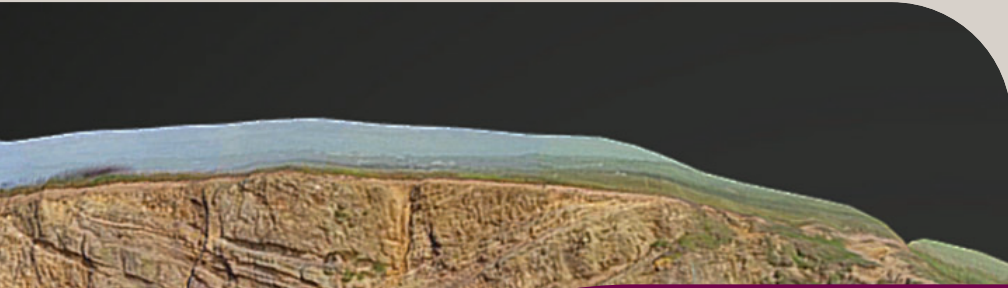


March 2019



NAUTILUS 3D LEARNING

Outcrop Reference Database (ORD) - 2018



3D LEARNING

Images of outcrop geology rendered for 3D visualisation provide a resource of **virtual analogues** that aid the **understanding** and **interpretation** of **structural, sedimentological and stratigraphic** features.

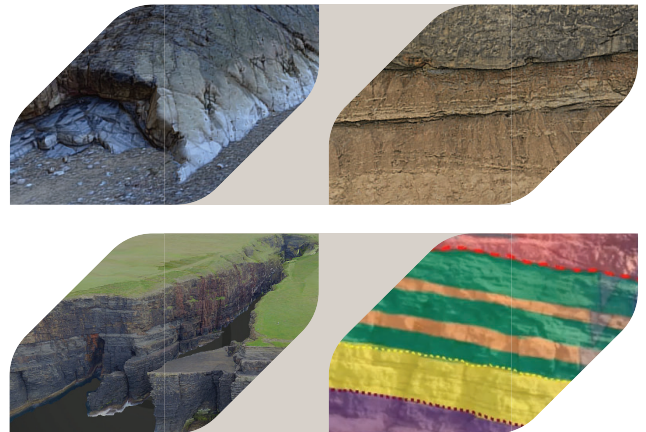
Relationships of complex or obscure features are clarified, and scale and perspective of geological features for comparison with the subsurface appreciated. Learning is consolidated through review of outcrop observations, and improved where field locations are inaccessible due to weather, tides or safety considerations.

OUTCROP REFERENCE DATABASE (ORD)

The ORD is an online searchable database of Reference Elements consisting outcrop images and 3D models collected globally. Each Reference Element is an example of a sedimentological, structural and stratigraphic feature relevant to understanding subsurface relationships.

Key features are:

- Reference Elements show examples of key sedimentological, structural and stratigraphic features
- Multiple 3D images that can be rotated, panned and zoomed to inspect details
- Videos, static images and interpretation overlays are available
- Descriptions and guides to key features provided by Nautilus Training Alliance subject area experts
- Full location information and stratigraphic context
- Links to relevant published literature



The ORD - <https://ord.training.rpsgroup.com/>

Demonstration Models

Unrestricted access has been given to 2 complete reference elements. These are available on the homepage and gives full access to images and models of the following examples:

- Continental Clastic - Meander-belt sandstone body, Lower Cretaceous, Isle of Wight, UK
- Shore Zone/Deltaic Clastic: Tidal estuary sandstone, Lower Cretaceous, Isle of Wight, UK

Viewing the 3D Models

To view the 3D Models, your browser needs to have WebGL enabled. The ORD works best on a desktop computer running Chrome, Firefox or Safari. The database contains 3D models and video flythroughs. A mouse, trackpad or touchscreen is required to explore the models.

Annual Subscription Fees

User Level	EU NTA Member Fee (GBP)	US NTA Member Fee (USD)
Single Company Annual Subscription 2019 Up to 25 Users	£7,500	\$10,000

CURRENT DATABASE CONTENT

CLASTIC SEDIMENTOLOGY

Continental Clastic

- Alluvial fan conglomerates, Tabernas, Spain
- Braided fluvial and aeolian deposits, Triassic, UK
- Delta front and delta top succession, Carboniferous, South Wales
- Delta plain succession, Carboniferous, South Wales
- Fluvial sheet sandstone, Devonian, South Wales
- Fluvial-aeolian interactions, Devonian, Ireland
- Heterogeneous and multistorey fluvial channel sandstones, Miocene, Northern Spain
- Heterolithic fluvial channel-fill deposits, Jurassic, Portugal
- Incised valleys and sheet sandstone fluvial systems, Cretaceous, Wyoming, USA
- Inland sabkha and ephemeral lake deposits, Triassic, UK
- Low-sinuosity fluvial sandstones, Devonian, Ireland
- Meander-belt and lacustrine deposits, Triassic, UK
- Meander-belt sandstone body, Lower Cretaceous, Isle of Wight, UK.
- Multistorey fluvial complex, Carboniferous, South Wales
- Multistorey fluvial sandstone bodies and overbank facies, Miocene, Spain
- Multistorey fluvial sandstone bodies, Jurassic, Portugal
- Multistorey pebbly-sandy braided river deposits, Jurassic, Portugal
- Pebbly and sandy braided river channel deposits, Oilgo-Miocene, Northern Spain
- Reservoir architecture and heterogeneities in aeolian systems, Utah, USA.

Deep Water Clastic

- Amalgamated deepwater channels, Namurian, County Clare, Ireland
- Channel-linked erosion surfaces and scours, Namurian, County Clare, Ireland
- Deepwater channel complex, Eocene, Spain
- Deepwater channel sandbodies, Namurian, County Clare, Ireland
- Deepwater sandy-lobe heterogeneity, Miocene, Spain
- Distal fan sheet sandstones, Namurian, County Clare, Ireland
- Distal outer fan and fan fringe deposition, Namurian, County Clare, Ireland
- Sheet-like turbidites, Eocene, Spain
- Slope sedimentation and syn-sedimentary deformation, Namurian, County Clare, Ireland

Shelf Clastic

- Cyclicity in source rocks, Jurassic, UK
- Shoreface sandstones and mudstones, Lower Cretaceous, Isle of Wight
- Shoreface sandstones, Lower Cretaceous, Isle of Wight

- Small scale heterolithic cross bedding in tidal sandstones, Ager Basin, Spain
- Stacked delta front parasequences and incised valley fill, Truskieve, Ireland
- Variations in reservoir quality and connectivity in a clastic shoreface system, Jurassic, UK

Shore Zone/Deltaic Clastic

- Growth fault, Carboniferous, County Clare, Ireland
- Highstand shorefaces and distributary channel, Cretaceous, Wyoming, USA
- Prograding shoreface parasequence, Cretaceous, Utah USA
- Shallow marine and tidal facies, Miocene, Malaysia
- Shallow marine depositional systems and oil sands, Upper Jurassic, UK
- Tidal estuary sandstone, Lower Cretaceous, Isle of Wight, UK.
- Tidal sandbodies in a tide-dominated delta, Eocene, Spain
- Transgressive sequence, Cretaceous, Utah, USA
- Wave- and tidal-influenced shallow marine parasequences, Miocene, Malaysia

STRUCTURE AND TECTONICS

Faulting, Stress and Fracturing

- Normal faulting and reservoir compartmentalisation, Miocene, Malaysia

Rifts and Extensional Tectonics

- Extensional fault systems, Jurassic, UK

Thrust and Contractual Tectonics

- Chevron and detachment folds in a turbidite sequence, Carboniferous, UK
- Chevron folding in a sand-dominated turbidite sequence, Carboniferous, UK
- Concentric folding in carbonates, Carbonif, Wales
- Hinge and limb deformation features in chevron folds, Carboniferous, UK
- Parasitic fold complex, Jurassic, UK
- Recumbent chevron folds, Carboniferous, UK
- Thrust fault propagation in heterolithic shoreface facies, Miocene, Malaysia

CARBONATES

Platform/Shelf Carbonates

- Carbonate sand body successions, Jurassic, UK
- Lithofacies of the Llucmayor Reef Complex, Miocene, Spain
- Sequence stratigraphy of the Llucmayor Reef Complex, Miocene, Spain

Shoreline/Lagoonal Carbonates

- Inner ramp margin, Miocene, Spain
- Restricted and marginal carbonates, Miocene, Spain



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