

# Fluvioglacial landforms essay sample

[Environment](#), [Earth](#)



Glaciers are capable of transporting large amount of debris and this waste material is classified according to the position in the glacier that it is found. There are therefore three ways in which glaciers transport debris.

The first is called supraglacial and is where material, often from rock falls and weathering processes, is carried on top of the glacier. Secondly there is englacial. This is where debris is transported within the glacier itself. This material may originally be from supraglacial material which was covered with fuher ice and snow, from material which has fallen into the crevasses of the glacier or sunk into the ice via a process know as localised pressure melting which occurs beneath large rocks and stones. If the debris continues to sink into the glacier it will become subglacial debris. This is the final way in which glaciers transport material and, as the name suggests, it is where debris is held underneath the glacier. This debris may also have been collected by processes such as plucking and abrasion.

Describe and explain the variety and location of fluvioglacial landforms (20 marks)

When glaciers begin to melt they produce large amounts of melt water which often results in extreme erosion and the transportation of debris, leading to the formation of distinctive landforms. Fluvioglacial deposits vary greatly to glacial deposits. They are deposited by melt water streams, which run beneath and then beyond the glaciers' snout, and in the same manner as any other stream they loose energy as their velocity or volume decreases. As their energy is lost they begin to deposit the debris that they are carrying, largest first followed by the smaller particles as more energy is lost.

The landforms of fluvioglacial activity fall under two categories, those formed by fluvioglacial erosion and those formed by fluvioglacial deposition.

Melt water channels are common features in areas which have experience fluvioglacial erosion, mainly occurring in areas where the melt water flows in discreet channels and these are often shallow, especially when the ground is still frozen. If a melt water channel is dammed, perhaps by a moraine, then the water level will rise and should the stream then over flow an overspill channel will form. An example of this is found in Newtondale in North Yorkshire where an ice sheet from Scandinavia blocked the flow of the melt water through the Esk Valley. When the water level rose it spilled through a low col eroding a deep gorge in the landscape.

Also occurring in areas which experience fluvioglacial erosion are Sichelwannens and Tunnel Valleys. Sichelwannens are crescent shaped scour marks made from melt water stream sometimes flowing supraglacially on the edge of a glacier. The marks are eroded into the rocks of the valley sides and when the glacier retreats the marks are exposed high up on the valley sides.

Tunnel valleys can be found in the Stour Valley in East Anglia; however there is much debate about how they are formed. One suggestion is that they were eroded by melt water streams and then filled in with deposited material.

We then move onto those landforms formed by fluvioglacial deposition. Melt water is particularly significant where there is variable discharge. When the

melt Water Rivers and channels have high water levels there gain enough energy to transport large pieces of debris over long distances. As the discharge of the river decreases so does its ability to carry its' load and so deposition begins to occur allowing numerous landforms to be shaped.

Outwash (or Sandur) is that name that is given to the flat stretches of sediment found in proglacial areas. It is formed as the melt water streams gradually lose their energy and begin to deposit their load. This deposited material is sorted by size, with the larger particles being deposited first. An example of this can be found on the south coast of Iceland where there is a large area of sandur which is fed by the melt water from a number of glaciers including the Gigjukull and the Silheimajkull.

Varves are layers of sediment which are deposited in pairs with each set representing a year's deposition. They are found in the bottom of proglacial lakes. As the melt water stream enters the lake energy is lost and so the sediment is deposited. The width of the band (varve) which is deposited tells us whether it was formed in the summer or winter months. If the band is wide we know that the deposition occurred during the summer months as there are large amounts of melt water which allow the streams to carry coarser material (such as sand and gravel). During the winter months, when there is little melt water, the size of the sediment is limited to silt and clay which results in the bands being thin and fine. Studies have been conducted into the Varves looking at climate change, with thicker bands being a sign of warmer climates. The colour of the bands can also be an indicator of the

climatic conditions with darker sediment thought to be more organic matter and so being a sign of more organic matter and a warmer climate.

During ice retreats kettle holes may form as dead ice becomes detached. Sediment then builds up around this dead ice until it eventually melts leaving a small hollow in which water accumulates to form a lake. The lakes which are formed are vast in size, for example there are a number of kettle holes in the Ellesmere region of Shropshire where lakes can be found with a diameter of over 100 meters. However, while this is the most accepted explanation of how these landforms are formed, others suggest that kettle holes may not be formed by fluvioglacial deposits and that they are formed by supraglacial deposits instead.

Eskers are long ridges found on the valley floor which are formed when material is deposited in subglacial tunnels as the supply of melt water decreases at the end of the glacial period. These streams may carry vast amounts of debris which is under a high amount of pressure in the confined tunnels and some argue that when this pressure is released as the melt water emerges at the snout deposition occurs. As the glacier retreats and the snout moves back up the valley the point of deposition would gradually withdraw up the valley which may explain why some eskers are beaded. The Trim esker, located near Dublin in Ireland is one of twelve found in the region and is 14.5 kilometres long and ranges from 4 - 15 meters in height.

Delta Kames are small mounds that form under a number of circumstances which are also found on the valley floor. The first way in which these landforms may be formed is when englacial streams emerge at the snout of

the glacier and then fall (much like a water fall) to the valley floor. These streams then lose their energy and deposit their load producing the small mound which can be found today. The other theory of how delta kames are formed is that supraglacial streams deposit material as they enter the ice marginal lakes however it is also possible that debris-filled crevasses during an ice retreat. There are many examples of delta kames found in East Lothian in Scotland where they are, on average, around a few hundred meters long and tens of meters high.

Kame Terraces are ridges of material which run along the edge of the valley floor and are formed by supraglacial stream on the edge of the glacier which pick up and carry debris from the lateral moraine that is deposited on the valley floor as the glacier retreats. These streams form as a result of the melting ice that is in contact with the valley sides, due to both friction and the heat-retaining properties of the rocks. Kame Terraces can be easily confused with lateral moraines and it must be remembered that whereas lateral moraines are made of glacial debris; Kame terraces are composed of more rounded and sorted fluvioglacial deposits. Kame terraces can be found in a valley called Kingsdale in the Yorkshire Dales, where one terrace extends for around two kilometres along the north side of the valley and is approximately two meters high for most of its length.

The final landform which is formed by fluvioglacial processes is Braided Streams. These are river channels which are subdivided by numerous islets and channels, where debris laden streams lose water at the end of the melting period and so can carry less material. This material is deposited in

the channel causing it to divide and then in some cases rejoin. Over time the bars produced will become stabilised by vegetation and then become more permanent features. The bars which are left unvegetated lack stability and can be moved and re-formed during floods and high periods of discharge. On the outwash plain of Iceland in the Síðlheimasandur region braiding occurs widely.

Much like glacial deposits, fluviglacial deposits are often difficult to identify when out in the field, and repeated advance and retreat can modify and alter the appearance of the landforms. Weathering, erosion and colonisation will also have an affect on the landforms.