# Altitudinal zonation

The notion of altitudinal zonation is used to account for the discontinuities associated with altitude in mountain areas. It has been the subject of many iconographic representations, the principal ones generally taking the form of diagram-blocks and sections.
Botanists were the first to define the working mechanisms of altitudinal zonation in mountain areas. The criteria applied to vegetation belong to physiognomy and phyto-geography (C. Troll). The altitudinal zonation of vegetation relies on the climatic effects produced by altitude on the physiology of vegetal species, or even on the absence of vegetal life (nival belt), while demonstrating, over variable ranges of elevation differences, the lower and upper limits that are sustainable for a given plant. Thus it is possible to observe a division of mountain slopes into superposed vegetal belts: hill, mountain, sub-alpine, alpine and nival belts, which appear in variable combinations according to their latitudes and massifs. For a long time, the approach to the notion of altitudinal zonation has been subjected to this model proposed by botanists.
In order to understand the vertical organisation of mountain spaces, we must add to this bioclimatic altitudinal zonation a morpho-dynamic altitudinal zonation that relies on the dominating morphogenesis type, and where discontinuities appear more gradually. Here we see, from the bottom upwards, a transition from meteoric processes with chemical predominance to mechanical processes in which gravity and frost prevail (P. Birot, J. Demangeot). Classically, we can identify successively the middle mountain belt, the periglacial belt and, lastly, the glacio-nival belt. Between these levels, morpho-dynamic interactions take place (crumbling, avalanches, mud slides) that make it impossible to consider their different modes of working independently from each other .
Conceptions of altitudinal zonation that see it as a succession of homogeneous altitudinal belts are questioned today (F. Alexandre, M. Lecompte). These authors point out the apparent discrepancy between the variation in climatic conditions evolving in the form of linear gradients, and the organisation in successive homogeneous belts in the classical altitudinal zonation model. The transition modalities from one belt to another are materialized in transition zones of the ecotone type. The authors also emphasise the need to take into account the role of mountain societies in the floristic composition of vegetal formations, in their local specificities as well as in their homogenising process.
Originating in the field of botany, this principle of the altitudinal division of mountains was later applied to the analysis of the agricultural valorisation of mountains under different latitudes, or to the locations of snow resorts and their ski areas in industrialised countries. Observation of correlations between the physiological needs of some cultivated plants (wheat, rice, corn, coffee, etc.) and the altitudinal distributions of mountain communities has led some authors to use the term â€˜Ã©tage utile' (usable belt) (J. Gallais) to characterize spaces occupied by certain human groups. When confronted with the overstepping of demographic thresholds and with exogenous factors, this scheme of altitudinal specialisation is sometimes questioned. The ability to adapt to other cultural schemes, and the agronomic flexibility of available food-producing plants, offer possible alternative approaches in situations with no apparent solutions, or in conditions of pressure on resources (Nepal). In other cases, groups deal with land needs by â€˜colonising' other lands (Cameroon), which sometimes also generates use conflicts with breeders.
Combined with this relative stability of agricultural uses of altitudinal levels in some massifs, we sometimes find in other areas vestiges of seasonal pastoral mobility between mountain levels. In a few extreme cases (e.g., the Anniviers valley in the Valais, studied by J. Brunhes), a quasi-permanent residential mobility existed all year round. Transhumance between lowlands and heights, or the moving of herds up to high mountain pastures in the summer, these â€˜remues' (migrations) moving over the â€˜petite' (low) or â€˜grande' (high) mountain, have provided and still do provide examples of a creative use of the complementarity between types of terrain in relation to phenomena of altitudinal zonation.

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