

## 2015 Q2 .C

### **Examine how Isostasy impacted the Irish landscape**

Isostasy is the balance between the earth's crust and the asthenosphere. When the thicker, heavier continental crust, with a width of 60 kilometres, sinks deeper into the mantle, the lighter oceanic crust, with a width of 10 kilometres, creates an equilibrium, known as Isostatic equilibrium. However, in the pleistocene ice age 20,000 years ago, a vast ice sheet pressed down on much of Europe causing it to carry extra weight. This caused the crust around Europe to sink further into the mantle in a process termed 'isostatic readjustment'. When the ice melted, the extra weight was removed which resulted in the crust rising higher in the mantle. This caused Europe to rise higher above sea level, as the process of isostatic adjustment caused crustal uplift.

In relation to rivers, a graded profile of a river represents the perfect balance between the river processes of erosion, transportation and deposition. However, the graded profile of a river can be changed due to isostatic uplift which causes river rejuvenation. The appearance of the Irish landscape will also then be changed as result of river rejuvenation.

The mouth of the river is where river rejuvenation commences; it is where the river begins to erode vertically due to hydraulic action, the sheer force of moving water, which creates a new V-shaped valley. The new V-shaped valley will continue upstream due to headward erosion causing the original profile to be demolished.

The point in which the old profile meets the new profile is called a Knickpoint. Knickpoints are often occupied by waterfall or rapids. If river rejuvenation occurs more than once due to crustal uplift, there can be more than one knickpoint in a valley. Knickpoints can be seen on River Erne in Co. Donegal at Kathleen's falls.

If a river vertically erodes, it will create a new valley in its original floodplain. It can be said to be a valley within a valley. The original floodplain will stand above the new valley on either side, seen as a step in the land above a river. These steps are called paired terraces. They can be seen on

the River Nore in Thomastown, Co. Kilkenny. If river rejuvenation occurs more than once there will be another set of terraces formed. They are then called stepped terraces.

If a river has a meander and river rejuvenation occurs, the meanders are called incised meanders, as the river's increased erosive power has cut deeper into the former floodplain.