Vegetation and climate – an introduction

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Within the series of 42 IAVS-Symposia, the interactions between “vegetation and climate” have been discussed twice: At the 1975-Congress in Rinteln/Germany this was the only topic. And for the 1999 symposium in Bilbao/Spain it was chosen as the main subject by the organizers (a survey of all the topics in Bilbao is given in the following article by Loidi). At both meetings, the majority of contributions focussed on meso-scalar climate and vegetation patterns. Another frequent topic of discussions is provided by phenological phenomena. Micrometeorological effects on plants – the modifications of the microclimate by the plant cover and adaptations of plants to extreme climatic conditions – were significant in the 70s, when ecosystematic approaches and ecophysiological methods arose. Those aspects where not in the centre of interest in Bilbao, but other questions emerged: How will the plant cover react to human induced climatic changes? And can we model those responses and make realistic predictions?

This issue presents a cross-section of the various perspectives from which the interrelations between the bio- and the atmosphere can be discussed. The sequence of papers was arranged according to three aspects: A) Climatic changes and their effect on vegetation, B) Phenological phenomena, and C) Climatic gradients and vegetation pattern at medium to small spatial scales.

A realistic prognosis of plant migrations under changing climatic conditions must take into consideration the results of palaeoclimatology and vegetation history. Therefore, the first section starts with the opening lecture-paper of Pott, who outlines the long-term climate and vegetation dynamics in Central and Southern Europe and offers a synthesis about Fagus sylvatica-refugia during the last glaciation and its migrations since. Besides the general and well known trends in postglacial vegetation changes, the detailed analysis makes clear that forest development in the holocene depended very much on local conditions and that the answers of taxa to climatic changes were very individualistic. Quite an individualistic response is also assumed by Box & Choi, who estimate on the basis of climatic envelope models the vulnerability of a west-mediterranean evergreen oak-community under global warming. At a very fine spatial scale and based upon a broad spectrum of vegetation and environmental parameters, Guisan & Theurillat model scenarios of plant community and species richness pattern for a small catchment in the subalpine-alpine ecotone of the Swiss Alps under changing climatic conditions.