The formation of a waterfall and a delta - 2014 Q2B(i)

Erosion: Waterfall

I have studied the formation of a waterfall. A waterfall is a vertical interruption in the river profile that occurs due to vertical erosion. Waterfalls occur in the youthful stage of a river. An Irish example is Torc Waterfall in Killarney, Co. Kerry.

In the youthful stage of a river, the river has a very high velocity. It is very powerful, causing vertical erosion into the river bed. Soft rock erodes faster than hard rock, this is called differential erosion.

The power of the river carves out hollows in the river bed by hydraulic action. Abrasion then occurs as broken rocks become trapped in these hollows, causing them to deepen and widen. These hollows eventually spread out to form a vertical drop, which the river flows over. Hydraulic action continues to occur as the force of the water flowing over the drop breaks the rock at the base, creating a plunge pool. Abrasion and hydraulic action widen and deepen the plunge pool and erode into the back wall of the waterfall – this is called undercutting. The undercutting creates an overhang as the soft rock is eroded and the hard rock is left. Eventually, the overhang collapses. Abrasion occurs as the rocks from the collapsed overhang hit off the river bed, eroding it further. As these rocks swirl around the plunge pool, they hit off each other, where erosion by attrition takes place.

Deposition: Delta

I have studied the formation of a delta. A delta is a flat area of alluvium deposited at the mouth of a river as it enters a sea or lake. They occur usually in the Old Age Stage of the river. An Irish example of a delta can be seen at Lough Tay in Co. Wicklow.

Deltas form due to a loss of river velocity, when the river begins to deposit its load along the mouth of the river. Deltas can only form when there are large amounts of sediment in the river and when the rate of deposition is greater than the rate of erosion.

Due to deposition, the mouth of the river becomes clogged with sediment which causes the river to split into distributaries. The deposited material is sorted into three beds: bottomset, topset and foreset. The bottomset consists of fine sediment which gets carried furthest into the sea or lake. The foreset is made up of thick layers of coarse material, deposited closer to the river's mouth. The topset consists of a mixture of heavy sediments deposited closest to the river’s mouth. There are three types of delta: bird’s foot delta (e.g. on the Mississippi River), arcuate delta (e.g. on the River Nile) and estuarine delta (e.g. on the River Shannon).