



Zechstein Field Trip

**Zechstein outcrops of the South Shields and Durham area, NE
England; sub-surface analogues and Petroleum Geology
perspectives**

June 17th – 19th June 2022

Leaders;

**Giancarlo Rizzi (Task Fronterra Geoscience) and Peter Browning-
Stamp (Horizon Energy Partners)**

The PESGB are pleased to announce that the above field trip is currently under preparation. This will be a 2 day trip to the Durham and South Shields area, extending along 18 km of coastline. The key objectives are as follows:

- To consider outcrop and Formation dimensions so that they may be placed within a seismic, exploration and well spacing context.
- To compare outcrops geometries and facies with their sub-surface equivalents. Core, open hole and image log characteristic will be considered in this regard, where possible.
- To examine the spectacular post-depositional processes which have affected some outcrops and their cliff-scale geometries.
- To discuss and observe outcrop reservoir quality, in terms of pore types (and fracturing), their connectivity and controls upon their distribution. The effects of Recent meteoric flushing upon extant pore systems will also be discussed, if applicable.

The outcrops which will be visited are as follows:

**TROW POINT
BLACKHALL ROCKS
CLAXHEUGH CLIFF (or Clach-see cliff as it is known
locally)**

**MARSDEN BAY
ROKER PROMENADE
TUNSTALL HILLS
SEAHAM HARBOUR**

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These outcrops are analogous to the Permian Zechstein successions of the North Sea, which comprise major cycles of Anhydrite, Halite, Carbonates and Shales. Presently, these are an up-and-coming exploration play on the UKCS, but are proven oil and gas producing intervals onshore Poland, Germany and the Netherlands.

The field trip will visit key Zechstein outcrops of the Kupferschiefer, ZechsteinKalk, Werranhydrit, Platendolomit and the Haupt Dolomite equivalents. Whilst also viewing the Rotliegendes. We will work upwards through the Z1 to Z3 Zechstein cycles, at least in part, during which their systems tracts and palaeogeographies will be discussed along with their impact on the petroleum system.

Modern cutting-edge seismic data sections, across the basin will be used to show all aspects of Zechstein Geology. The trip will be led by experienced Carbonate Geologists and is suitable for early career and experienced Geoscientists.

Logistically unshared private transport between outcrops will be utilised. The cost of the trip is £250.00 and will include field trip, a pre-packed lunch and dinner. A comprehensive and extensively illustrated PESGB Field Trip Guide will also be provided. We expect to finish mid to- late Sunday afternoon, pending summer tidal cycle times.

This is a super trip. The outcrops are of world class status and the coastline is spectacular. We hope you can join us. By registering at this stage you are showing your interest in the event and is not a final booking. The schedule of outcrop visits will be dependent upon tidal activity, in part but it is anticipated we will begin the trip with a visit to Claxheugh Rock.

References

Browning-Stamp, P. (2021) The Z2 Haupt Dolomite - a new oil play on the margin of the Southern Gas Basin. Petroleum Exploration Society of Great Britain evening lecture. Available on-line.

Browning-Stam P. (2021) The Z2 Haupt Dolomite Play - The Up and Coming Star of Exploration on the MNSH. PETEX conference presentation.

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DAY 1

Saturday, 18th June 2021



CLAXHEUGH CLIFF

South Hylton, Sunderland

The area is primarily known for the large limestone and sandstone cliff formed in the Late Permian period, known as Claxheugh Rock. Pictured is a spectacular seismic-scale outcrop at the South Hylton area of Sunderland. The horizontal foreground area consists of Coal Measures with the orange coloured rock comprising Rotliegende aeolian sandstones. These are overlain by buff coloured Zechsteinkalk equivalent Ford Formation carbonates, part of the so called downhill slide complex.



TROW POINT

Trow Point, South Tyneside

A complex outcrop which can be correlated, in part with the offshore. Undisturbed Stratified Zechsteinkalk equivalent Raisby Formation carbonates at base, overlain by the buff-coloured Raisby Formation submarine debris flow deposits. The overlying massive rocks comprise the Concretionary Limestone Formation. A thin insoluble clayey residue separates both. Height of outcrop is around 12 m.



TUNSTALL HILLS

Sunderland, Tyne and Wear

A Local Nature Reserve designated a Site of Special Scientific Interest both for its geological and biological importance, comprises of seismic-scale reef bumps which have a regional-scale trend. Massive buff coloured dolomitic reef rock of the Ford Formation.

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ROKER PROMENADE

The type locality for the Roker Dolostone Formation and equivalent to the Hauptdolomit. The famous 'Cannon Ball Limestones' also occur at this locality. The outcrop consists predominantly of gently dipping grainy dolostones.

DAY 2

Sunday, 19th June 2021



MARSDEN BAY

Marsden, Tyne and Wear

The nearby Marsden Bay includes the Marsd rock formation owned by the National Trust. The rock is a 100 ft (30m) sea stack of periclase and Magnesian Limestone. The steps at the northern end of the bay were barricaded as of August 2021. The outcrops at this locality have undergone repeated episodes of diagenetic alteration. A variety of brecciation processes and associated collapse is also spectacularly developed at this locality. Note open, vertical, through-going and bed confined solutionally enhanced fractures – could these fracture orientations inform your well planning? Also of note are the vertical changes in bed thickness trends.

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BLACKHALL ROCKS

County Durham

Raised beach and fossil cliffs immediately east of the Castletown River estuary. a small microbial build up within the spectacular stromatolitic Crinkly Bed Unit of the Roker Formation. Individual stromatolitic build ups may extend laterally for several metres and more. They contain local interconnecting open pore networks.