CLIMATIC CHANGES IN THE WESTERN HIMALAYAN REGION DURING HOLOCENE

Amalava Bhattacharyya Parminder S. Ranhotra
Birbal Sahni Institute of Palaeobotany
53, University Road, Lucknow- 226 007, India

ABSTRACT

The Himalaya in continuation with the Tibetan plateau plays significant role in changing the pressure gradient, which is regulating the monsoon climatic regime. The analysis of past climatic changes of this region will be of great significant to understand the climatic variability in South-East Asia especially in the Indian Subcontinent. A good exposure of Quaternary deposits of glacial, Lacustrine, glacio- fluvial origin and existence of large number brackish and fresh water lake provide ideal source materials for the analyses of proxy data and geomorphological evidences to analyze climatic changes of this region. In the present paper climatic changes of the western part of the Himalaya during Holocene has been discussed giving emphasis on the available pollen data supplemented with the magnetic susceptibility and $\delta^{13}C$ data from sub surface sediments from glacio-lacustrine sediments analyzed from close to tree-line around Gangotri glacier ($30^0 44'$- 30^0 $56'$ N and $79^0 04'$- $79^0 15'$ E) It has been noted that *Betula, Salix, Pinus, Cedrus* and other trees used to grow close to this site around 9,000 yrs. B.P when climate was warm-moist. These elements get declined around 8,300-7,600 yrs B.P under comparatively cooler and drier climatic conditions. Around 7,000-6,000 yrs. B.P, the expansion of *Betula, Salix* and decline in steppe elements viz., *Ephedra* Cheno/Ams into the area indicate that climate was reverted to warm-moist. Subsequently, after 6,000 yrs. B.P. and onwards the decline of *Betula, Salix, Alnus,* Conifers, Ferns and aquatics, and increase in *Ephedra* and Cheno/Ams are suggestive of comparatively drier climate. Around 2,000 years B.P., the open Juniperus-Betula forest revealing comparatively cooler and moister climatic condition occupied the area. Subsequently, around 1,700 years B.P. Increase of local arboreal taxa viz., *Juniperus, Betula, Salix* and extra local elements mainly *Pinus* indicate further amelioration of climate i.e. increase of both precipitation and temperature. Around 1,000- 850 years B.P. with sharp increase of *Ephedra* and other steppe elements reflect a trend towards drier climatic conditions. During recent time, climate again reverted to warmer condition reflected by the increase of *Betula*, Pine and other trees. The most salient feature recorded in the present study is the sharp rise of magnetic parameters and also the increase of $\delta^{13}C$ values around 5000 – 4000 yr B.P. suggesting drier climate. Palynologically also, this period is characterized by drier climatic conditions.

Pattern of climatic changes around Gangotri region discussed here has almost similar trend noticed in several other regions, especially of the northwest and northeast part of the Tibetan plateau and Sahara Arabian Zone. At the Tibetan plateau, it has been recorded that the monsoon reached at its peak during 8000year BP in the south-eastern part which is earlier than to the northwest and north east part where it is around 7000year BP. Latter region, has been found more closer to peak precipitation recorded in the western Himalayan region. Interestingly almost similar climatic trend has also been noticed in the Mediterranean region This synchrononisation of climatic changes covering

vast area of Mediterranean region, Tibetan plateau and the western part of the Himalayan region might be some common force regulating the climatic dynamics of the regional climatology. It seems that orbital forcing might be the major cause for such similarity.