A2 Geography 4.2 Glacial Systems Student Notes

Fluvio-glacial Areas have Distinct Features

Field Evidence to Distinguish Glacial Landforms From Fluvio-Glacial Landforms.

Glacial deposits are generally:

- **unsorted,**
- **angular and**
- **unstratified.**

Material may display a common orientation of elongated particles that can be subject to till fabric analysis.

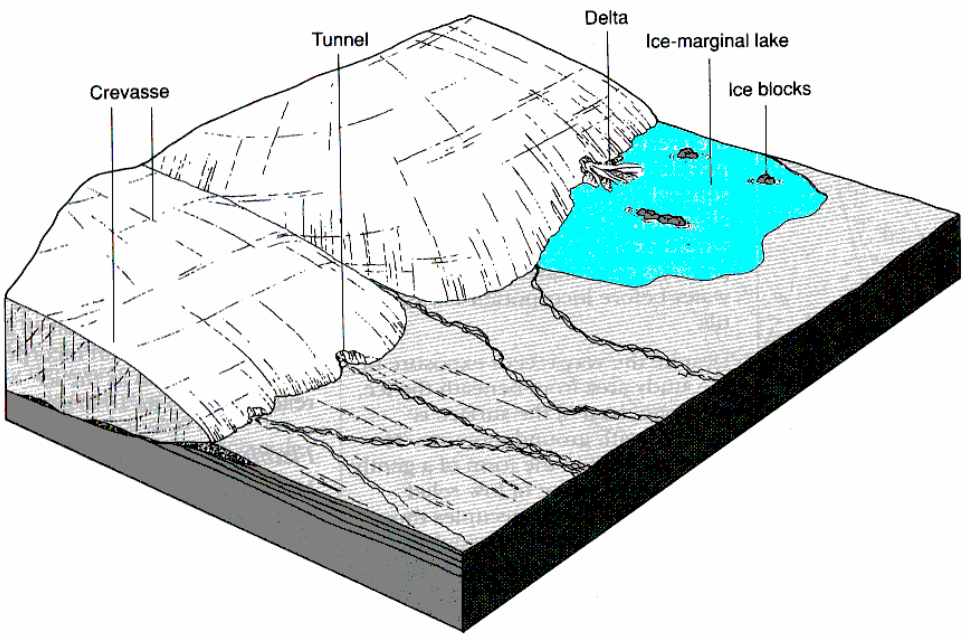
However fluvio-glacial deposits are generally:

- **sorted**
- **rounded and**
- **stratified.**

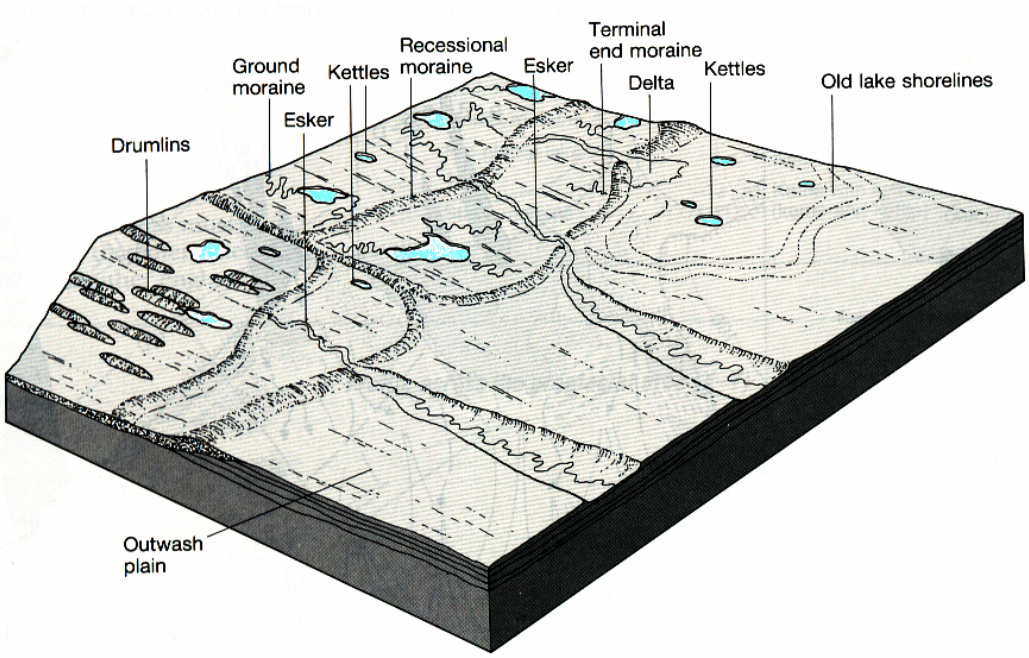
Fine deposition in pro-glacial lakes may take the form of varves. These are thin laminar beds of sediment divided into thicker lower, lighter coloured bands of sand, grading upwards into a thinner upper, darker bands of silt. They are formed in pro-glacial lakes by glacial meltwater. The lower, coarser layer represents the summer season and the upper, finer layer, which was deposited when the melting was reduced, represents the rest of the year. Since the two bands represent a single years sedimentary accumulation, the age of the deposit can be calculated by counting varves. They have proved very useful in constructing the chronology of glaciated areas.

The range and Variety of Fluvio-Glacial Landforms

You should be able to describe and explain the processes of formation of each landform. Annotated diagrams and sketches should be used as well as examples from one or more located areas.

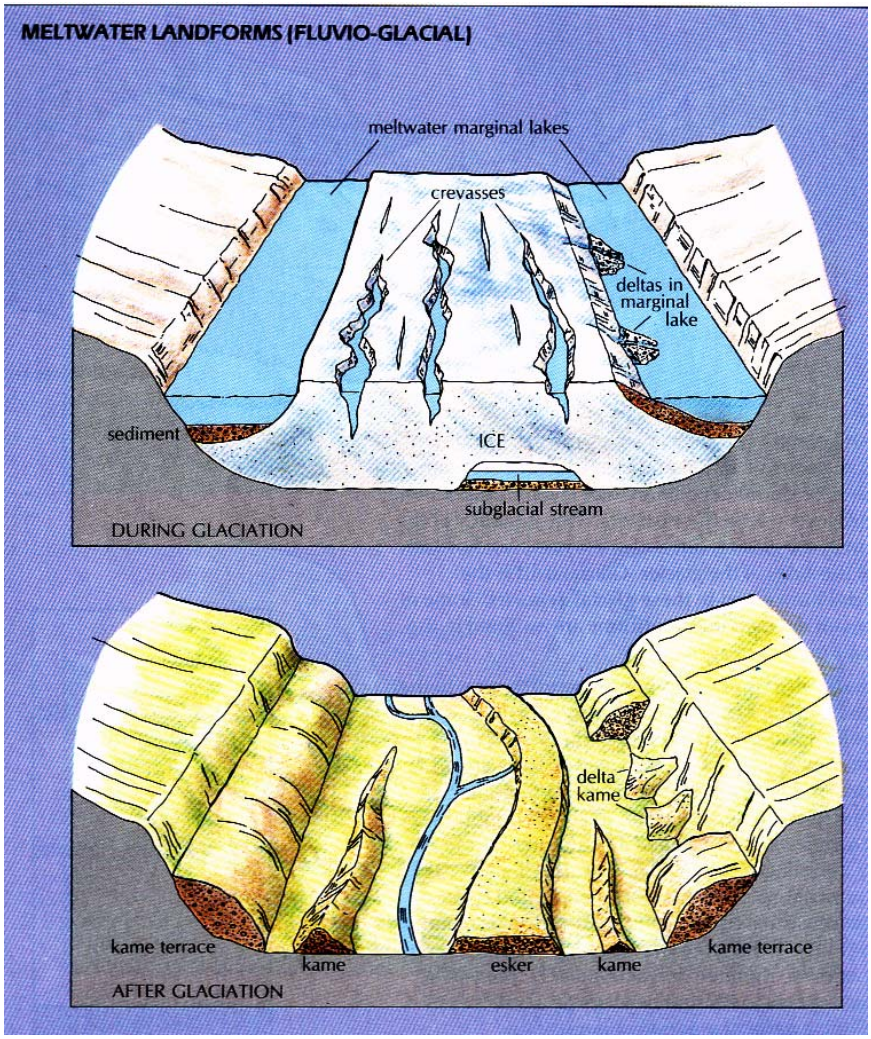


The locations of landforms that develop as a result of a continental glacier depend on the position of the ice margin. Some features form beneath the ice, others as a result of temporary ice-dammed lakes. A further group of landforms result from meltwater extending well beyond the snout of the glacier.



After the ice has receded, a range of landforms is left. Some landforms are a result of direct glacial deposition (such as moraines and drumlins); some relate to former ice-marginal lakes, (such as kame deltas) and others result from deposition and erosion on the outwash plain.

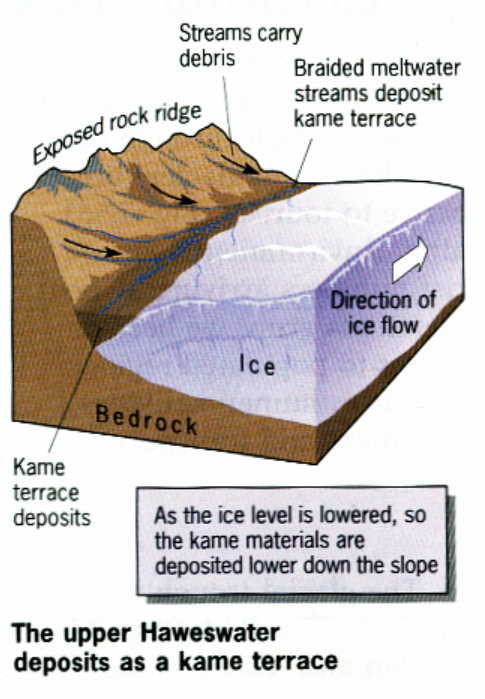
Eskers: a narrow sinuous ridge of partly course sand and gravel of fluvio-glacial origin. Eskers wind across the countryside and frequently bare little relationship to the modern drainage pattern. The torrential bedding suggests they were formed by currents of meltwater flowing under considerable hydrostatic pressure and therefore capable of carrying heavy burdens of glaciogenic material, at high velocities. Some authors believe that they are formed as a "cast" of the deposits of a sub-glacial stream. Others believe that they formed like elongated deltas at the edge of a retreating ice-sheet of glacier.



Beaded esker: a sinuous upstanding ridge of sand and gravel along which as occasional wider hillocks, linked by narrower segments. Since the esker is known to be of fluvio-glacial origin, it is suggested that the beaded form represents differential input rates of sediment from the meltwater stream. The narrow sections may have been formed in cooler periods when melting slowed down and the beads when meltwater activity increased in the warmer phase. Alternatively, the beads represent temporary deltas formed at a stationary period during glacial retreat. (See *esker*).

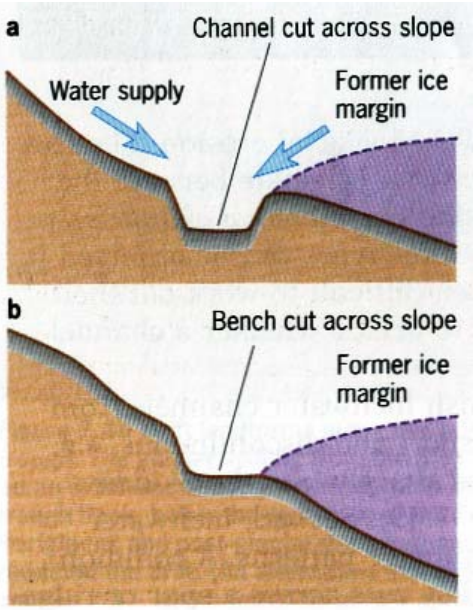
Kame: a steep sided ridge, or conical hill, of bedded fluvio-glacial material formed from a crevasse filling.

Kame deltas: if a debris-laden meltwater stream emerges from the ice front and deposits its load into an ice-dammed lake, the gravel and sand will form a kame delta.



The upper Haweswater deposits as a kame terrace

Kame terrace: a flat topped ridge or terrace-feature occurring between a valley glacier and the valley slopes. It is composed of bedded fluvio-glacial material deposited by meltwater streams flowing laterally to the glacier. The kame terrace may be pitted with *kettles* and post-glacial streams may dissect it.



Ice-marginal channels

Meltwater channels and Ice Marginal Channels: a channel, perhaps no longer carrying a stream, or carrying a misfit stream, cut into rock by meltwater. Often associated with *kame terraces, deltas* or *eskers*.