

Glacial break-up



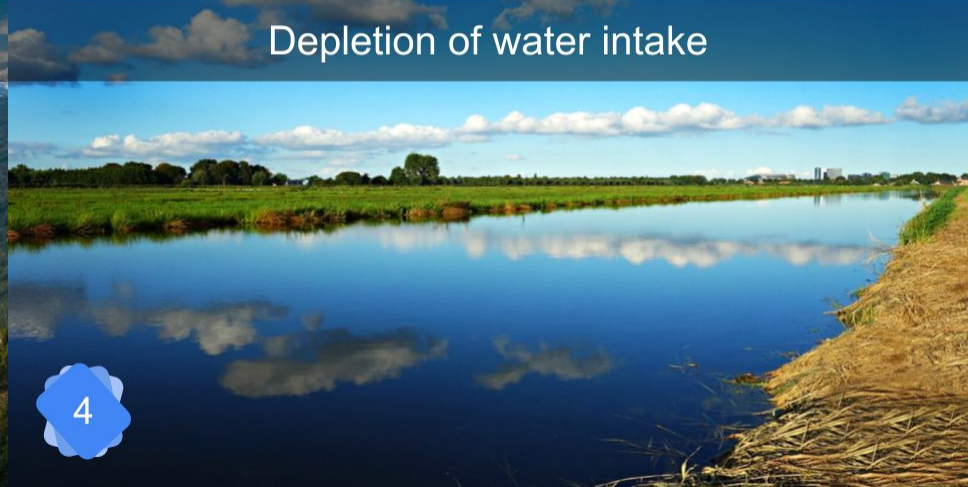
Socio-economic impact : mountaineering



Melting of glaciers



Depletion of water intake





1

Break-up is a meteorological phenomenon in which the ice cover suddenly breaks up, followed by a massive departure in blocks and preceding their melting. Piles of ice forming a natural dam may occur during break-up.



2

Some countries, such as Nepal, derive the majority of their currency from mountaineering. With the increasing instability of glaciers, the risk of serac falls is increasing.



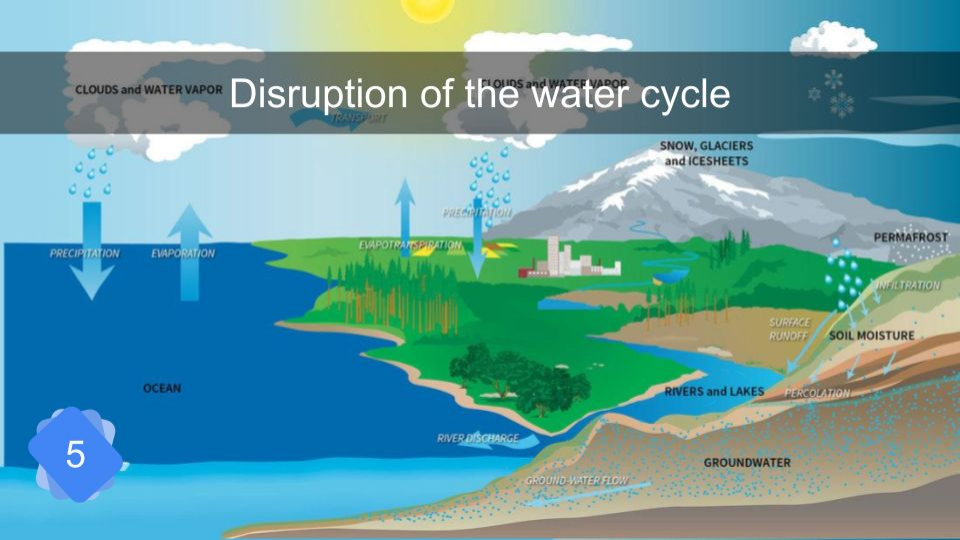
3

Almost all glaciers have receded, and hundreds of them have already disappeared. Glaciers are important because they regulate and provide freshwater.



4

Freshwater resources are affected by changes in rainfall and by the melting of glaciers that regulate the flow of rivers.



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Hotter oceans and hotter atmosphere lead to stronger evaporation, causing rain clouds and rainfall. Hotter land and a hotter atmosphere also lead to stronger evaporation, this time causing the ground to dry out.

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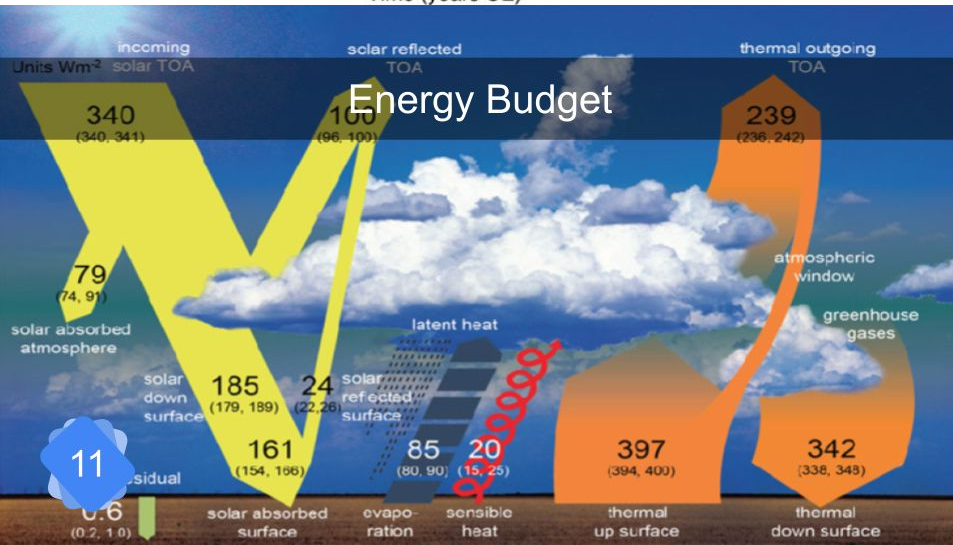
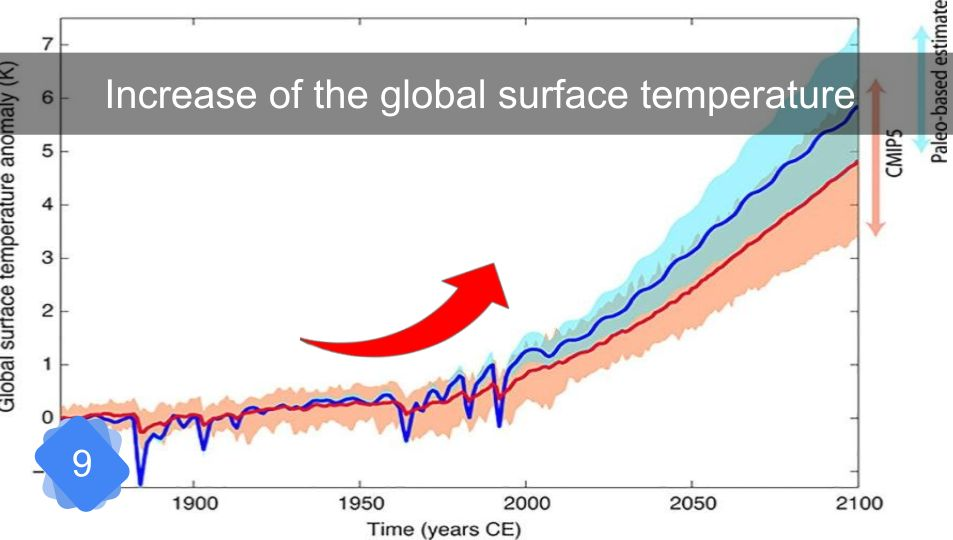
The disruption of the water cycle can both increase and decrease rainfall. More rain can lead to river flooding. If the soil is very dry, it makes matters worse because the water runs off it.

7

Permafrost is permanently frozen ground. It is starting to melt, releasing into the atmosphere previously locked-in methane and CO<sub>2</sub> from decomposed biomass. This creates a positive feedback loop, just like forest fires and albedo changes due to melting sea ice.

8

The disruption of the water cycle can both increase and decrease rainfall. A lack of rain can cause drought. Droughts are likely to become more frequent in the future.



9

The average air temperature at the surface of the Earth has increased by  $1.2^{\circ}\text{C}$  since 1900. Future emission scenarios predict that this increase will reach between  $2$  and  $5^{\circ}\text{C}$  by 2100. During the last ice age 20,000 years ago, the average air temperature was only  $5^{\circ}\text{C}$  lower than today and warming up took 10,000 years.

10

Radiative forcing represents the difference between the energy that reaches the Earth each second and the energy that is released. It is rated at  $2.8 \text{ W/m}^2$  (Watt per square metre),  $3.8 \text{ W/m}^2$  from the greenhouse effect and  $-1 \text{ W/m}^2$  from aerosols.

11

Due to radiative forcing, the energy accumulated warms up the ocean, melts ice, dissipates into the ground and warms up the atmosphere.

12

The loss of water resources has a direct impact on agricultural production. Agriculture uses about 70% of the world's freshwater consumption, but water use efficiency in many countries is less than 50%.