

## ROLE OF GEOMORPHOLOGY IN PALAEOBOTANICAL STUDIES

The science of geomorphology, sometimes also called as recent geology, has two main aspects. One of the aspects deals with the nature, origin and distribution of landforms (surface morphological features of the earth) while the other is related to the study of various geological processes responsible for the development of these features.

Usually, geomorphological studies are mainly concerned with the investigations of present day landforms and the recent geological processes. However, according to the concept of uniformitarianism that present is the key to the past, the knowledge of modern geological phenomena forms the basis for clear and better understanding of palaeolandscapes and the work of these processes in the geological past. And hence, studies of ancient landforms and associated processes are now grouped under the science of *Palaeogeomorphology*.

It is well known that in the study of earth sciences one deals with a landform or a geological process either directly or indirectly and which may belong to past or recent times.

Palaeobotany is also an earth science which deals with the palaeofloras, studied mainly from the mega- and microfossils, found preserved in the sedimentary rocks deposited in the basins during geological past. This knowledge of past vegetation helps in building biostratigraphy, in understanding the palaeoenvironments and various other aspects related to the origin and evolution of the flora in general. It is an established fact, that for the proper appreciation and interpretation of these aspects a detailed knowledge regarding the nature of sedimentary rocks, structure, and evolution of the basins along with the behaviour of the processes involved in their formation and development is essential. As any basin is a landform, the above aspects can only be covered by geomorphological studies. Further, its significance increases when the palaeobotanical findings are to be utilized in the exploration of fossil fuels (coal and oil) as these products have originated in a basin under the influence of geomorphic agencies.

The role of geomorphology is significant in Quaternary palynological investigations as Quaternary sediments are present almost everywhere, particularly in the lake basins, river valleys and ocean floors, etc. Out of these only the lake basins have so far been investigated in some detail, as the palynology of the lake sediments helps a great deal in the reconstruction of vegetational and climatic history. In this connection it has to be mentioned that for such interpretations, knowledge regarding the origin and evolution of the basins is essential, which can only be acquired by geomorphological studies. Further, one needs to understand the type of basin with which he is dealing, such as, cut-off meander lake, cirque lake (glacial), marginal periglacial lake, topographical depression, deflation basin, rann, salt flat, sebkha, etc. and various other types of basins formed due to the natural damming of drainage channels. The pattern of sedimentation and the provenance changes with the type of basin. In the case of a topographical depression only the local sediments are deposited in the lake, whereas, in case of a lake developed due to the damming of a channel the sediments transported from long distances will be deposited. This makes a lot of difference in the interpretation of the vegetational and climatic history of the region. In most of the cases climatic interpretations can as well be confirmed or supplemented with the help of geomorpholo-

gical findings. Recently, lot of work has been done in this field and almost a new branch of climatic geomorphology has emerged which deals both with the recent and past climates.

In cases of the basins having complicated geomorphic history the detailed geomorphic studies are required with the help of satellite imageries and aerial photographs. These recent methods help in understanding the regional geomorphic evolution of the landforms and also facilitate field work for studying the succession of features in relation to the erosional and depositional history. The succession of the features generally includes the tracing of the ancient drainage systems (study of the lost channels), the study of erosional surfaces, and the development of superimposed landscapes etc., which is required in solving the complicated geomorphological problems.

Further, geomorphological studies carried out in coastal areas help in understanding the evolution of the coast lines and other problems of marine geology and oceanography, particularly the palaeoshorelines. Besides, this study is also useful in understanding the various archaeological problems, like the reasons for migration of civilizations. As the human beings are dependent on nature, particularly easy access to a water source, they change their place of inhabitation with the changes in the river channels, etc.

The direct application of geomorphology in palaeobotanical studies below the Quaternary Period is comparatively limited, as it deals mainly with the palaeolandforms, which are usually not exposed for study. Recently, some work has been done on the nature and evolution of palaeogeomorphic features which has helped a great deal in the interpretations of the depositionary models. Geomorphic studies carried out with the help of remote sensing techniques (satellite imageries and aerial photographs) provide regional geological picture of the area in the laboratory, generating basic data for detailed field investigations, particularly for tracing fossiliferous beds. These studies also help in the preparation of a geological map, in the selection of a suitable section and in interpreting the tectonic framework of the area, which are essential for biostratigraphical interpretations.

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