FLOODING

A flood is a short period of high discharge resulting from heavy rainfall or melting snow. When water rises over the channel and spreads over the flood plain. This becomes a hazard if it overtops the river banks. When the water is maintained within the channel it is said to be bankfull discharge (without overtopping it). Floods are of geomorphological importance. It is during floods that geomorphological activities take place such as widening, deepening of channels and transport of sediments. Floods can be caused by meteorological or catchment factors.

Meteorological factors

- Rapid snow melting in high altitude areas
- Very intense rainfall leading to Horton's overland flow
- Heavy rainfall on a wet catchment leading to saturation overland flow

Catchment factors

- Low infiltration capacity, e.g. as a result of deforestation, urbanisation, etc.
- High drainage density
- Steep side slopes in catchment
- circular catchments

The infiltration capacity and drainage density can be exacerbated by human activities.

Response of a catchment to a flood

Catchment is the area of land from which all surface water received as precipitation and all eroded sediment is transported to the same outlet. - a single drainage system in which all rainfall within it finds it way in the rivers. The boundary is the line of maximum relief across which there is no transport of sediment or surface water.

The response of the catchment to the flood, whether it will be rapid or delayed will depend on the following factors.

1. Amount of storage in the catchment
2. Nature of flow pathways and flow velocity - A large storage capacity has to be filled first before the rainfall flows into the streams. There is a delayed and subdued response. The peak is small, continued response and spread out. A small storage capacity leads to an immediate rise, smaller peak that falls much faster, there is no continued response.
3. Shape of catchment - A circular catchment gives a high peak (rapid response), while an elongated catchment gives a very slow response (low peak). The circular catchment has a lot of water concentrated at one area. The perimeter will converge at mouth, giving rise to a rapid response. The elongated catchment will have a longer distance converging at the mouth.
4. Shape affects response to precipitation, thus the steeper the slope, the higher the response.
5. Channel network, high drainage density results in a quick response, a low drainage density gives a slower response.
6. Nature of catchment - Factors which determine flow velocity within channels:
    - The steeper the channel, the higher the velocity
    - Channel size and shape is another factor. Generally, the deeper the channel, the higher the velocity.
    - Roughness of the beds and the banks. As roughness increases, velocity decreases because of friction. The roughness increases from sand, gravel, boulders, vegetation.