



Geological structures exposed.

460 million years ago

Nigel:

Well we've been looking at structures in Scotland over about a week now, and in the last couple of days particularly we've seen examples of ductile deformation and, indeed, in some outcrops we've seen evidence for the more than one phase of ductile deformation.

John:

And don't forget that back at Knockan Crag there we could see evidence for early ductile deformation in the Mylenites and the deformation had had to have gone on long enough for the rocks to have cooled, to have become close enough to the surface for the last stages of deformation to have become brittle, so we require quite a long period of time over which those rocks could have deformed.

Nigel:

And if we add to the structural information we've been gathering some geo-chronological data, then we know at least from work going on in Ireland that there was an Arc-continent collision about 460 million years ago. That's the mid-Ordovician and that probably initiated the deformation and metamorphism we see in the Inner Zone. And we also know from work done on the Moine Thrust that that thrust was active considerably more recently in the late Silurian to early Devonian, about 420 to 400 million years ago so that's, there's been Orogenic events going on over a period of sixty million years.

John:

Which is very much the same order of time period that you see in other younger Orogenic belts. In the Alps, for example, there's good evidence that collision had initiated by the mid-Cretaceous, by 70 million years. That's when events had started and there was deformation progressing at five, six million years ago, so very much the same magnitude of time periods.

Nigel:

And in the Himalayas we know that the collision was initiated fifty million years ago and the mountain building's still going on today so, once again, that's a fifty million year old time span which the Orogenies evolve.

John:

Well with that time period available then it really isn't surprising that we see numbers of structures superimposed on top of one another.

Narrator:

In this video we have examined structures from the Scottish segment of the Caledonian Orogenic Belt. We have used them to unravel the kinematics and the chronology of deformation. Like other Orogenic Belts, the Caledonian Belt has experienced deformation over long periods of time, overprinting the effects of earlier events. The results are often complex. But by looking at structures recorded by grain shapes, small outcrops, and even whole mountain sides, we can unravel the sequence of events that caused deformation and mountain building.