KS3 Geography: Physical geography with Liz Bonnin

Glaciation and the UK coastline

LIZ BONNIN: Hi, I'm Liz Bonnin. Now Britain is, of course, an island and always has been, right? Well, no. During the most recent major ice age - which only really ended around 11,000 years ago - glaciation meant that lots of the Earth's water froze, expanding the ice sheets and exposing huge areas that were normally covered by sea. It meant that it was possible to walk from here to Northern Europe, and on the way you might encounter a rhino or a hippo.

To find out more, here's Alice Roberts visiting Cromer, on the north Norfolk coast...

ALICE ROBERTS: The north Norfolk coastline is very distinctive, the way it sort of bulges out into the North Sea, and it's along this coastline that we find evidence for how and when Britain became an island, and actually very excitingly, when that was.

For the answer, we have to go back in time to what we broadly call the ice age. For 700,000 years, massive ice sheets, up to a mile thick, have come and gone across Britain, moving slowly down from Scotland and carving the landmass as they travelled.

Along the way they swept up rocks, crunching them up as they slipped southwards. At one point, the ice sheets began to melt as they approached the north Norfolk coast, and even today we can still see evidence in the landscape.

What I'm really interested in are the hills in the distance over there because whereas most of Norfolk is of course flat, those hills are particularly interesting because they were formed by the edge of the ice sheet.

All the crumbled rock it carried within it was dumped in a long line at the point where the ice melted.

All of these hills are what's left behind.

But these hefty ice sheets did much more than carve mountains and create hillsides. They changed the position of the entire East coastline.

Evidence for the transformation lies under the waters of North Sea. Core samples taken from the floor of the sea reveal how the last ice age completely changed the shape of Britain.

PETER BALSON: We can see this dark brown peat layer, which was deposited in a marsh environment which existed in this area between about 11,000 and 9,000 years ago.

ALICE ROBERTS: Right. Hang on a minute, because you're saying this is a marsh environment. It's peat, so it's fresh water, but this is water that's now underneath the North Sea?

PETER BALSON: Yes, so in fact this core was taken from about 35m water depth in the North Sea.

ALICE ROBERTS: **Peat can only be formed on land in freshwater marshes. Finding this peat layer proves that the North Sea must once have been dry land. Carbon dating suggests the peat is around 11,000 years old, from the tail-end of the last ice age.**

Why was the sea level so low at that point?

PETER BALSON: During the maximum period of glaciation, global sea level might have been up to 120m below the present day. That's because of the amount of water that's been locked away inside these ice caps.

ALICE ROBERTS: How extensive was this area of exposed land?

PETER BALSON: This area of land at this time was very extensive in the southern North Sea. The area we're talking about stretches from right the way across north Norfolk to Holland. And all of this area here would have been this sort of lowland marshy area that you could imagine that animals and human beings could have crossed this area, and that's why it's known as a land bridge.

ALICE ROBERTS: **So we were joined to mainland Europe by a temporary bridge of land, that would have come and gone with changes in climate. And it's all still there under the North Sea. Deep freeze cold-snaps have happened many times over the last 700,000 years.**

During each cold period, water was locked up as ice, causing sea levels to fall and exposing new areas of land that connected us to Europe.

Animal bones dredged up from the North Sea reveal a lost world we wouldn't recognise today.

At Gressenhall Museum, there's a vast repository of these exotic animal bones.

NIGEL LARKIN: This is a rhino skull that was dredged off the coast of Yarmouth, about 100 years ago I believe. This was our indigenous fauna during the ice ages. We had woolly rhino, woolly mammoth, reindeer - not so exotic.

ALICE ROBERTS: Yeah.

NIGEL LARKIN: But at other times, during warmer periods, we did have much more exotic sounding creatures. We had things like hippos that lived here during the warmer period. During which time we hardly had any land bridge at all. And then, after that, there came the ice ages again and they became extinct locally.

ALICE ROBERTS: **The evidence from under the sea proves there was a land bridge, which allowed animals and our ancestors to walk back into Britain after the coldest periods of the last ice age.**

A few more thousand years of melting ice and rising sea levels, and the land bridge disappeared under the sea. And we began our adventure as an island people.

LIZ BONNIN: And if you're not sure what the peat is that Alice referred to in that clip, it's basically plant matter that has decomposed in wet areas - like marshes and bogs - and over time has turned into a thick, muddy substance. This is incredibly important habitat for lots of wildlife and it helps to keep our planet healthy.