Trail 5: Exnaboe

The lowlands contained several lakes, fed by water from the mountains and draining south-eastwards. Periodically the lakes would deepen and spread over the surrounding land, then shrink again. These episodes of expansion and retreat have left their mark in the geological record.

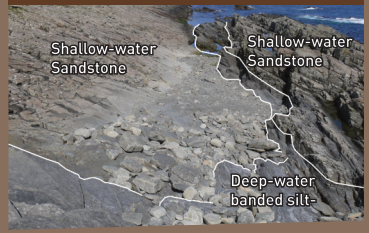
The coastline north of Exnaboe cuts through a thick sequence of sediments that were laid down in one of these lakes. The rocks dip (slope) towards the south-east, so as you walk northwards you are travelling back in time. In several places, ripples can be seen in the rocks, caused by the action of small waves on the sand in shallow water on the lake margin.

Rippled sandstone

At the Cletts 1 the sea has stripped away the weaker strata overlying a particularly resistant bed of sandstone, to form a long ramp sloping down to the sea. Immediately above this, the sequence of shallow-water sandstone is interrupted by two thick beds of finer sediment that were laid down in deep water during the lake's expansive periods.

The deep-water strata are best seen at the bottom of Shingly Geo. Here you will find a three-metre thick layer of banded grey rocks, each band representing the changing seasons over a single year. In spring, meltwater from the mountains carried sediment into the lake. Coarser grains settled out around the lake margins and only fine silt made it to deep water, where it formed the grey bottom element of each band. As the lake warmed, algae multiplied in the surface waters and stripped carbon dioxide from the water as they **photosynthesised**. This caused calcium carbonate to precipitate from the water and settle to the lake bed as a paler second layer. Finally, the **algal bloom** died and its remains sank, darkening the top of each band with carbon.

Shingly Geo



The depths of the lake were cold and devoid of oxygen and life. Any fish that died in the surface waters and sank, or were unlucky enough to swim down and suffocate, would be preserved and buried. Fossils aren't common here, but a few can be seen on the surfaces of rock slabs.

At Broken Brough 2, where the remains of an Iron Age Broch can be seen, the cliffs record an earlier, drier time, before the lake formed.

Fossil fish

The parallel beds of lake sediment are replaced by cross-bedded dune sandstones. Desert dunes march downwind as sand grains are blown up the gentle back slope and spill down the front. Here, sheltered from the wind, they form characteristic sloping beds with a curved foot that can be seen picked out by weathering of the cliff face.

Dune sandstones

Directions

By car / bike: From Scatness, return the way you have come, turning left onto the main A970. After crossing the runway, take the next right turn, signposted to Eastshore. Follow the road, taking the first right turn to continue along the shore. Take the junction on the right, towards the pier, and park in the car park (HU40111130).

Continuing on foot, return back up the road, turning right at the junction. From the turning point at the end of the road, follow the coastal path north.

Access

- The route is uneven and may be wet/muddy in places
- The route includes a number of two-step/ladder stiles
- The cliffs are high in places

Interpretation

- On-site information panel at Shingly Geo 1

Facilities

- Nearest public toilets at Grutness Pier (HU405100)
- Food and toilets available at Sumburgh Head Lighthouse and Visitor Centre

Glossary

Photosynthesis: a process used by plants and other organisms to convert light energy into chemical energy.

Algal bloom: a rapid increase or accumulation in the population of algae.