

# When the Tramlines are Missing

Sometimes it is hard to tell the orientation of a core based on sedimentary features alone. That is not the case for the Ness Formation from the Northern North Sea.

Photo: Henk Kombrink.



A slab of Ness Formation from well 211/23d-18 in the UK Northern North Sea.

In order to help geologists orientate cores correctly in terms of what is up and what is down, the outside of the core is often marked with a red and yellow line, the so-called tram line. Red is right, yellow is left.

In many cases, this is a great help, especially if you are not an expert in sedimentology. At the end of the day, only a small selection of cores shows clear sedimentological indications that indicate what the correct orientation of the core should be. Think of bottomset laminations or the way cross-bedded sandstones are truncated.

There is one sedimentary succession in the North Sea that very often does not need inspection of the tramlines in order to find out what the orientation of the core should be. That is the Ness Formation from the Northern North Sea.

The sediments of the Ness Formation were deposited during the Middle Jurassic and form part of the Brent delta succession that is characterised by a series of delta progradations and retrogradations.

Ness Formation strata are often characterised by beautifully laminated fine-grained sediments, as the image illustrates. It is the alternation between darker mudstones and whitish fine sands, in which very often wave ripples can be interpreted, that characterises many Ness

Formation cores.

## TOP OF THE DELTA

These sediments reflect a low-energy environment, where mud was deposited most of the time. However, a sediment source for coarser-grained siliciclastics must always have been close-by. Most people attribute the Ness sediments to a delta-top environment, where shallow lakes accommodated settling of fines, with intermittent input of coarser material from nearby distributary channels.

If the laminated fine sands cannot already be the clue towards putting a Ness core in the right orientation, then there are trace fossils that can do the job. What is generally thought of being the work of *Diplocraterion*, these bottom-feeders dug their way into the soft sediments of the Brent delta plain.



Photo: Henk Kombrink.

This core shows a good example of tramlines, with the red and yellow lines clearly marked on the outside. The red line should always be on the right.



Photo: Henk Kombrink.

Close-up of a Ness core showing burrows that clearly indicate what the orientation of the core needs to be.

Due to subsequent sediment compaction, the original mostly vertical burrows now often show up as a squiggly line, but that does not take away the possibility to discern the starting point from where the digging started.

Very often, it is a slightly sandier bit that formed the starting point of a new burrow, clearly enabling people to conclude what is up and what is down when looking at a bit of Ness. Even when the tramlines are missing. ■

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