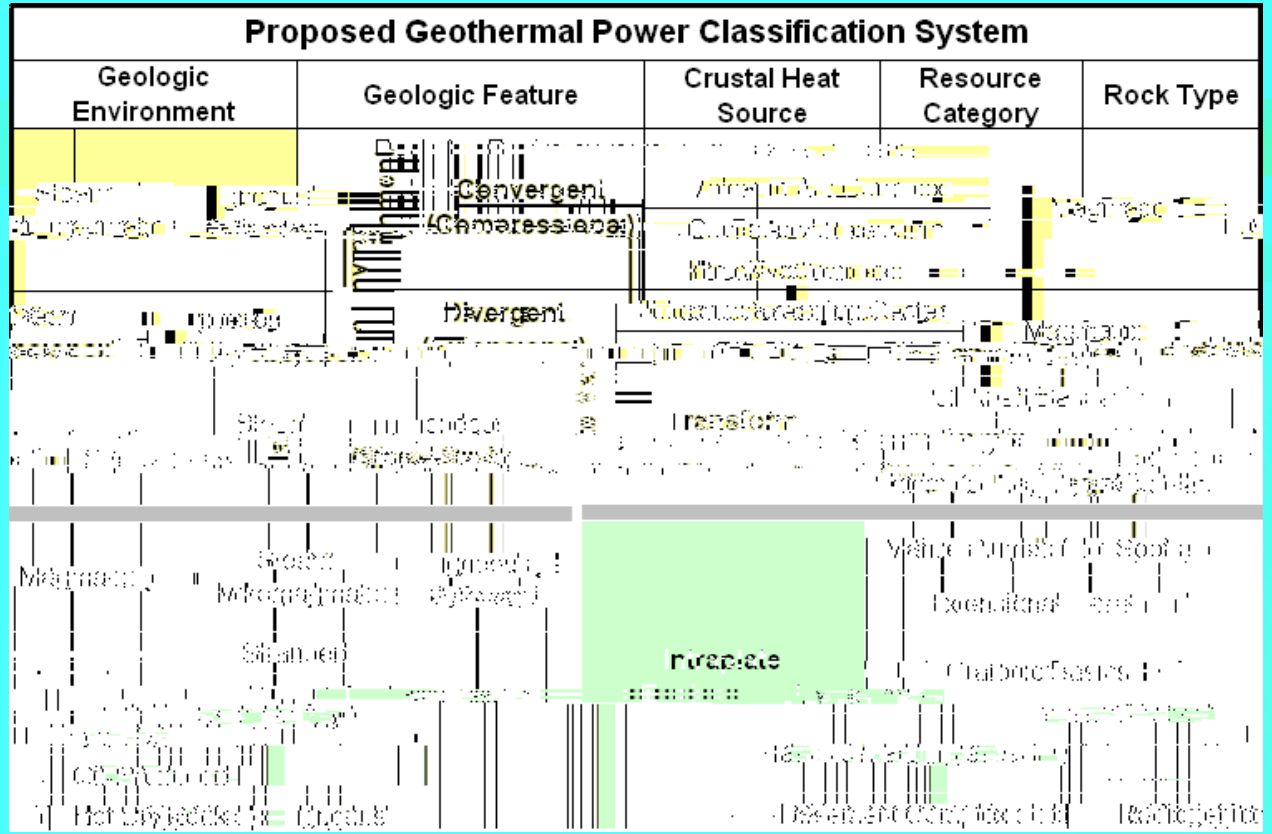


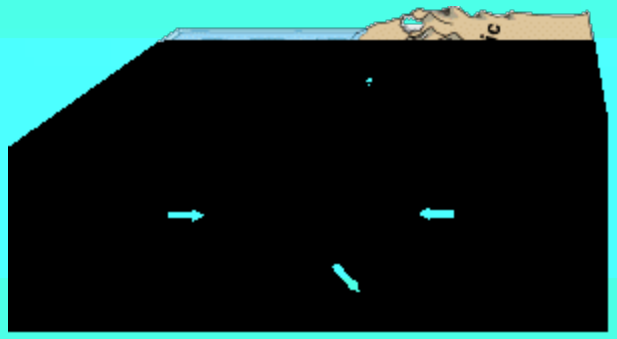
Plate Margin – Convergent (Compression)

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"

Table from: Tulane University

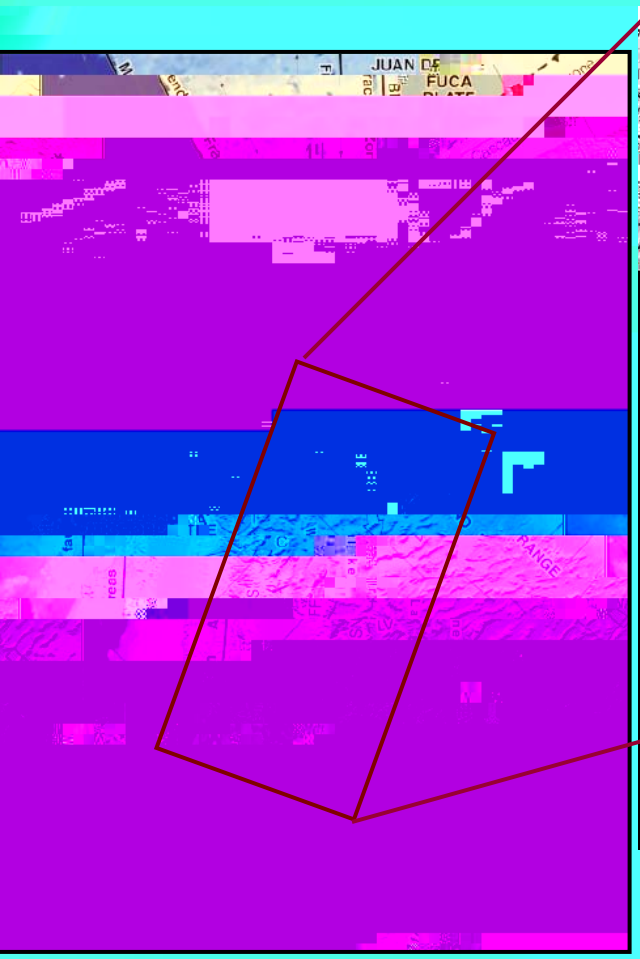
Summary Table

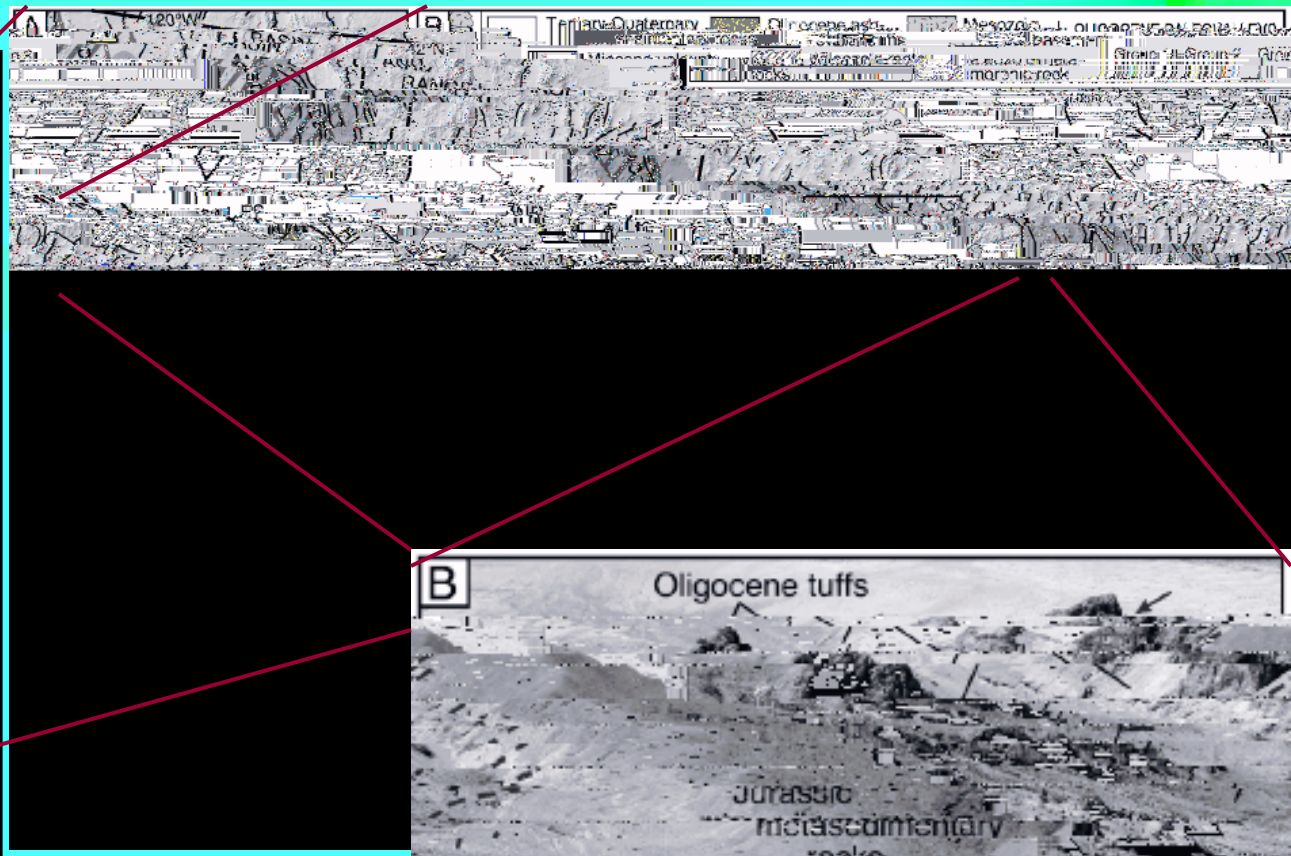
Magma Type	Solidified Rock	Chemical Composition	Temperature	Viscosity	Gas Content
Low	Basaltic	Basalt	45-55 SiO_2 %, high in Fe, Mg, Ca, low in K, Na	1000 - 1200 °C	Low
Intermediate	Andesitic	Andesite	55-65 SiO_2 %, intermediate in Fe, Mg, Ca, Na, K	800 - 1000 °C	Intermediate
High	Rhyolitic	Rhyolite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

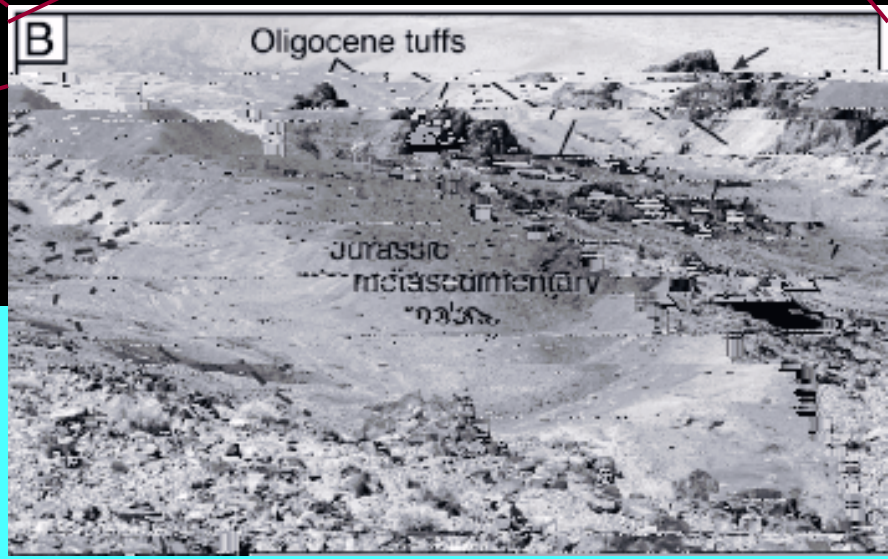
Pli61-.MC .61450 168 cmn 0 0 SCN0 0 m.n

Transtension / Volcanic

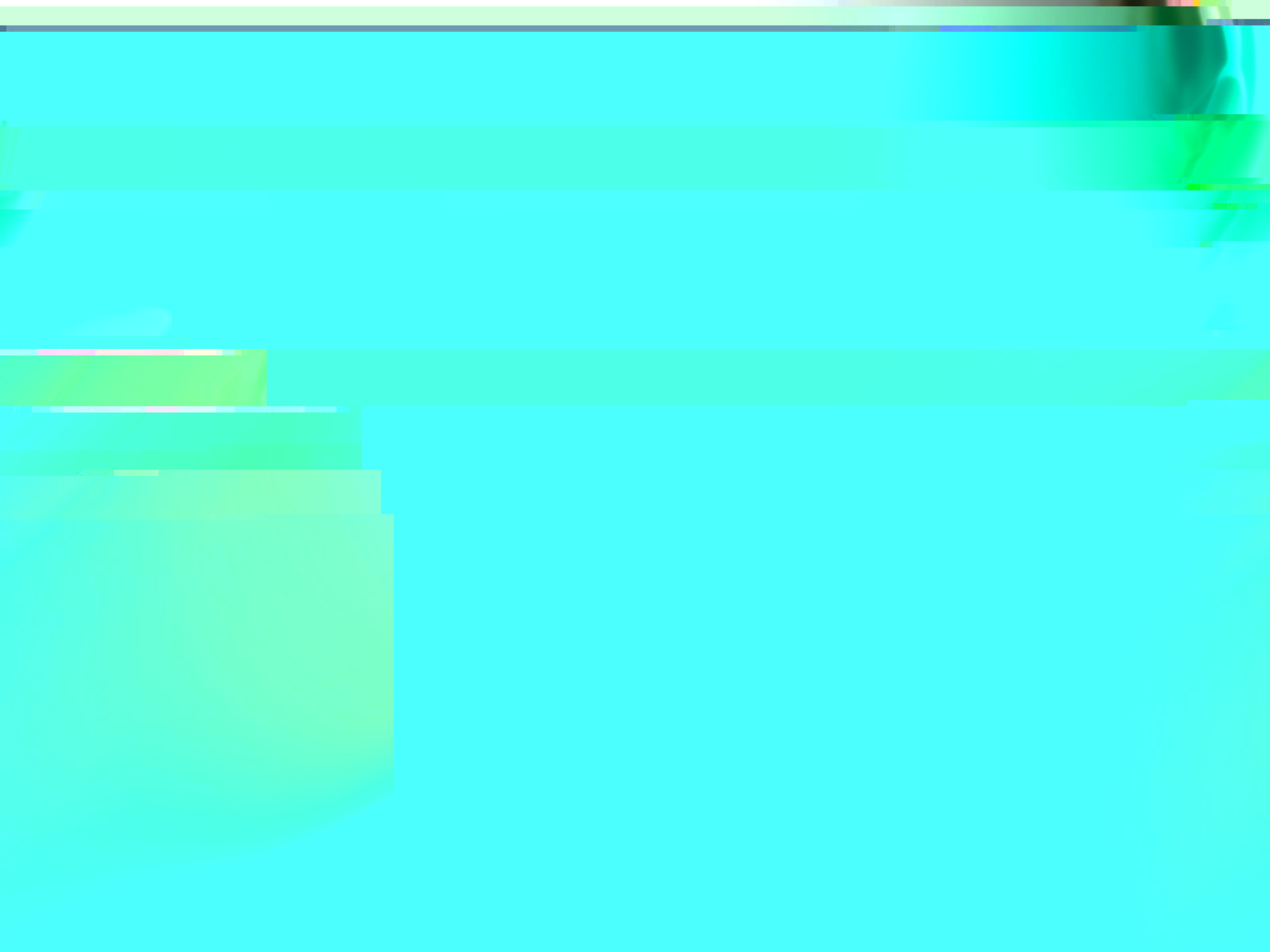
Faulds, Henry, & Hinz, 2005, GSA



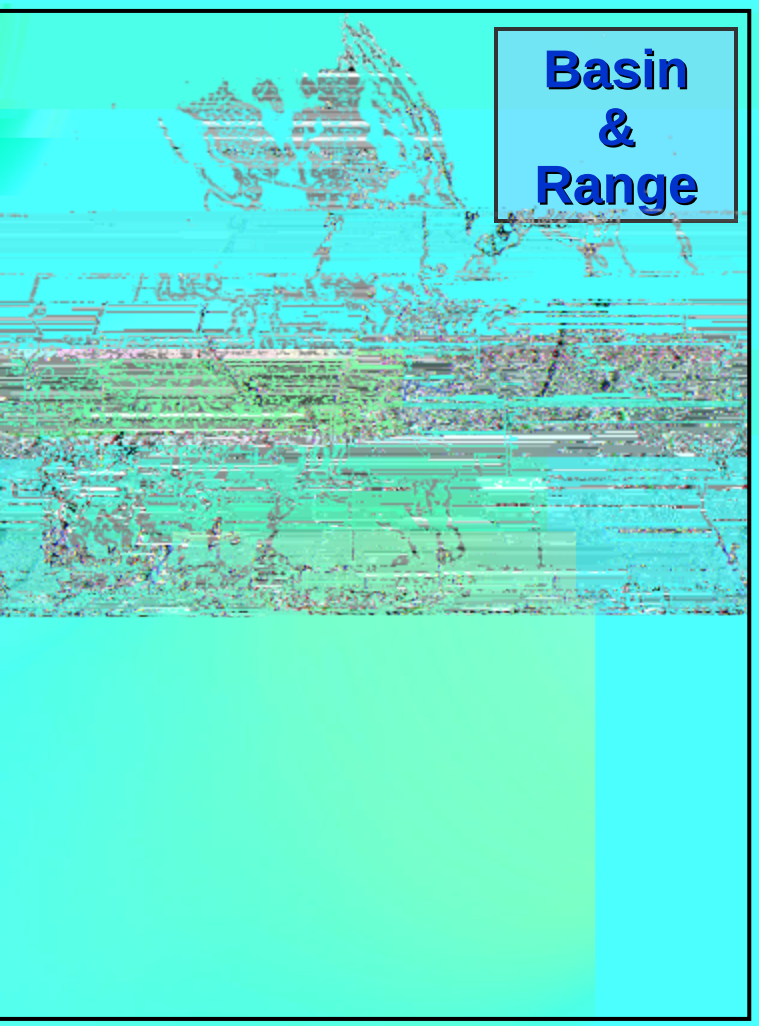




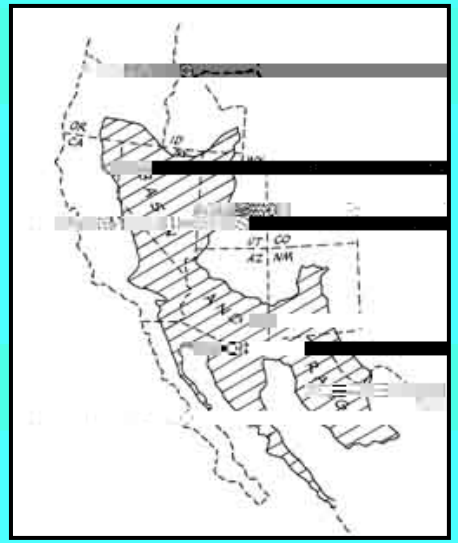
Unruh, Humphrey, & Barron, 2003, GSA



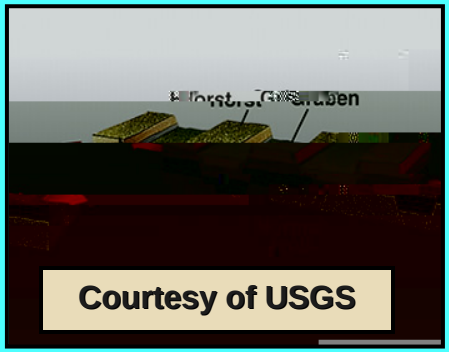
Intraplate – Extensional Terrain

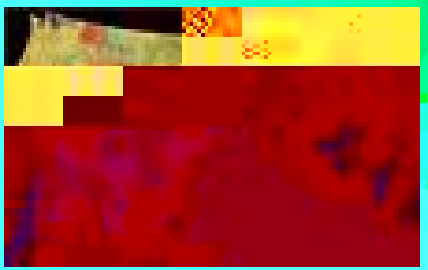


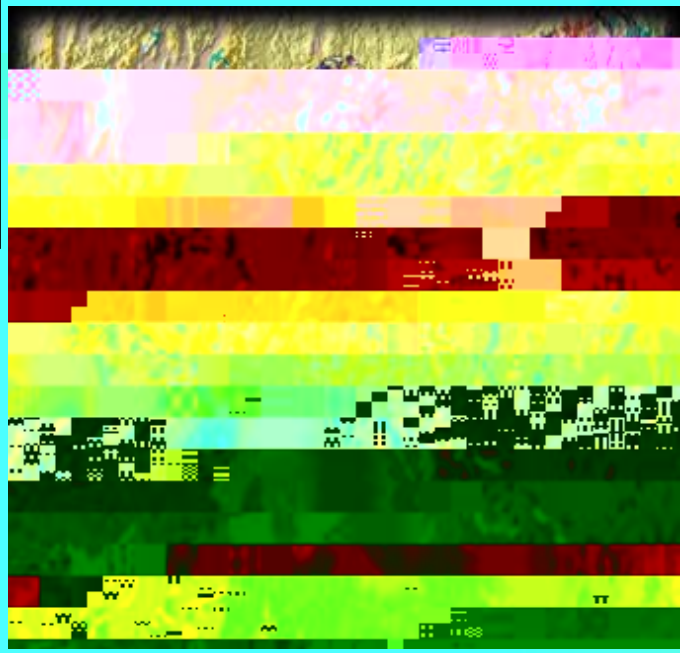
http://www.colorado.edu/GeolSci/Resources/WUSTectonics/CoreComplex/5700.html



Basaltic
To
Rhyolitic







Basin and Range