

Chemostratigraphic characterisation and provenance of the Jurassic and Cretaceous successions within the Porcupine Basin

Roach, C., Pearce, T.J., Riley, D.A., Finlay, A. & Benfedda, A.

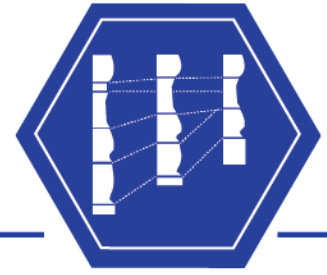


Cliffs of Moher, Co. Clare

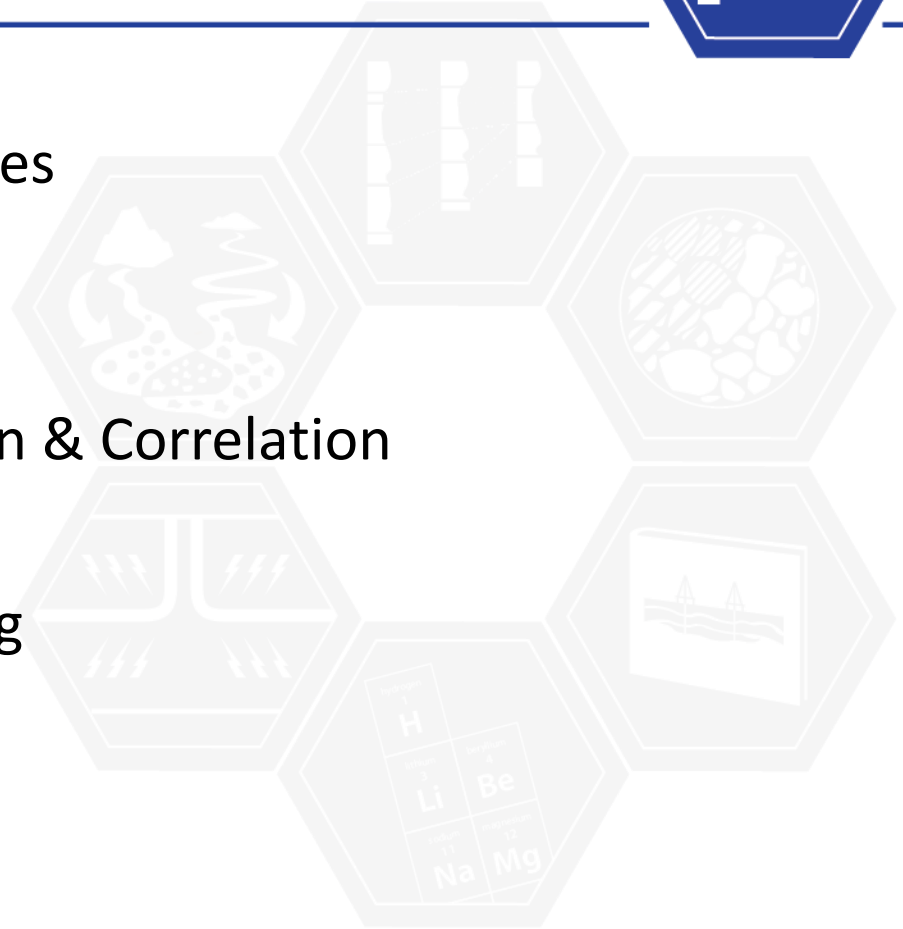
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Outline

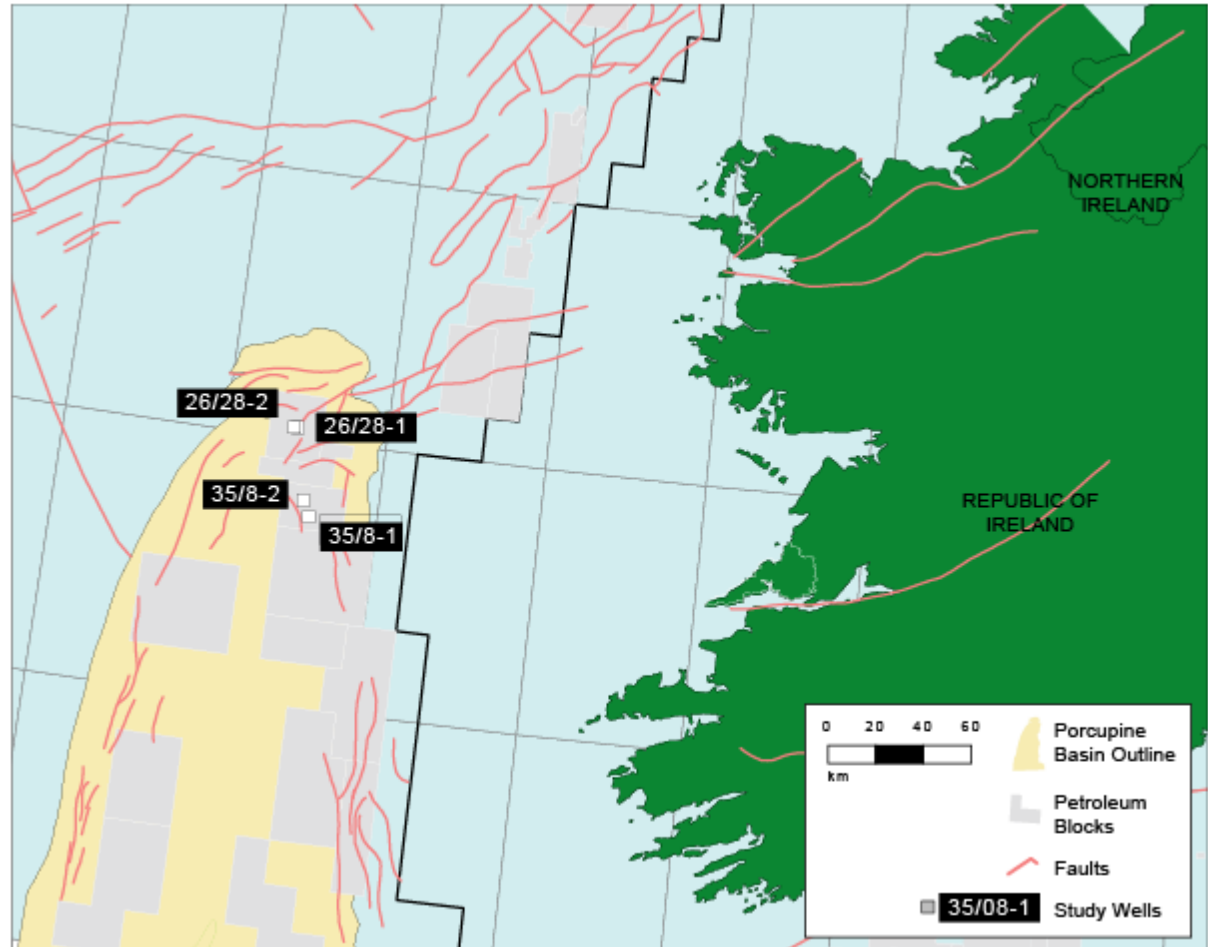


- Study Location and Objectives
- Dataset
- Elements to Minerals
- Chemostratigraphic Zonation & Correlation
- Seismic Validation
- Detrital Zircon Fingerprinting

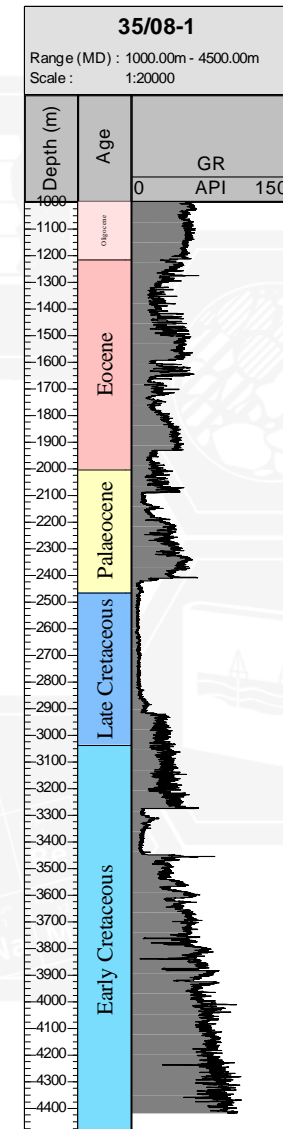
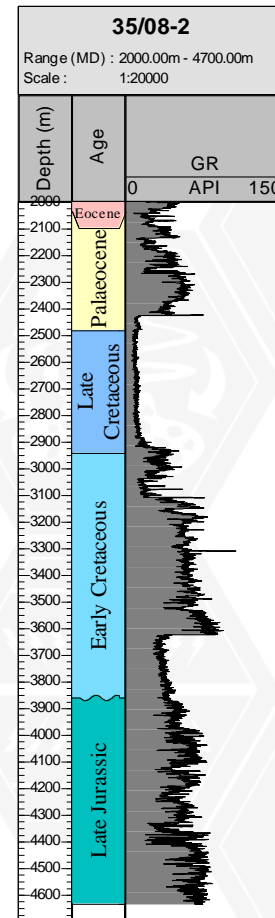
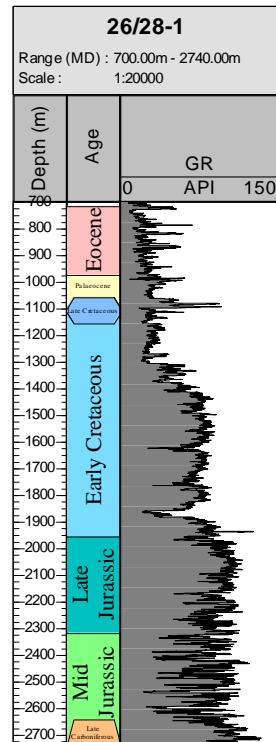
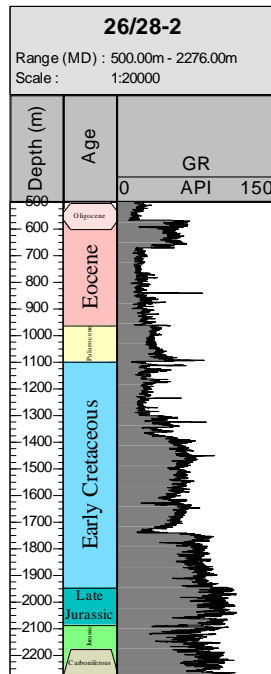


Introduction & Location

- 4 wells from the Spanish Point & Connemara Fields within the Porcupine Basin
- N-S striking, Mesozoic to Cenozoic rift basin
- 3 notable rift episodes: Triassic, Late Jurassic & Early Cretaceous
- The proceeding, Late Jurassic syn-rift strata comprise the main source rocks

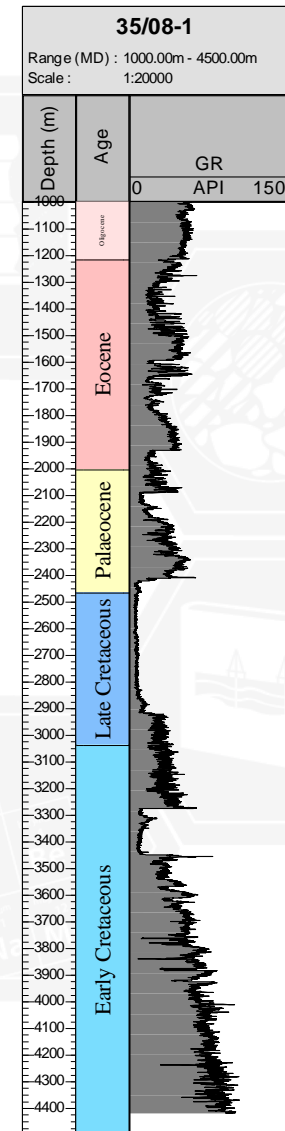
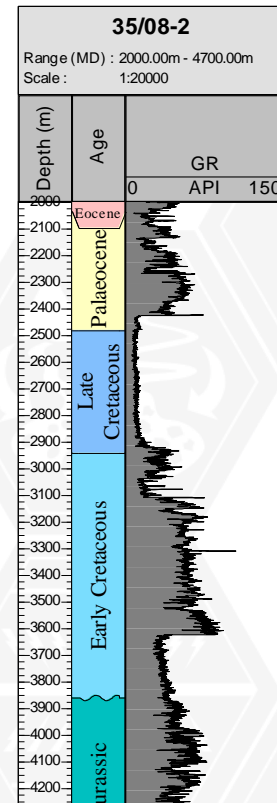
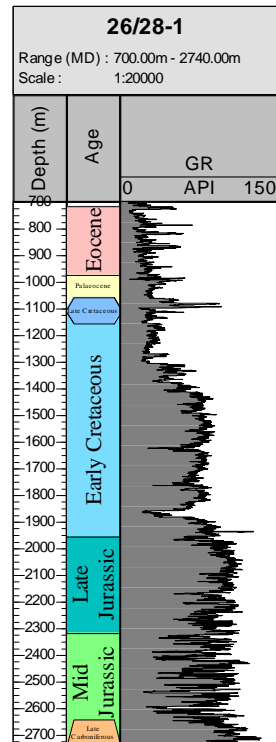
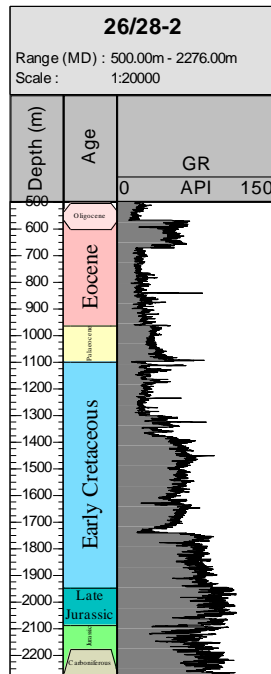


Well Sections



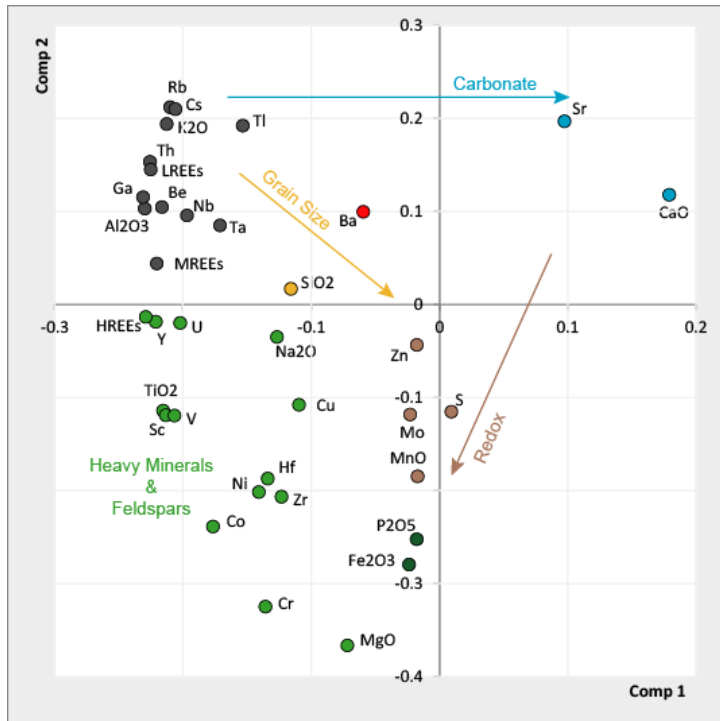
- Broad age constraints taken from well composite logs
- Sample resolution = 20 - 50m (low resolution)

Well Sections

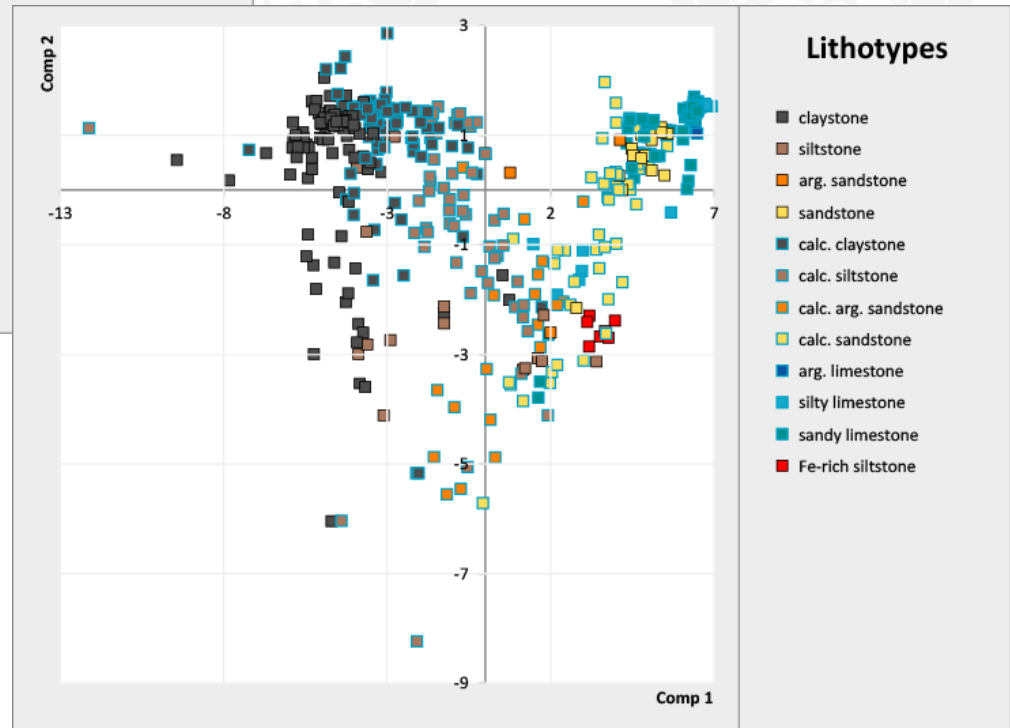


- Study Objectives:
 - Assess the viability of chemostratigraphy as a correlation tool within the Porcupine Basin
 - Assess any provenance changes evident in the chemistry and the zircon analysis

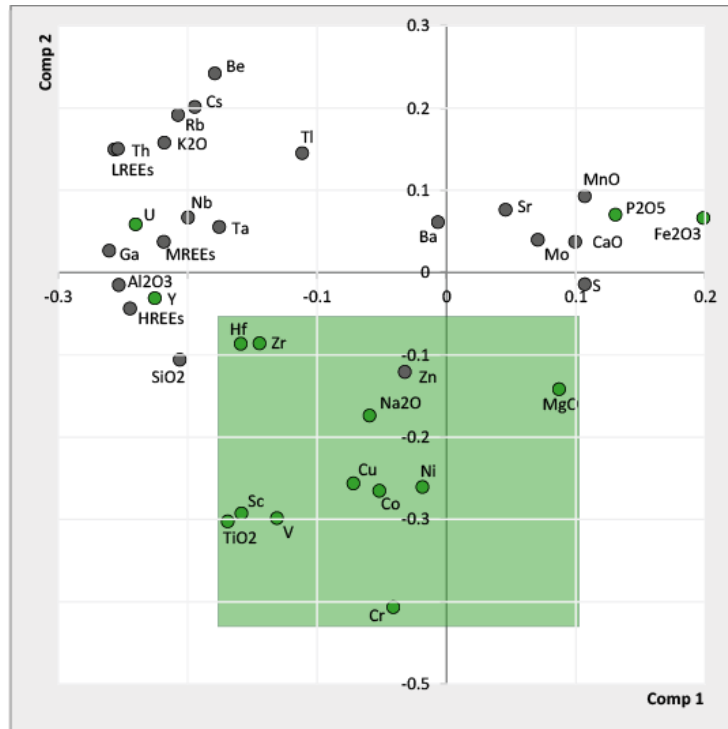
Elements to Minerals



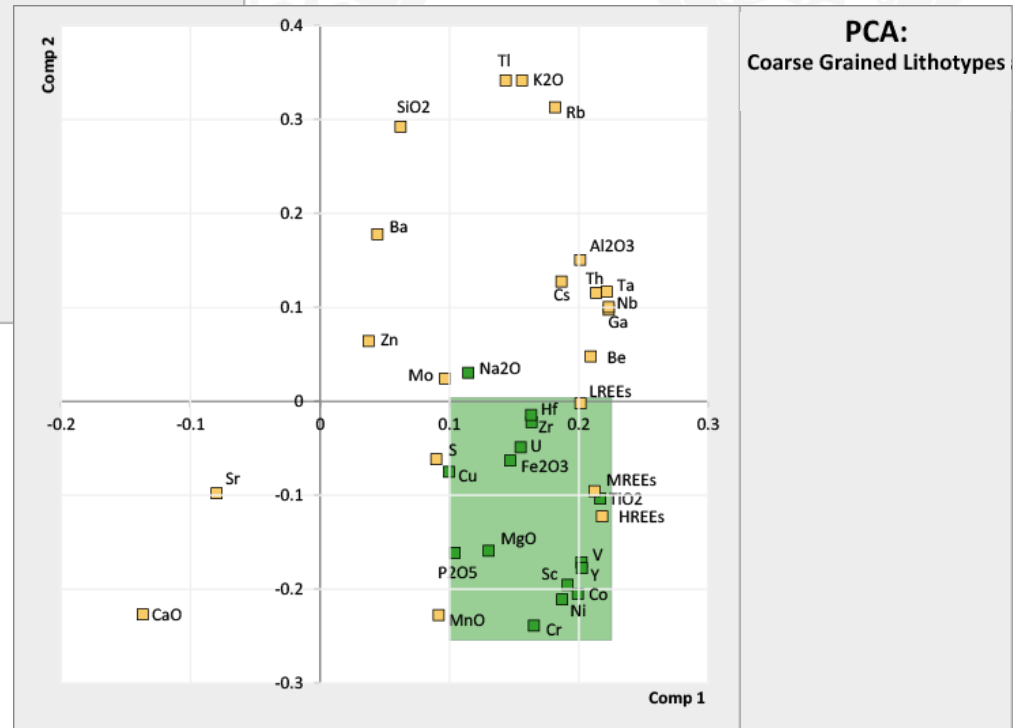
PCA:
All Lithotypes



Identifying Refractory Minerals



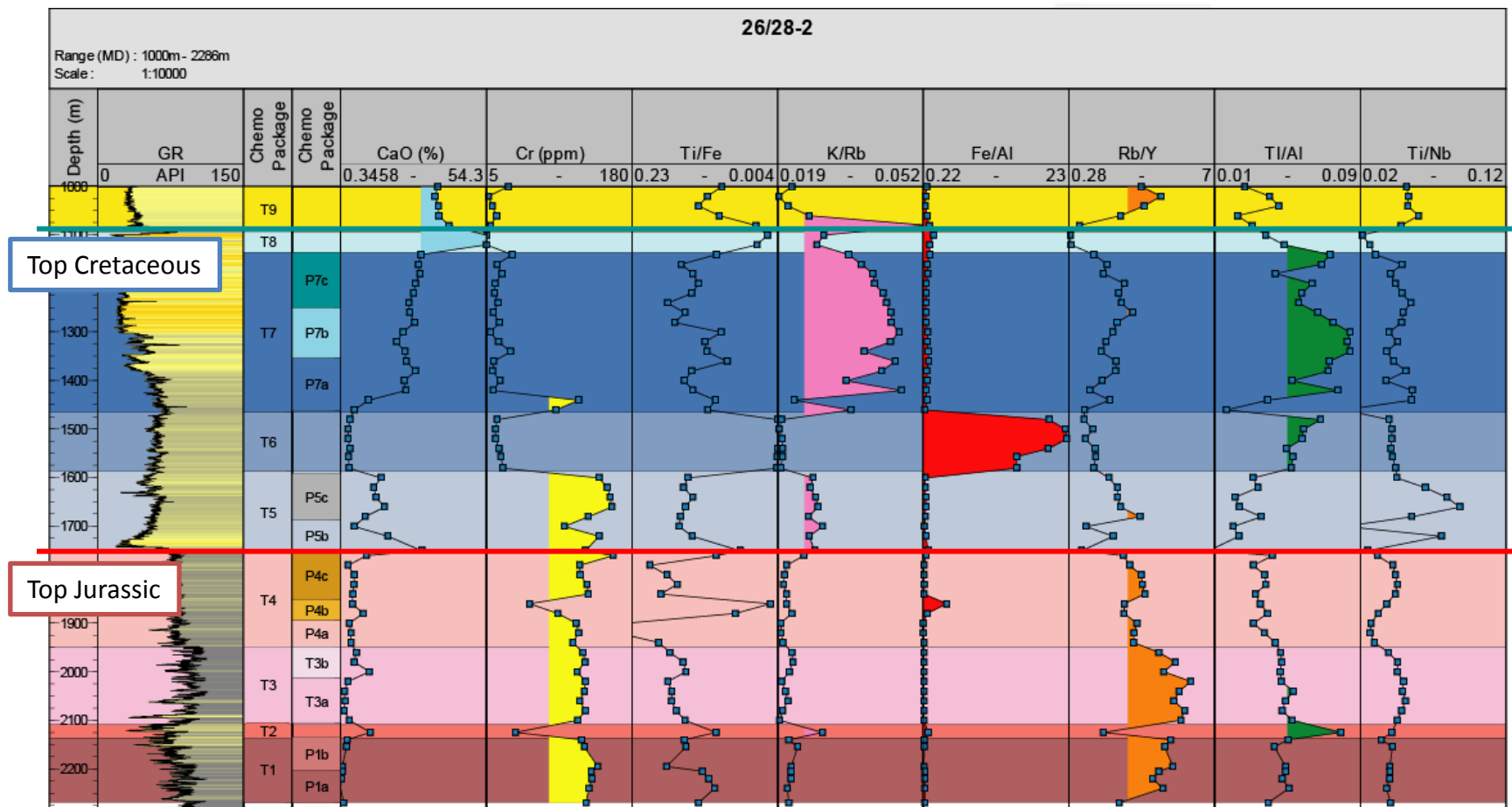
PCA:
Fine Grained Lithotypes



PCA:
Coarse Grained Lithotypes

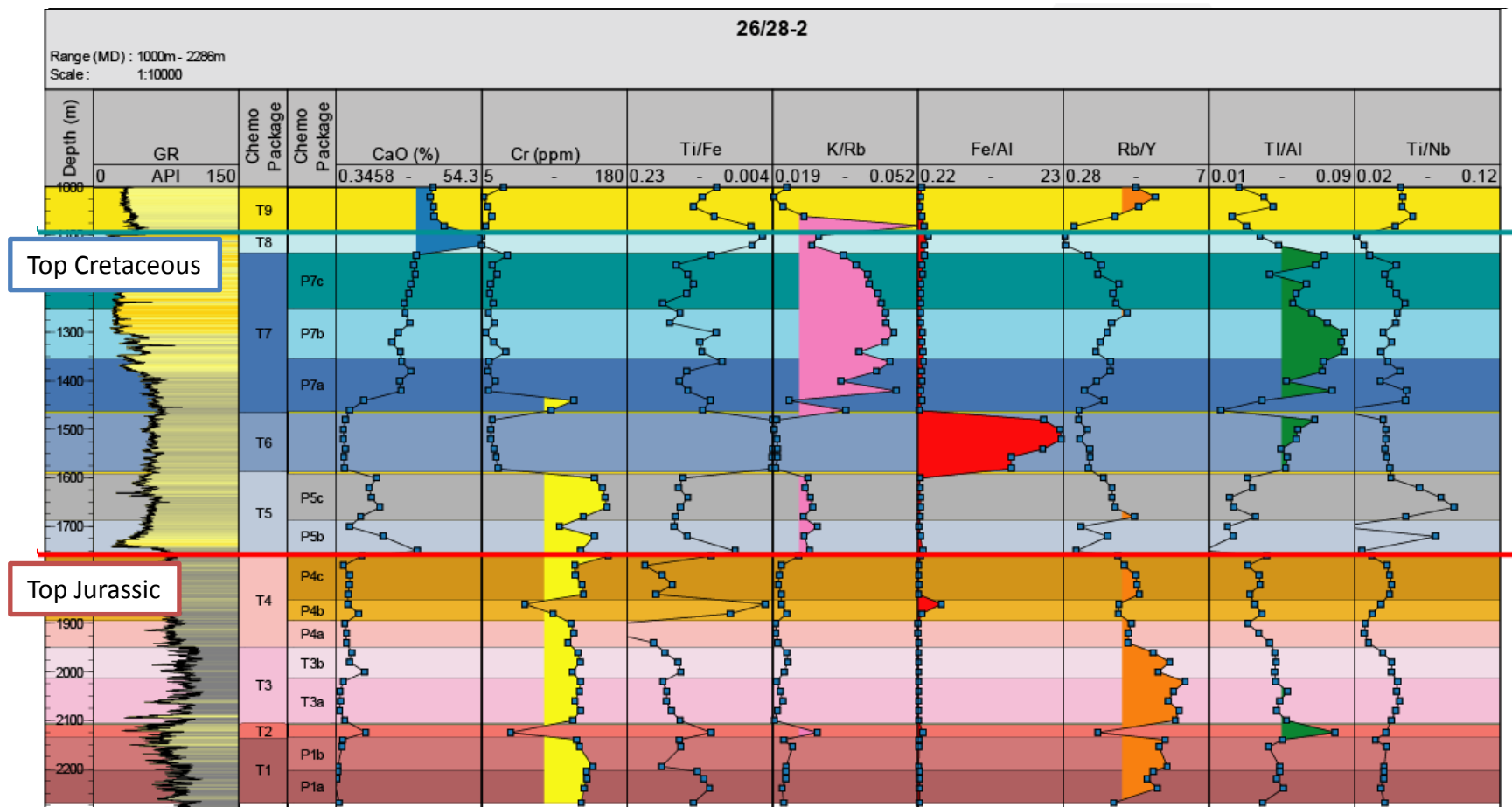
Chemostratigraphic Characterisation

- Type Section: Packages



Chemostratigraphic Characterisation

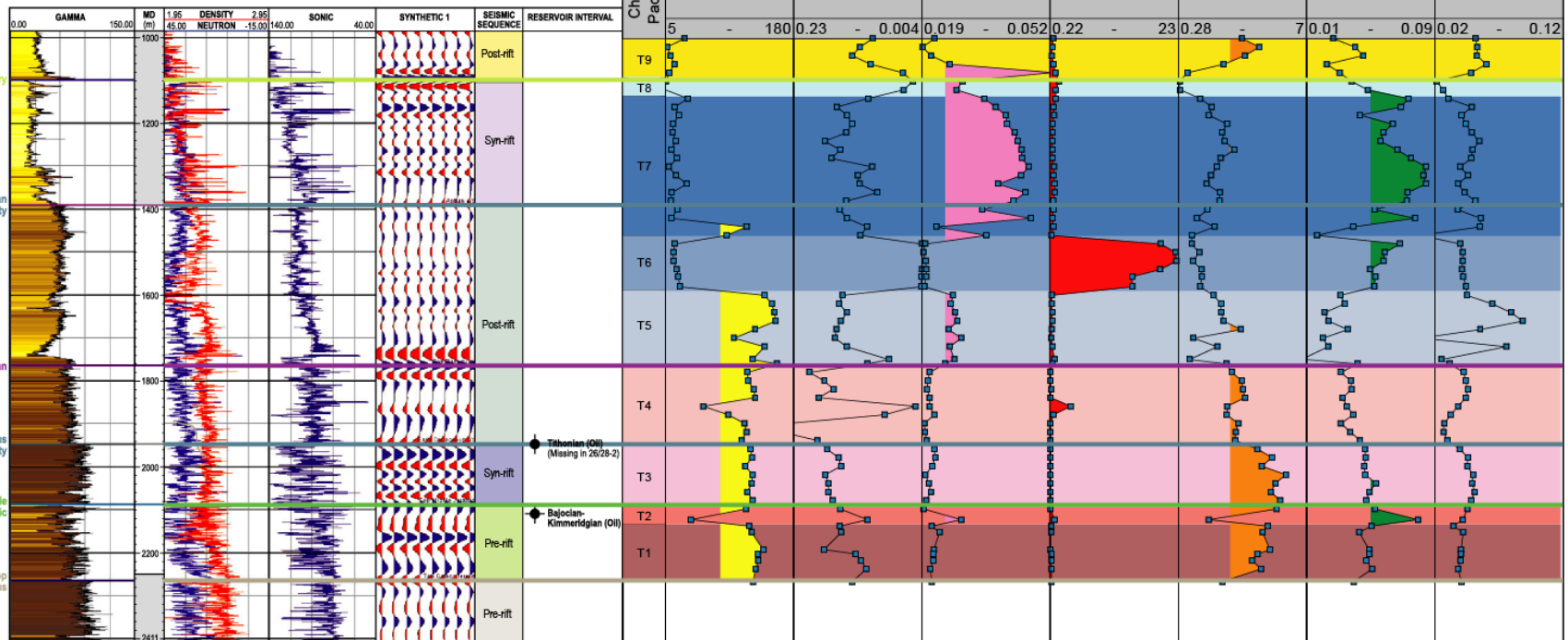
- Type Section: Units



Ties to Seismic

26/28-2

Range (MD) : 1000m - 2411m

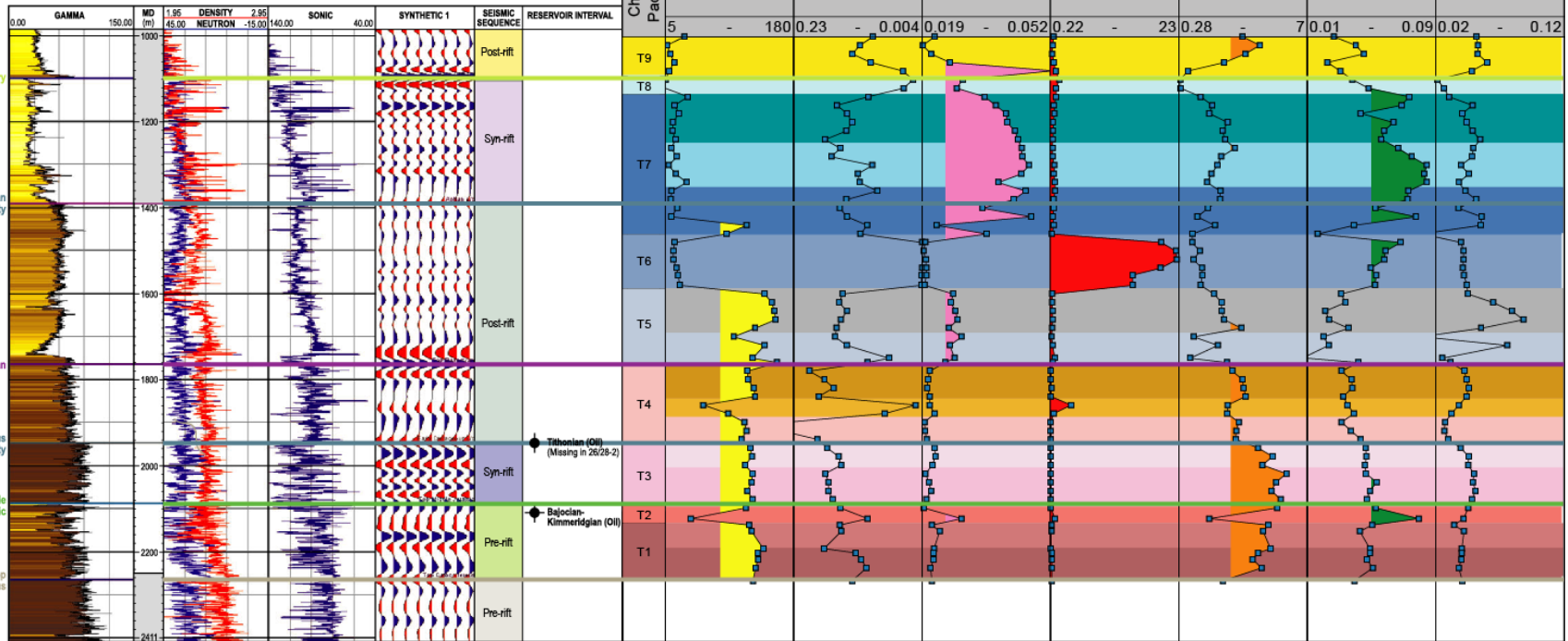


Jones & Underhill, 2011

Ties to Seismic

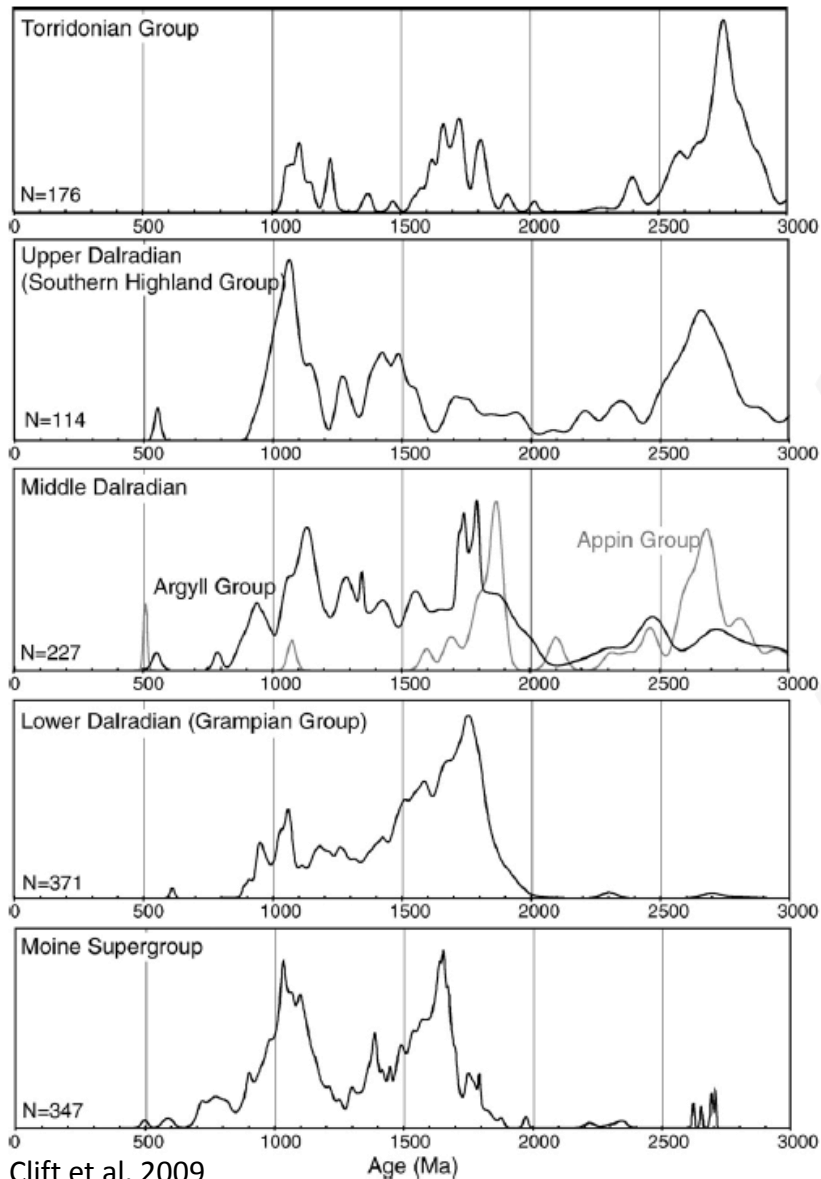
26/28-2

Range (MD) : 1000m - 2411m

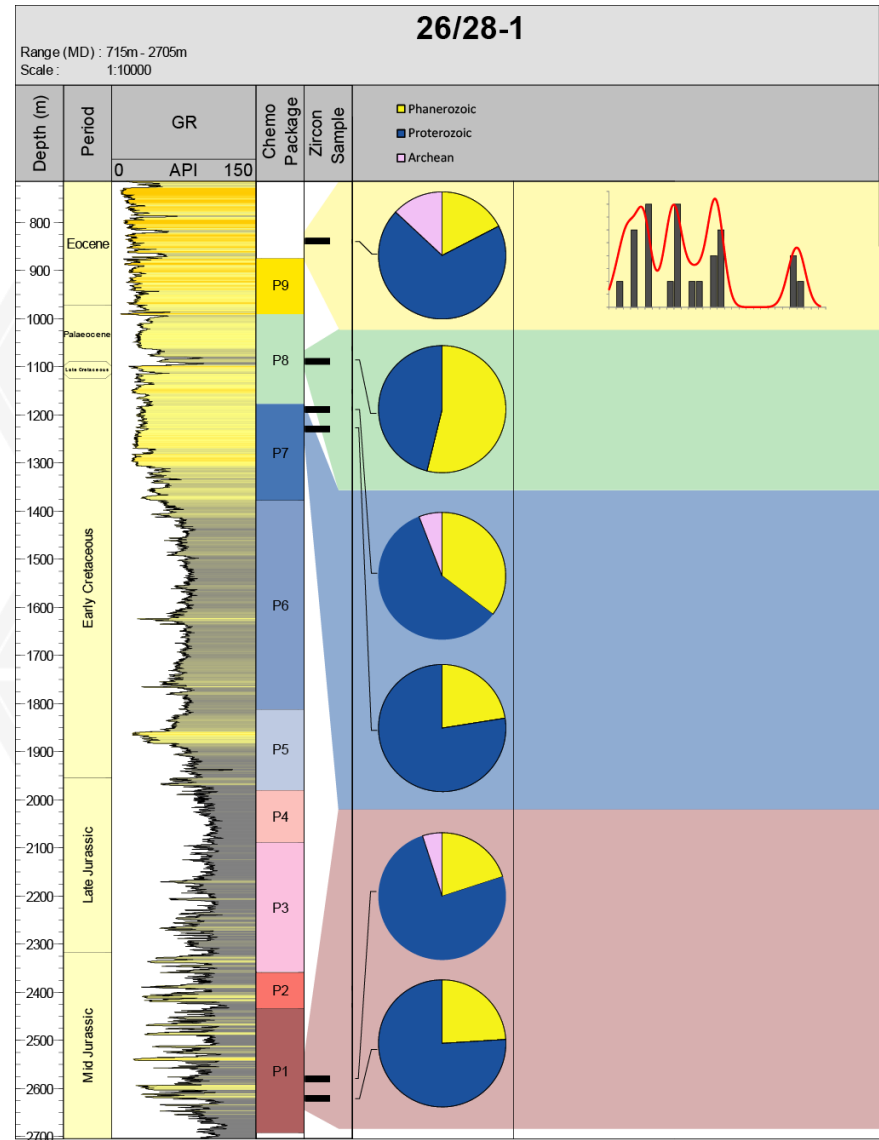


Jones & Underhill, 2011

Detrital Zircon Fingerprinting

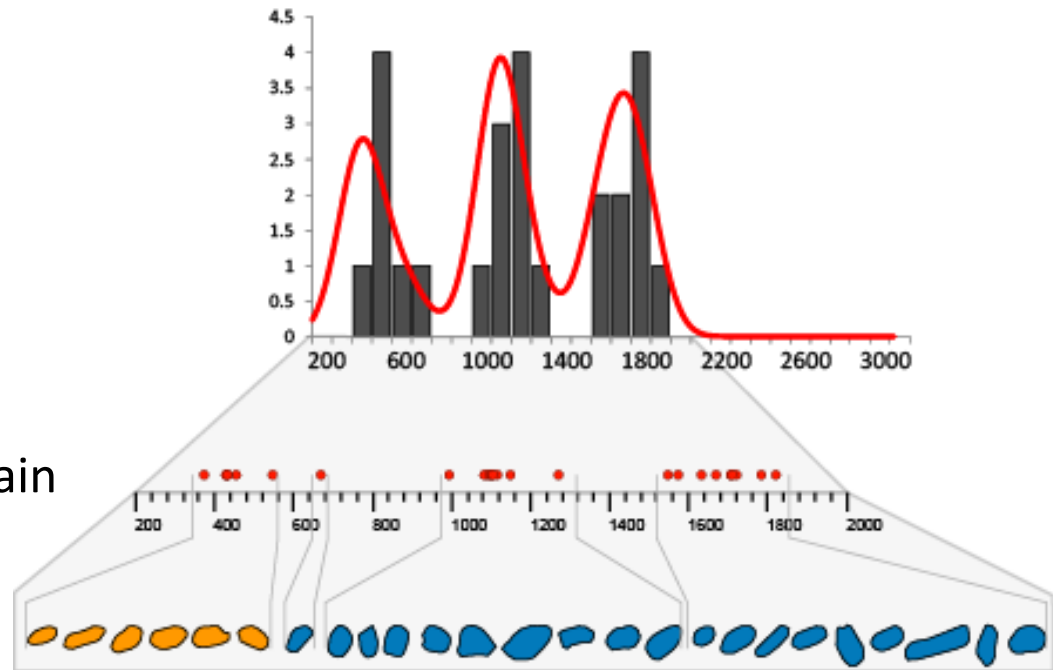


Clift et al. 2009

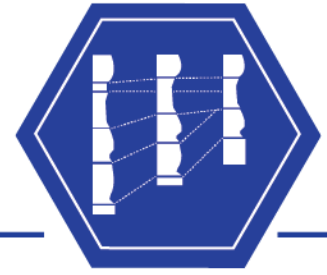


Zircon Morphology

- Zircons are often used in provenance studies
- However, by their nature, they can undergo several recycling phases
- It is important to take into consideration the size and shape of each analysed grain



Conclusions



- A robust, chemostratigraphic correlation has been established across the Porcupine Basin wells
- Broad chemostratigraphic packages correspond with regional seismic markers
- Chemostratigraphic units can be used to reinforce and / or refine lesser seismic picks
- Potential for a higher resolution correlation
- Correlation can be used to constrain key sandstone bodies, which only then, can be targeted for further provenance-based analysis
- Detrital zircon populations reinforce provenance switches identified in the chemistry and shows the potential for further isotopic fingerprinting of key sandstones



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