

University of Anbar

College of Science – Applied Geology Department

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4th Stage

Quaternary

Lecture 7: Non Glacial Environment

Non Glacial Environment

The periods of warm or normal conditions , present climate differ from the past one , to compare between them

<i>Present</i>	----- 90 -----	<i>Ice Age</i>
Ice	----- 80 -----	Ice
Tundra	----- 70 -----	Ice
Tundra	----- 60 -----	Ice
Temperate	----- 50 -----	Tundra
Mediterranean	----- 40 -----	Mediterranean
Steppe	----- 30 -----	Steppe
Desert	----- 20 -----	Savannah
Savannah	-----	
Monsoon	----- 10 -----	Monsoon
Equatorial	----- 0 -----	Equatorial

Tundra : inventory plains at polar regions.

Steppe : large open plains at arid regions with out any trees but some high drought resistance plants.

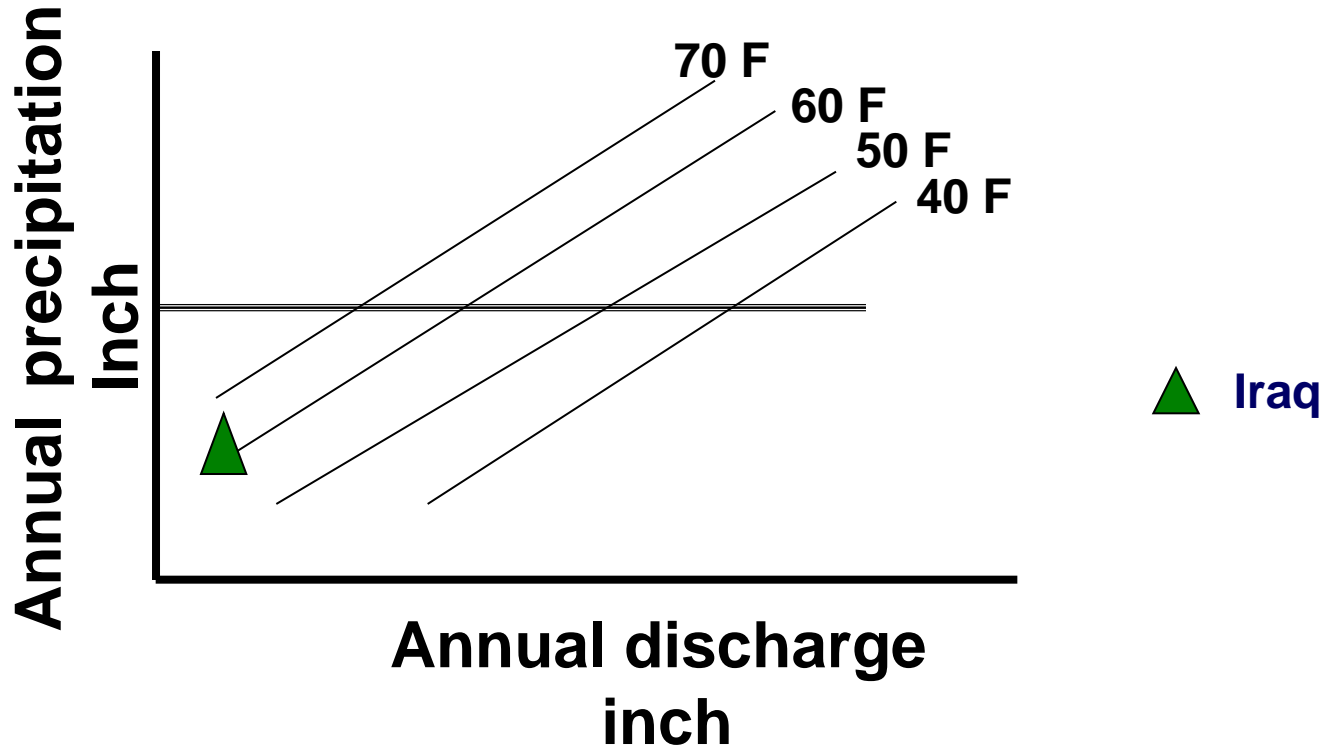
Savannah : flat area or semi flat with or with out some small trees and plants .

The ice region at quaternary periods will extends downward and effect new areas .and other regions will pressed .

To understand what happened at Quaternary and the changes of climate – hydrology – plants- discharges - sediments , must study the present and its factors (Climate –Temperature - Rains) with their relations and consider it happened at that time in general.

Schumm think (the present is the key of past) so he give 3 relations to understand the Quaternary Environment

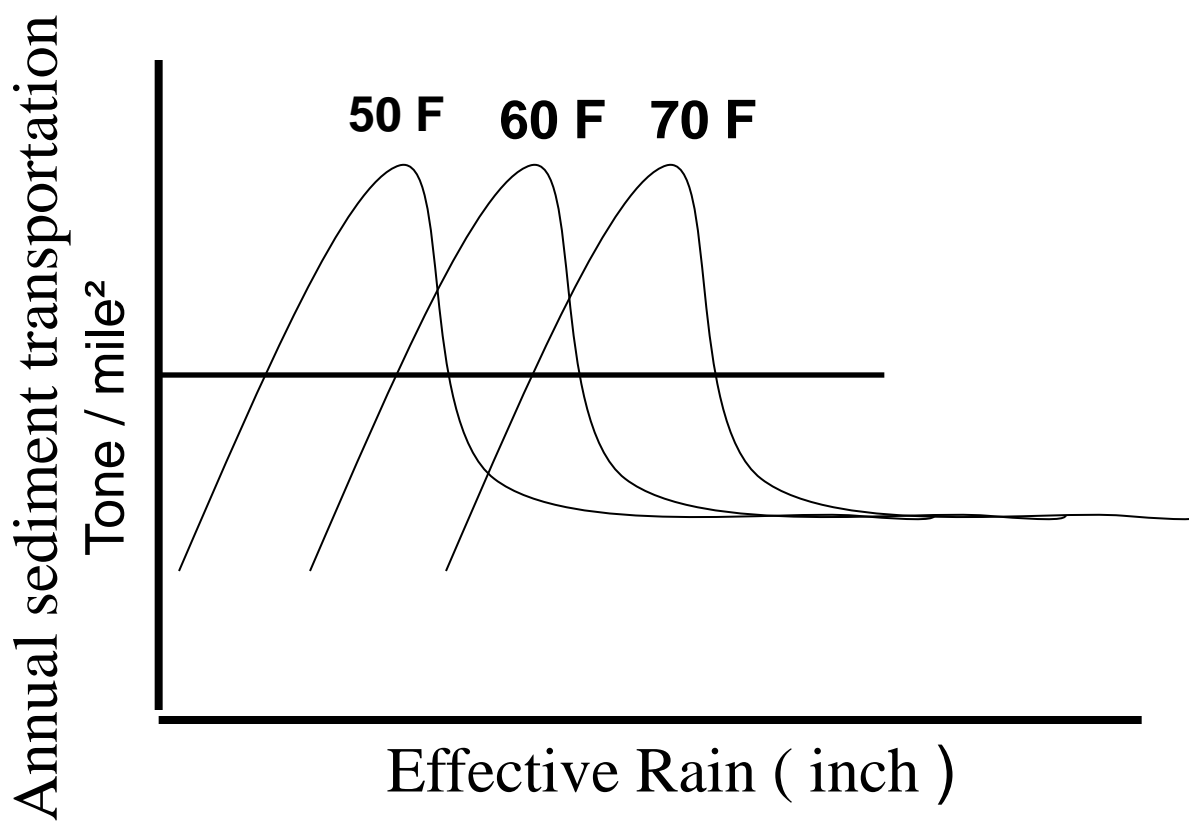
Relation (1) : The relation between annual rain precipitation and annual discharge with effect by the third factor (temperature) . In general when the precipitate increase the discharge will increase also at same temperature . But at same level of precipitation the discharge increase when the temperature decrees.



The reason of that relation : at high temperature the evaporate will increase and that caused low discharge . So if we know any tow factors we can calculate the other one .

Relation (2) : The relation between effective rain and rate of sediment transportation .

The effective rain can be calculated from first relation so its real Values, The diagram show not at increase of effective rain the sediment transportation would increase because (when the rain Increase some plants will grow up and cover many areas then can fix the soil and prevent the Erosion .



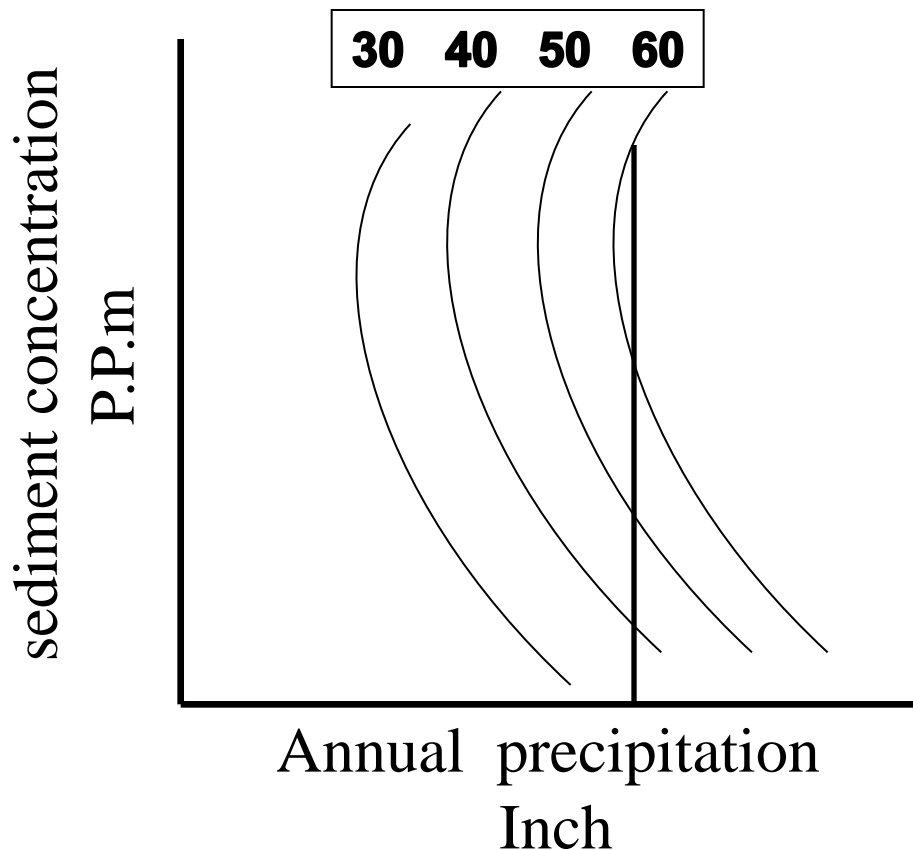
The curve may go up till reach the peak then get down .

When the temperature increase the rain must be more to produce same quantity of sediment transportation.

Relation (3) : The relation between sediment concentration and Annual precipitation with different temperatures .

When the Annual precipitation increase the sediment concentration will decrease because of large quantities of water .

The temperature factor (at a known Annual precipitation value) , sediment concentration will increase when the temperature increase , because the evaporate increase and cause decrease water volume



The general idea of the non Glacial Areas at Quaternary glacial periods is temperature less than present about 5 – 10 C° and the annual rain rate more than present about 25 cm. And at interglacial period the temperature more than present about 5 F .

Final result the temperature less about 10 F and rain more about 25 cm .

In Quaternary when glacial periods, the precipitation cause increase of runoff with sediment transportation and decrease at concentration , but at interglacial periods (present) the precipitation decrease with extensive decrease of transportation and very high concentration of sediments .

About the sediment Transportation depend on the weather

Arid to semi Arid + Sediment Transportation

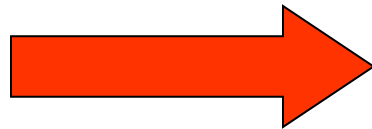
Semi Arid to Wet - Sediment Transportation

Both cases can find at Iraq

But if the Runoff increase more that level within Glacial periods many quantities of water inter the rivers and cause some changes to the channel (width – depth) with different ratios .

But at the flood plain of the river this factor can cause (river terraces)

+ Temperature
- Precipitation



+ Runoff
- concentration

NOW

QUATERNARY

References

Glacial and Quaternary Geology

http://www.colby.edu/geology/GE354/Index_GE354.html

Internet Remote Sensing Lectures sites