



## Rocks in the field

### *The interbasaltic horizon*

#### **GLYNDA:**

East of the Causeway, one other feature that takes the eye is this very distinctive red band that occurs between the two sets of lava flows. So let's go and find out what it is.

#### **TONY:**

I'm now at the level of the red horizon and from close up on the path it really is quite an intriguing rock. It's yellow coloured here. And quite deeply red coloured here. There's actually a lot of colour variation within it. But there are also some grey patches as well. I can see another feature of it that the rock itself is in fact very crumbly. What we have here is a rock which has been intensely chemically weathered. We started off with a basalt and under what was probably humid conditions we had two stages of alteration to this rock. The first stage involves the break down of the feldspars, the pyroxenes plus any olivine that's present releasing in solution soluble ions of calcium, sodium and potassium. And it leaves behind a kaolinitic rock which is effectively a clay-rich rock. You then have a second stage and this actually attacks in particular the silica in the rock again removing it in solution, and leaving behind now a rock which is essentially rich in aluminium hydroxide or iron oxides in the form of bauxite or laterite.

If you look at the rock we've got this deep red weathered rock here and we've got a purpley grey coloured rock here. The red unit is where you have more iron and the grey unit is where you actually have more aluminium. We've just been looking at a red horizon, which locally we call the interbasaltic horizon. We know it's been developed by chemical weathering and we suggest that the time scale over which this process operated was of the order of 10,000 years or so. Now given the humid conditions under which this chemical weathering took place, it's not surprising that erosional processes were also operating, and in fact in this area a number of quite deeply incised river valleys are cut into the lava flows and the interbasaltic horizon. When you get these Causeway basalts erupted the flows flow into these valleys and fill them up. The lava, in effect, becomes ponded so that as it starts to cool and crystallise, joint systems develop both from the top and the base of the flow which propagate in the centre of the lava to generate these really rather spectacular columns.

One of the features of this chemical weathering of basalts in fact can be seen right throughout Northern Ireland where the Antrim plateau basalts are exposed. They frequently weather near the surface -they oxidise to a reddish colour -and that can actually produce a red colouration to the soils. Below that there is evidence for two lava flows and they are separated by a zone of very badly rotted basalt -which is now lateritised to a considerable degree.

And then above that we see the massive section of the second flow. Within this central portion of the flow the joint systems have acted as zones of preferential weathering. The chemical weathering process has operated at best along the joints opening them out and then has worked its way in to the central portions of the basalt blocks and as we can see has generated a distinctive spheroidal type of weathering. And this is often called onion skin weathering.