

The relevance of global processes on mining

A brief review of issues at the coal mines of the Appin region

Relevant geological events

deposition

gas

structure

coalification

CH₄ & CO₂

3 km burial

uplift

escape

normal faults

rifting

biogenic gas

volcanism

CO₂

compression

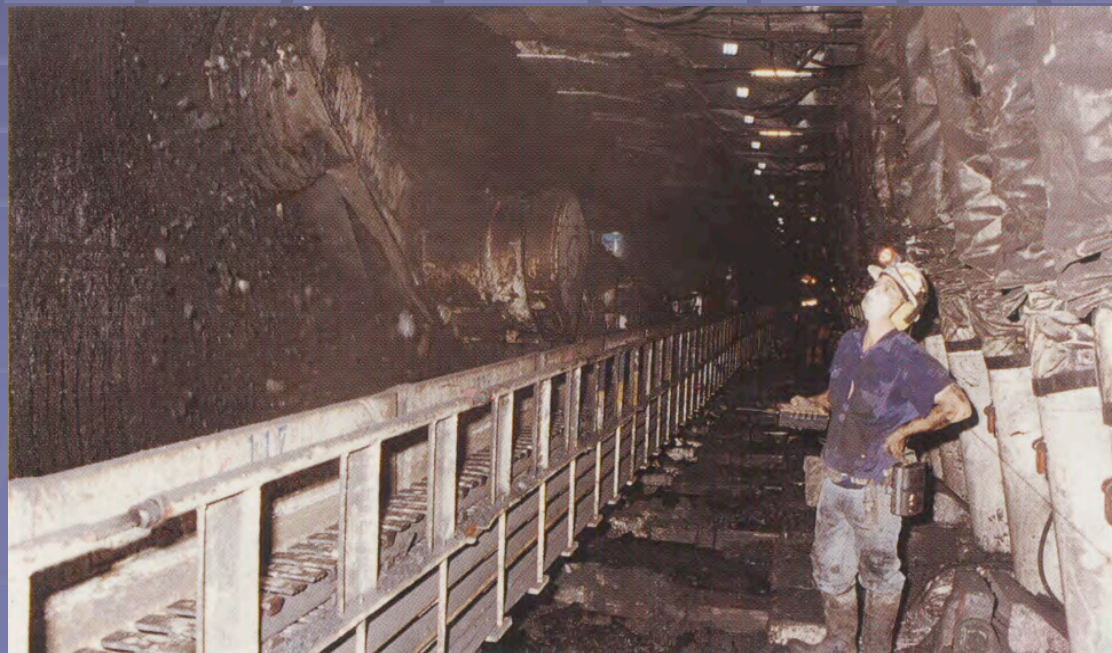
thrusting

250 Ma

100 Ma

50 Ma

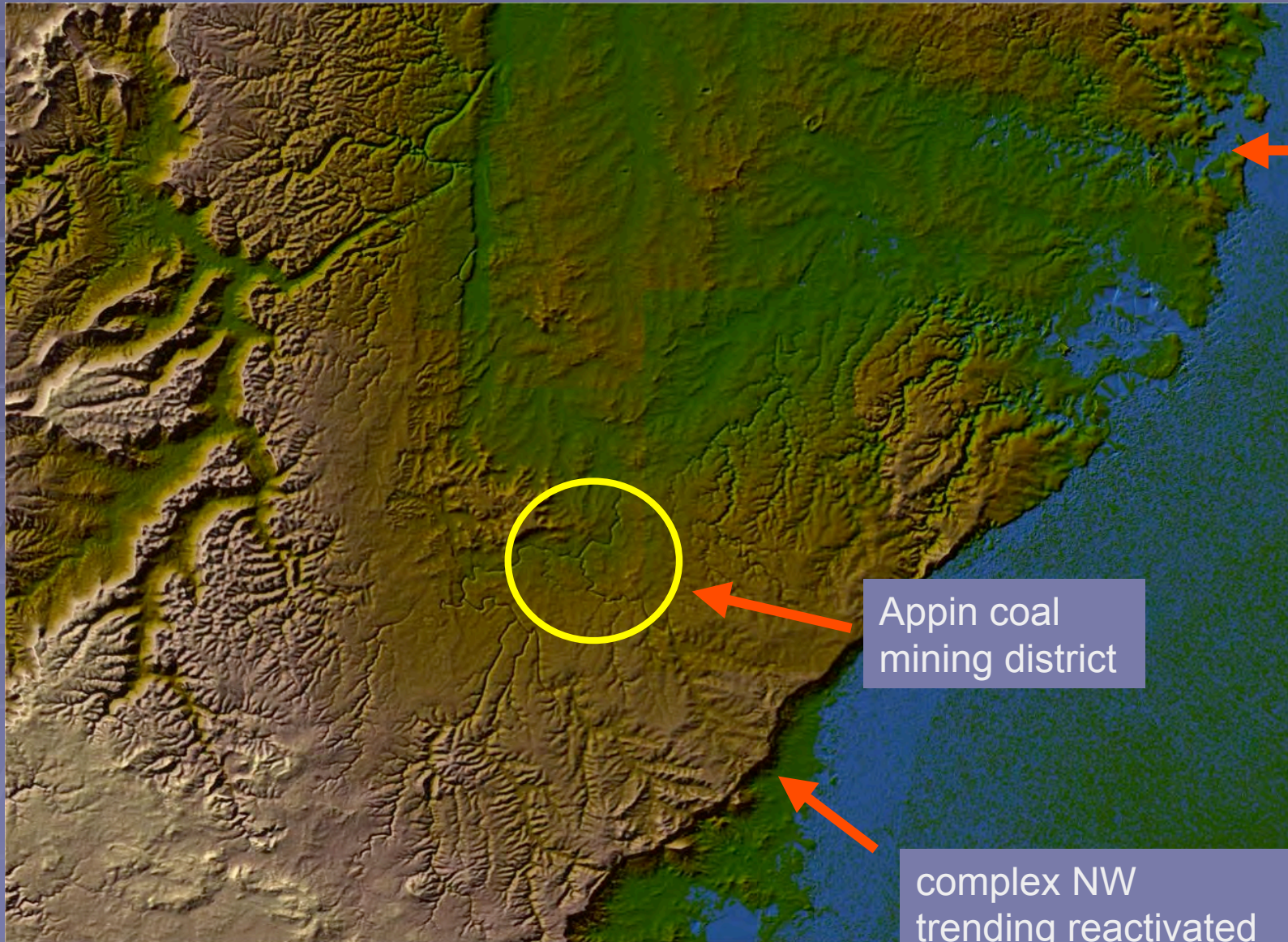
10 Ma



Lapstone structural complex



Sydney



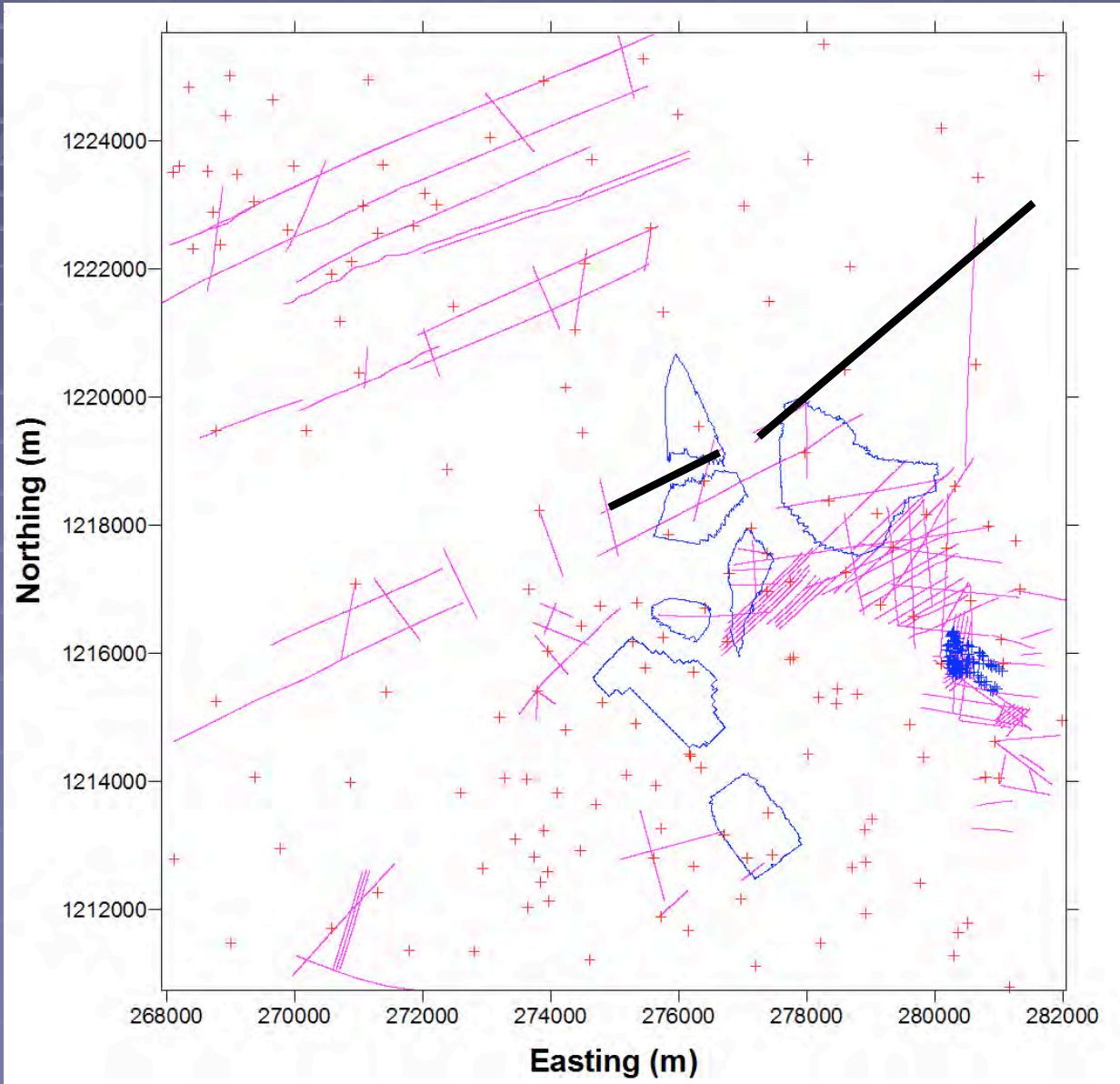
Appin coal mining district

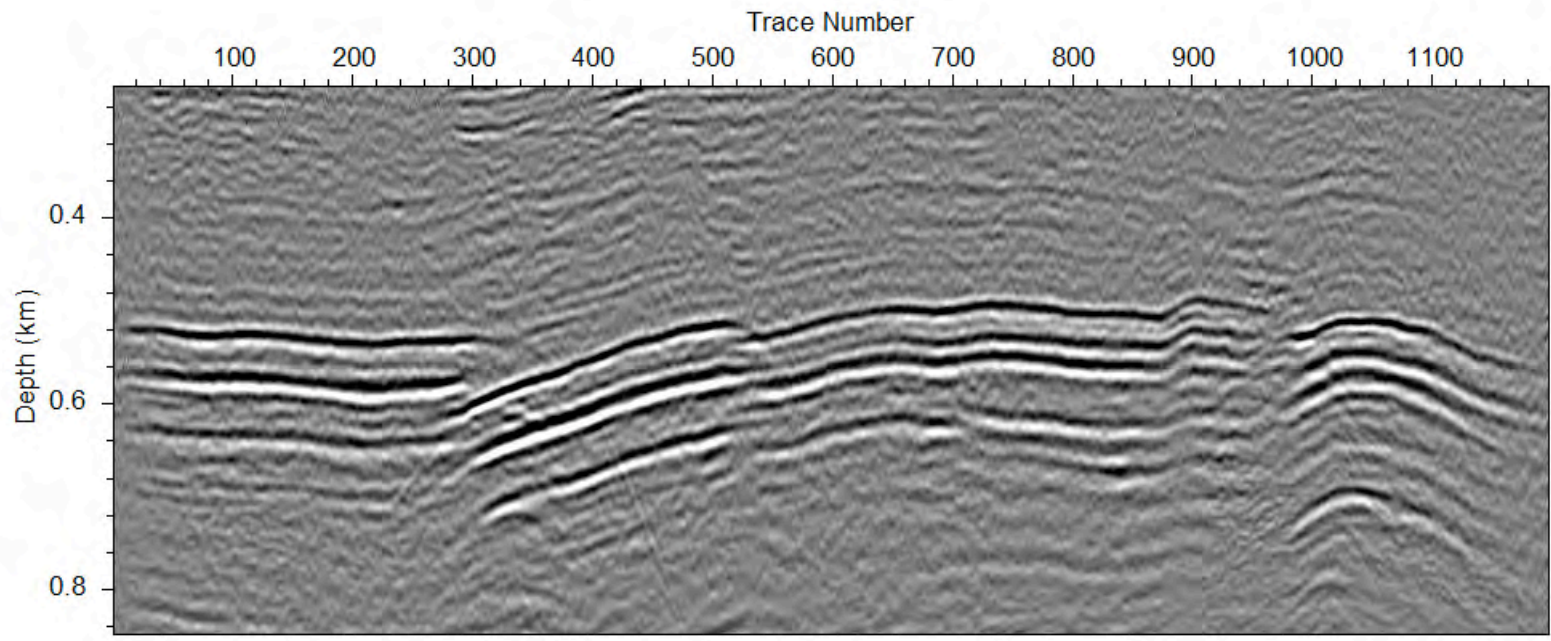


complex NW trending reactivated normal faults

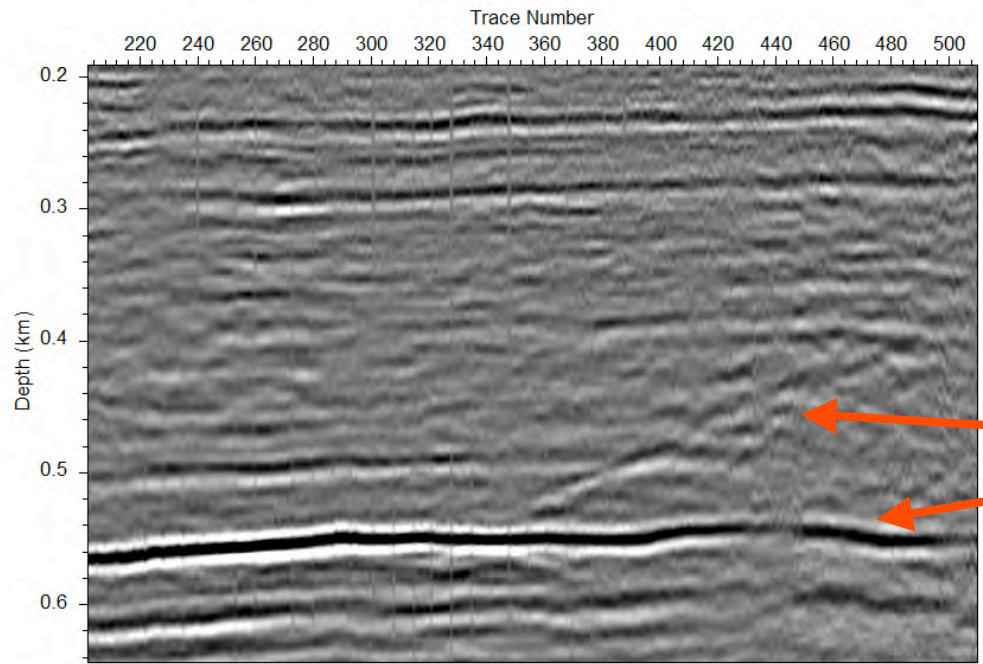


Fault systems





NW-SE
trending
structure
s



N-S trending
structures

Volcanic intrusions

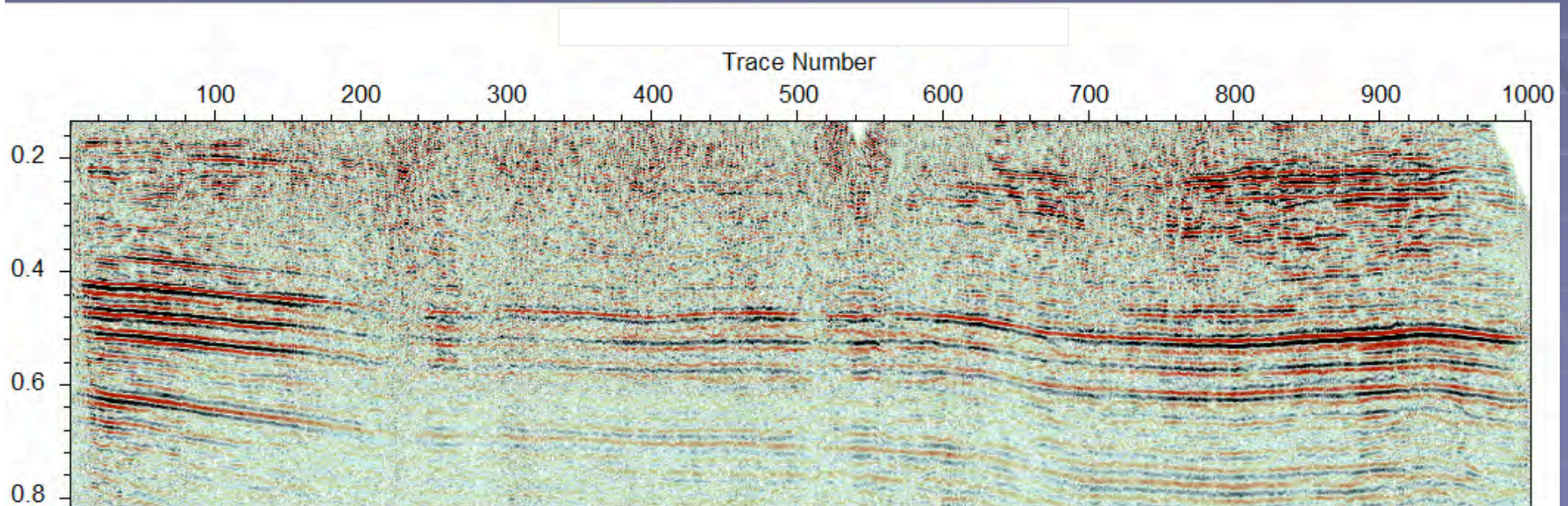


Coal measure gases

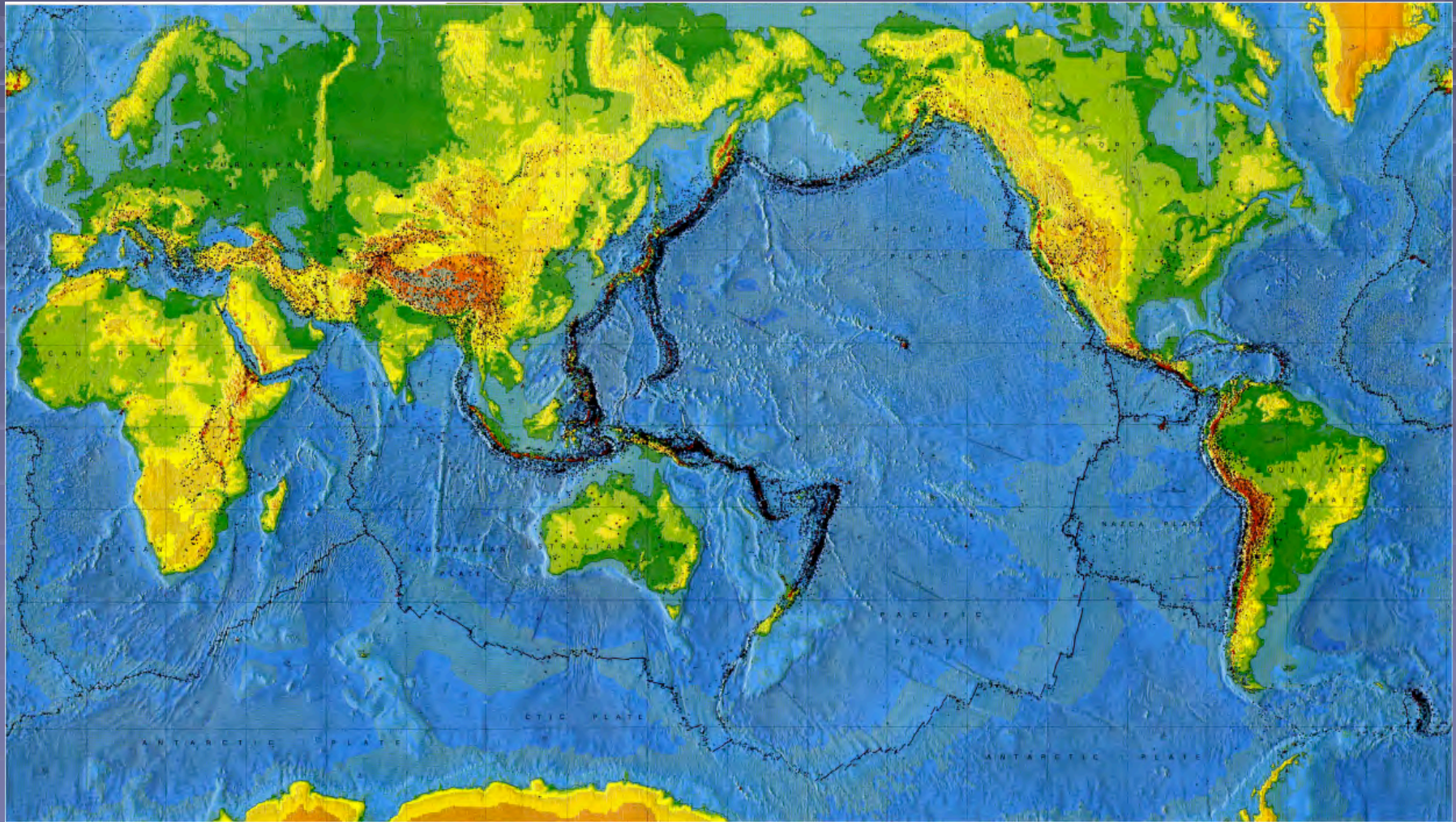
- *Primary biogenic gases – Permian 250 Ma*
- *Thermogenic gases – Triassic – Jurassic*
- *Uplift erosion – Early Cretaceous – escape of shallower gases*
- *Tasman sea rifting – extension – secondary biogenic gas*
- *Volcanic activity – carbon dioxide*

? How and why does the gas composition and location vary

? How is the gas best drained and managed

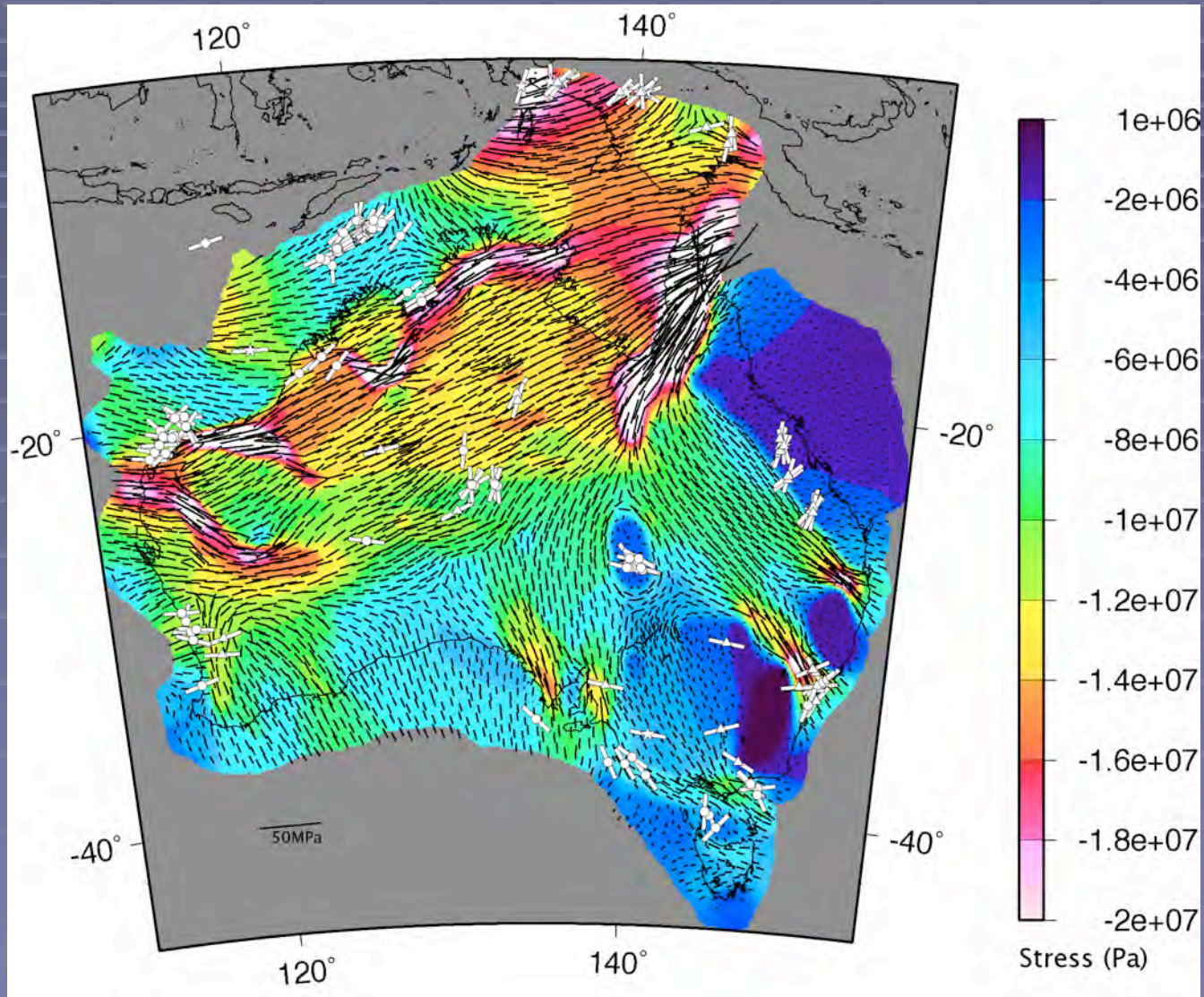


Stress

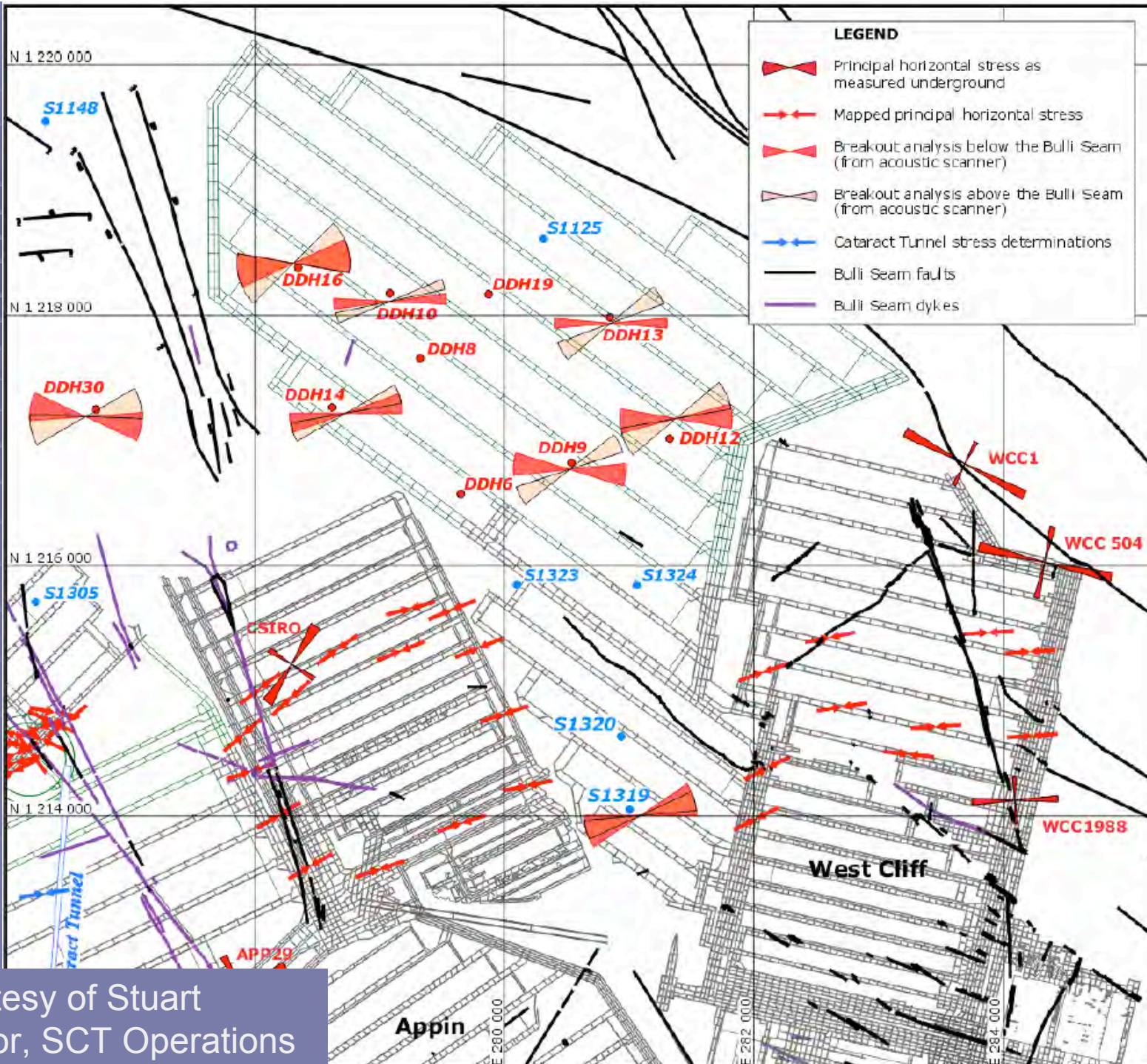


<http://pubs.usgs.gov/pdf/planet.html>

Stress modelling



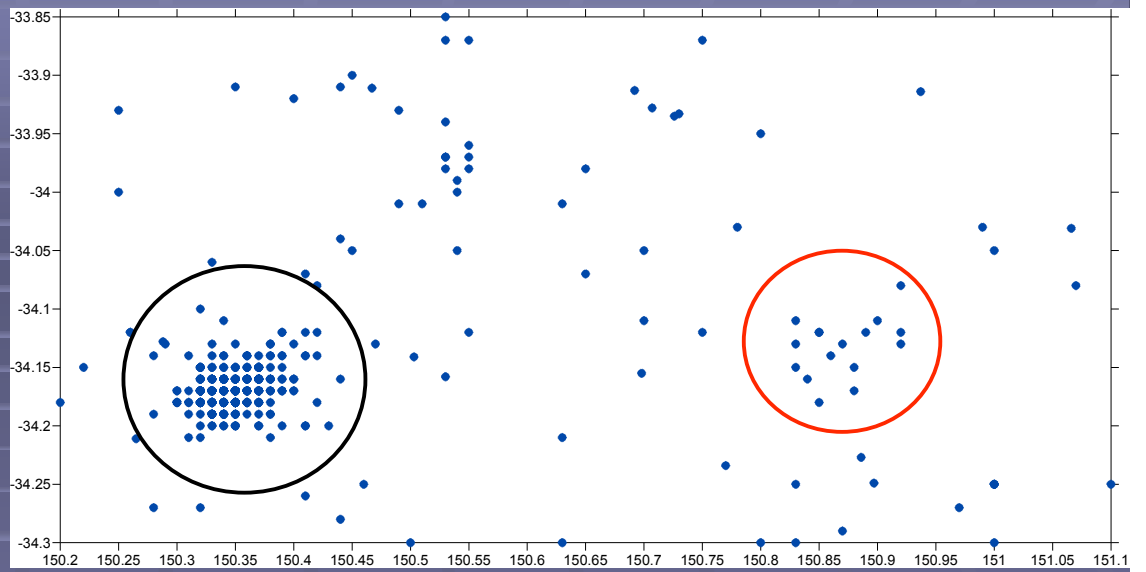
Courtesy, Dietmar Mueller, University of Sydney



Map courtesy of Stuart MacGregor, SCT Operations



Earthquakes and infrastructure



Geoinformatics?

Safe, productive and sustainable mining requires an understanding of the complex systems of the Earth's environment both past and present

