

Hydrographs

Examine the impacts of human activity on river hydrographs.

Hydrographs are used to graph and visualise rainfall and discharge over a given period of time. Certain features of the hydrograph, such as the rising limb and the lag time, can be affected by different factors. The way in which humans change the land and our knowledge of floods and drainage basins can help us predict the effect of human activity on these hydrographs.

+ ultimately model flood events + give advanced warning to vulnerable populations.

What humans do best is urbanisation. Building cities often involves the clearing of forested areas first, in order to obtain land to build on. By removing the vegetation in said area, it reduces the rate of interception by the leaves and the trees themselves, leading to a steeper rising limb on a hydrograph, as well as a shorter lag time. It can also reduce the amount of infiltration, as trees normally soak up water via their roots. If there are no trees, the water will stay in the soil and the land will become saturated, not being able to take up more. In comparison to this, afforestation in some areas could increase interception and infiltration, therefore increasing lag time and resulting in a gentler rising limb.

vegetated

Covering up the soil in tarmac is common in cities. As tarmac is impermeable, there will be no infiltration and much more surface runoff, especially if the city was built on a slope. This would shorten the lag time by creating a steeper rising limb. We should also consider the fact that in populated cities, many people use a lot of water which is then drained, adding to the volume of water in the drainage basin: this would increase discharge, resulting in a higher peak.

'normal flow'

In agricultural areas, there is often a lot of infiltration and interception due to the presence of many plants. This results in less surface runoff, meaning a gentle rising limb and longer lag time. Due to the higher amount of groundwater storage, there will be a lower discharge, reducing the height of the peak discharge. However, if the land has been recently ploughed, the ground will be saturated with water, reducing the rate of infiltration, which would result in a steep rising limb and short lag time. As agriculture is often on flat land though, it doesn't have a huge impact due to still little surface runoff.

Humans can also extract water from drainage basins, resulting in a lower peak discharge as the total volume of water is decreased. As discharge is reduced, there would be a longer lag time. Humans can also add water to drainage basins and agricultural areas for example, increasing discharge and saturating the ground, reducing infiltration rates. Reservoirs, built to prevent floods, can take up water too, again resulting in a longer lag time. However, when water is released from them, discharge is increased: this can result in higher peak discharge and potentially shorter lag time.

'normal flow rate'

Careful with some of your descriptive terms Lola.

7/10
22/11/18