

Portugal's mountain regions. Challenges for the 21st Century

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Among the Earth's varied environments, mountains, with their diverse physical conditions, define an individual character in those who dwell there.

Elisée RECLUS, *L'Homme et la Terre*, 1905.

Beyond the mythical feelings, which the mountain continues to kindle in different segments of today's society, it has always held a tutelary presence in Geographical Science and particularly in Physical Geography, as a vehicle for both theoretical as well as methodological development. From Herodotus to Humboldt and Reclus and until the beginning of the 20th century, many geographers have, in one way or another, undertaken the study of mountain spaces.

It is understandable that even today, in the 20th century, the vast majority of PhD theses in Physical Geography and more specifically, in Geomorphology, have mountain spaces as their subject¹.

This seems to be owed to the fact that mountains form a unique and functional landscape system which is due to their natural environment, regardless of their dimension, altitude or the patterns of life they sustain² (RECLUS, 1905; DIÉGUEZ, 1980).

What is a mountain?

Quoting Bernard DEBARBIEUX (2001) there are two geographical ways of analysing mountain spaces. Firstly, they can be examined from an 'absolute perspective', which is connected to its cartographic representation. In this case a mountain would be defined as: great reliefs of the earth's surface, large in dimension, high in altitude and with steep slopes, like the Andes, the Himalayas, and the Alps are considered to be. Secondly, the mountain can be studied from a 'relative perspective', namely in relation to its rural

occupation of space, agricultural, silvicolous or pastoral. As such the mountain can be recognised as having a differentiated structural landscape which is situated above a place of observation and identification. In this way, we can classify the Serras da Boa Viagem (250 m), Sicó (553 m) or Buçaco (527 m) as mountain spaces, in spite of their reduced dimension or altitude.

Equally, Yvette VEYRET (2001) suggests two criteria for defining mountain spaces or mountain territories. The first criteria is based on the natural-physical features, essentially the geomorphological elements. In other words, the mountain is the opposite of low lands, plains and valleys, or of flat-plateaued areas. The second criteria involves distinguishing the ways of life and features of the people living there, as Reclus, Dupaigne and Saussure had attempted to do.

It was from the aforementioned perspective, relatively and comparatively, that we wrote this text on some aspects of the mountains located in Central Portugal and on the upcoming challenges for the 21st century.

Depending on the time, place, or socio-economic and cultural contexts as well as the authors who wrote about them, the mountain as a geographic object or entity has been seen in many different ways. Thus, have been ascribed different meanings and functions that rapidly and non-systematically are remembered.

According to Y. VEYRET the mountain has been seen both as a political barrier or frontier, as well as a sacred space of identification and union for its people. It has not only been seen as something sublime, grandiose, beautiful and romantic, while at the same time being a purifying and invigorating space (J. J. ROUSSEAU), but at times it has also been seen as a barren and frightening space, which is sometimes cursed and feared. It has also been viewed as a wild and empty space, which has also been referred to as a place of conquest and refuge³. It has also been regarded as a space of natural resources for timber, forests, mineral and energy resources, but above all water, as well as an ecological landscape and environmental sanctuary. Finally, it has been regarded as a traditional rural space, known for its stability and endurance of values not to be found in today's urban-industrial society, which gives it great significance for tourism and recreation, such as active and sports tourism, as well as rural and environmental tourism.

Mountains in Portugal

Generally speaking, Portugal cannot really be described as a mountainous country. Just under 12% of the 89 500 sq km of mainland Portugal is at an altitude of more than 700m, while less than 0.5% rises to over 1200 m (DAVEAU, 1995, based on CHOFFAT, 1907; Figs 1 and 2).

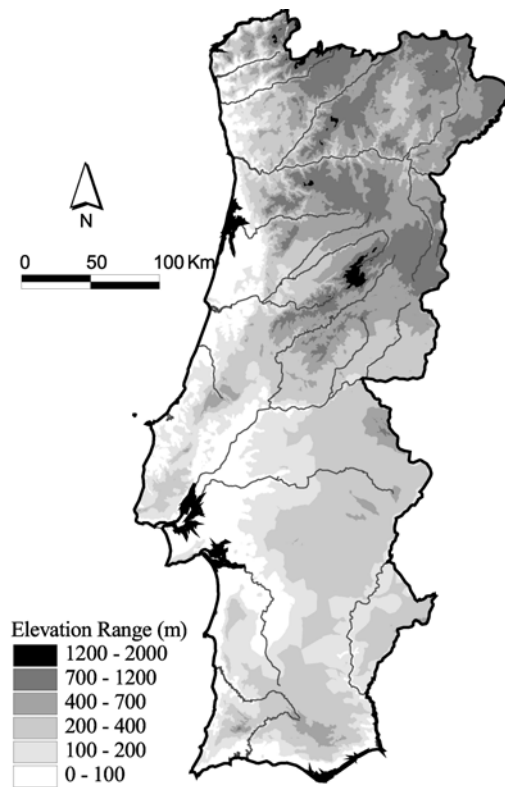


Fig. 1 – Hypsometric map of Portugal

But when we consider the size of the country, its landscape compartmentalization and the interaction of the natural features of the land with the lifestyles of its people, we can still, without any doubt, speak about mountainous geographical regions in Portugal. These occupy approximately 18% of Portugal's territory.

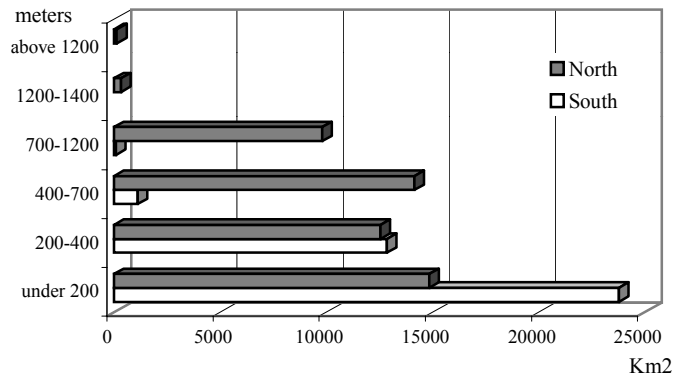


Fig. 2 – Altimetric classes in Portugal (DAVEAU, 1995)

The Portuguese *serras* (mountain ranges) are essentially associated with tectonic influences, particularly with the uplifts of the Alpine orogeny (Cenozoic), although in most cases the Alpine movements had only rearranged older events from the late Hercynian age (end of the Palaeozoic period). In the Hesperian Massif we find granite *serras* (Serra da Estrela, Gerês, Marão), schist *serras* (usually lower-lying, given their reduced lithological strength, such as those of Açor, Lousã Alvão), and quartzitic *serras*, aligned strictly in accordance with the Hercynian directions (Valongo, Buçaco, S. Mamede). On the western and southern Mesocenozoic Rims we find significantly lower ranges (barely over 400 m), which are much smaller (a hundred sq km). These are also essentially tectonic in origin, and they are, as a rule, associated with harder, karstifiable outcrops of limestone from the mid Jurassic period (Serras de Sicó, de Candeeiros, de Aire and da Arrábida), or with Alpine granite intrusions (Serras de Sintra and Monchique).

In Portugal, *serras* are mostly found north of the Tejo river, and they have been significant both from the standpoint of history and, at least until the 1960s, as an important element in the country's geography. This is expressed equally in the detailed compartmentalization of the landscape, and in the complementary nature of relations that the sylvan and pastoral lifestyles of the mountains have with respect to the agricultural ways of life of the plateaus and valleys. Of particular importance is the transhumance of the flocks of sheep, which descend to the plains during the winter, and return to the hillside grazing lands in the spring – this takes place on the Serra da Estrela and Serra do Montemuro, for example.

With the progressive abandonment of rural spaces which have been occurring especially since the 60s, there will be important transformations of mountain spaces registered. Perhaps the most important is the gradual process of depopulation, in which rarefaction is accompanied by an aging population and is at the same time, the cause and consequence for the transformation and destruction of the agro-silvo-pastoral economy, which was associated to communitarian practices and to the collective ownership of land. (PEREIRA, 1988)

The geomorphological specificity of the mountains

Topographical conditions (altitude; slopes; morphological diversity in short spaces), climatic conditions (higher heavier precipitations; lower temperatures; increased wind speeds; more liable to fog; rarefied atmosphere, and lower carbon dioxide and water vapour content), and biogeographical conditions of mountain regions explain the greater dynamic of the geomorphological processes, at the level of erosion, transport and accumulation processes. This powerful individual geomorphological dynamic is, more than anything else, responsible for the diverse series of forms whose genetic specificity, coupled with their spectacular and singular nature, greatly enhance their value as environmental and scenic assets. Taking the Limestone Massifs of the *Serras* of the Western Mesocenoic Rim and the granite *Serras da Estrela* and *do Montemuro*, on the Hesperian Massif, for instance, there are many examples of spectacular mountain scenery. In the first group, the formations and landscapes are caused by karstic processes, as in the case of the remarkable *Minde polje*, the amazing fluvial-karstic canyons, mysterious caves, and enigmatic “buracas”. The landscape of the *Serra da Estrela*, in particular, betrays signs left by the last glaciations, among which are the glaciated valleys of the river *Zêzere*. Given that it is a fault valley and that it is located in the NE sector (more sheltered!) of the Massif, it extends for a considerable distance. In addition, there are the many lakes that make use of the irregular sub-glacial topography, and the huge blocks thrown up from the glacial moraine, like the *Poio do Judeu*. In the cases of both the *Serra da Estrela* and the *Serra do Montemuro*, the granite substrate is responsible for a range of unusual and whimsical forms, which are quite spectacular, like castle koppies and tors, not to mention the smaller ones, such as “balanced stones”, “weathering pits” and tafoni, which appear on many rock surfaces.

The biophysical conditions of mountain areas that justify these greater and more varied dynamics of geomorphological processes which

have an immediate translation in the spectacular, detailed and general morphology also have strong implications in the chain of events of many rapidly evolving slopes that shape the so-called natural risks.



Photos 1-3 – Some geomorphological features of mountains in Central Portugal (Serras de Montemuro, Estrela e Sicó)

The transformation of the ways and conditions of life on the mountains which has taken place in what are termed the developed countries, and which has essentially occurred in Portugal from the 1960s, has led to a clear attenuation of the importance of physical factors in the lives of those who dwell there. In other words, the deterministic character of the Nature-Mankind relations in mountain regions is now less potent. Natural risks that are especially prevalent in the mountains (avalanches; landslides; small floods; extremes of climate – snowstorms) no longer condition the life of the increasingly sparser local populations, but they do have a critical influence on citizens' capacity to use mountains for recreational and tourist purposes. In the past, the indigenous people once lived with these extreme conditions, which were sometimes on the scale of Natural disasters, almost as a matter of course, regarding them as supernatural manifestations of a divine power that controlled their lives with blessings, but also with punishments. Nowadays, the outsiders who go to the mountains are less able to endure the dangers of natural events.

In Portugal, as there are not very many days when the ground is covered by snow, and as the mountains, even the Serra da Estrela, the highest range in mainland Portugal, are not very high, there is virtually no risk of avalanches occurring. The geomorphological risks of landslides and flash floods do, however, exist in most of the country's mountain ranges. Such events sometimes lead to real disasters, as was the case in the 2000/2001 winter, when over 70 people died and around 500 million dollars of damage was caused.

Always present are the risks of weather conditions associated to storms, snowfalls or even fog, which impair visibility and the conditions for circulation which often endanger those visiting the mountain areas.

The Mediterranean aspects of Portugal's climate, even in the heart of the mountains, means that one of the chief hazards affecting the lives of Mountain dwellers today is, without a shadow of a doubt, the risk of forest fire. Related to pastoral activities, where they remain, forest fires are also caused by a somewhat dense forestation, which is almost always disorganized, or involve other activities that many people, today, are still doing to try to make the fragile mountain spaces profitable. However, we can say that the major cause for the elevated number of fires and their intensity is believed to be related to the general state of abandonment, in which most rural areas, and especially the Portuguese mountain areas, are in.

They occur every summer, steadily ruining a valuable asset and placing in danger the lives of people who, because of their demographic (especially advanced age), social, cultural and economic characteristics, are

particularly vulnerable. To give us some idea of the scale and seriousness of this very real scourge, we need look no further than some figures for the Serra da Estrela Natural Park.

According to NUNES (2001), between 1980 and 1999 there were around 7154 fires (more than 350 per year!), burning a total area of 89 200 hectares which corresponds to approximately 88% of the total National Park area, if there weren't, an overlapping of burnt areas, from the various fires.

Recent changes in traditional rural areas

Certain demographic characteristics are common to almost all mountain regions in Portugal. They include low population density (fig. 3); progressive depopulation; ageing of the population, and the continuing importance of the primary sector. The mountain areas of Sicó and Montemuro are clear examples of these situations. Very low population densities are attributable to the population losses sustained in the second half of the last century, and in some parishes there were fewer than 20 people per sq km in 2001.

Even so, during the last decade (1991-2001) significant losses have been continuously registered and have reached totals higher than 20% in Maciço de Sicó and 30% in certain parishes of the Serras de Montemuro, Açor and Lousã (fig. 4), to list a few examples.

The progressive abandonment of rural areas that occurred from the 1960s meant that mountain regions saw a steady depleting and ageing of their populations. The transformation of agro-silvo-pastoral economies often linked to communitarian practices and the collective ownership of land, to a more modern silviculture, where the pine and eucalyptus reign supreme, to the detriment of native species.

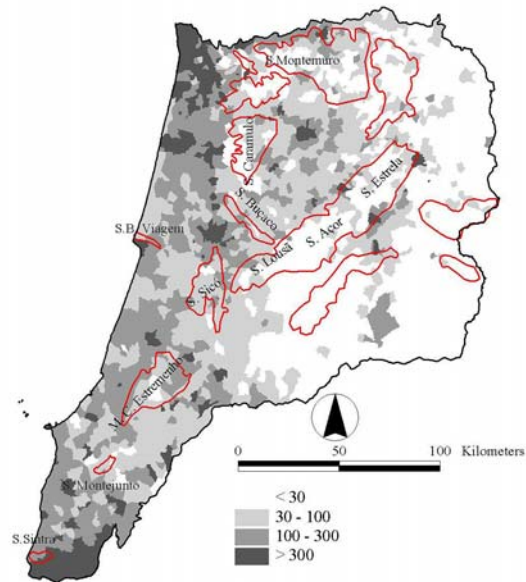


Fig. 3 – Mountain areas and population density (2001) in the parishes of Central Portugal (source: INE, Censo de 2001)

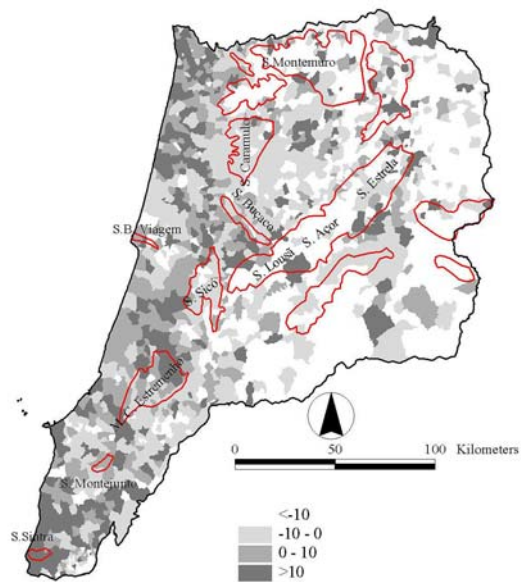


Fig. 4 – Mountain areas and population change (1991-2001) in the parishes of Central Portugal (Fonte: INE, Censos de 1991 e de 2001)

Despite the dense forestation to which some mountain areas have been subjected, weak human pressure and the kind of activities developed in them have helped to ensure that the outstanding, contrasting landscapes still endure there. These landscapes retain their natural flavour, enhanced by existence of floral species that are important evidence of native Peninsular vegetation, instances of significant endemism and providing refuges for many kinds of animals under threat from farming and forestry activities, as well as recreational pursuits (hunting and fishing). They are also very often the last custodians of cultures, traditions and ways of life that are genuinely rural, and which are today cherished from an environmental standpoint, not to mention their value in tourism and economic terms to a society that is more urbanised, globalised and standardised with each year that passes. This is why, of the twelve National and Natural Parks (fig.5) that comprise the fulcrum of the network of Portugal's protected areas, 2/3, or around 75% of the area, are *serras*, that is, regions which, at least in the regional context, may be regarded as mountain spaces. When we consider the protected areas embraced by what is known as the Nature 2000 network (fig.6), the expression of the mountains is further boosted (60% of the sites, but 80% of the total area).

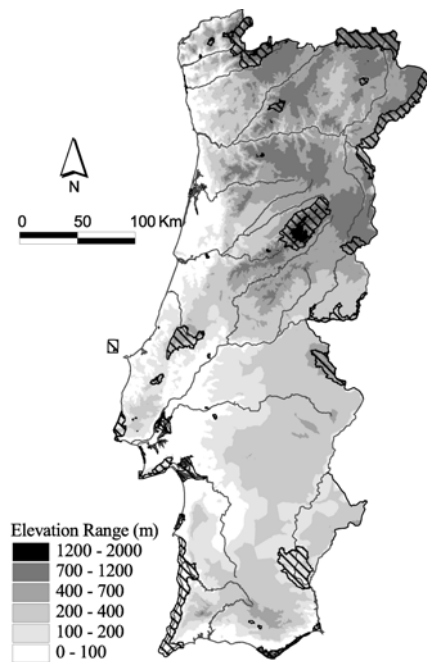


Fig. 5 – Protected areas in Portugal:
Natural parks

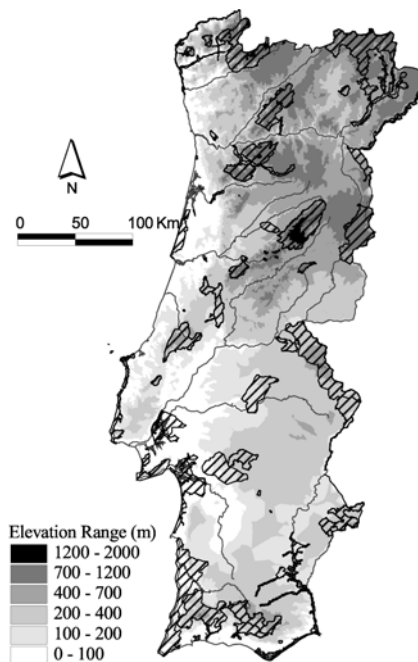


Fig. 6 – Protected areas in Portugal:
Natura 2000 network

Mountains, tourism and leisure

Of all Portugal's *serras*, the Serra da Estrela, as the highest region in mainland Portugal, is most in demand for recreational tourist pursuits. Data gathered by FERNANDES (1998) show that the Serra da Estrela region received a total of 114 000 tourists in 1995 (81% of whom were Portuguese). Recent trends indicate an increase in that number, as well as a strengthening of the domestic component. The Serra da Estrela currently has quite good amenities in terms of infrastructures (Hotels, Pousadas, Rural Tourism establishments, Campsites), and in relation to the organisation of tourist activities, provides visitors with events, adventure tourism and sports tourism, which suggests a rosy future for this sector. On the other hand, tourism generates a significant environmental impact in an area which is environmentally protected by law (and those which are a part of Portugal's Natural Park(s) network).

Seasonality is less of an issue than it is for Portugal's more traditional tourism segments (Sun and Sea, and Spa tourism), formal tourism, or accommodation in licensed establishments, is considerably bolstered by a large number of day trippers who take advantage of sunny winter days to enjoy the snow on the peaks of the Serra, or summer days, when they can wander around, observe and appreciate the natural landscapes in the ever-beautiful rural scenery.

In general, the other mountains in central Portugal are less in demand for leisure and outdoor activities; even so, remain important. Special attention should be focussed on the Serras do Buçaco and Caramulo whose natural heritage and luxurious hotels provide a high demand for tourism and leisure.

In other mountain areas, notably the Serras de Sicó and do Montemuro, which have been taken as examples, formal tourist activities are still in their infancy. But these spaces are systematically being visited by informal groups of rambblers, and are especially being singled out for radical sports (mountaineering; climbing; rappel; slide; potholing). Although this use has not yet had any real economic expression in terms of local job and wealth creation, it is nevertheless serving to publicize, valorise and help preserve these spaces.

A totally different situation is found in the mountain areas close to the coast and the major urban centres, like the case of the Serras de Sintra and da Arrábida. Here, tourist pressure, and even property pressure, is so great that it frequently enters into open conflict with the environmental

protection activities of bodies charged with the management of the protected areas of which they form a part.

Conclusion: challenges for Portugal's mountains

The mountain started off as a place of refuge, conquest and challenge; it became a marginal area, witnessing economic and demographic decline, and now represents a potential for regional conservation and economic enhancement, which should be given due consideration.

Throughout the text we have given a brief presentation of some mountain areas in central Portugal and have tried to show the importance of these natural resources, landscapes and environments which Portuguese mountains have as a part of local and regional development, albeit fragile from an economic perspective, but with some sustainability at a social and environmental level. The complex way in which, throughout history, societies were integrated with the natural elements originated in mountain complex territories and landscapes, which encompass different functions, and consequently different potentials and weaknesses which should be systematised.

In reference to its functional differentiation, it is possible to distinguish mountain spaces in Central Portugal which continue to be essentially agro-pastoral: for example, Serra do Montemouro; essentially forestal, such as the Serras do Açor and Lousã; those particularly designated for leisure and tourist activities, such as the Serras da Boa Viagem and Sintra; those in which conservation activities are connected to leisure and tourist activities, such as the Serras da Estrela, Caramulo and Buçaco; and finally areas in which there is conflict between conservation activities which are often linked to leisure, and to extractive activities or cattle raising activities with a strong negative impact on the environment.

Apart from the difference of the natural characteristics, the positions they occupy geographically and their economic and social use, mountain areas in Central Portugal share potentials and weaknesses which are important to consider in relation to regional and local political development. These potentialities are mainly related to environmental values (landscape, natural heritage, hydric and forestal resources, and cultural heritage) which have been increased due to their good accessibility and have been progressively implemented in almost all mountain areas.

The weaknesses are usually due to the demographic, social and cultural characteristics of the population as well as to some environmental

degradation situations related to incorrect exploitation of mountain resources.

Environmental discourses and the universal sense of “political correctness” today insist on calling attention to the environmental degradation (particularly to deforestation and the loss of bio-diversity) occurring in mountain areas, in relation to the activities that are currently attempting to promote and render profitable those spaces that are most marginal. This arises from a perspective and social representation of the mountain as a natural if not actually virgin, space, which at least still retains much of the wild character already lost to other territories.

But if recreational and tourist activities are properly organised and structured, integrated into broader development policies that respect the environmental quality of the land, and the social and cultural values of the people living there, they can be a powerful tool for local development; they can generate wealth and encourage young people to settle there. If they have no other impact, the necessary improvements in road infrastructure, the restoration of traditional buildings (chapels; country cottages, shepherds shelters), the promotion of traditional products (cheese, honey, chestnuts; wine, smoked meats and sausages) and the ethnographic valorisation of the area (crafts; festive processions) will always signify development and the fostering of quality of life for the small populations of unfairly treated mountain dwellers.

Bibliography

- CABERO DIÉGUEZ, V. (1980), Estado actual de las regiones montañosas, Asociación de Geógrafos españoles - *La Region y la Geografía Española*, Valladolid, pp. 243-258
- CUNHA, L. (1988), *As serras calcárias de Condeixa-Sicó-Alvaiázere. Estudo de Geomorfologia*, Diss. Doutoramento, Coimbra.
- CUNHA, L. (2003), Maciço de Sicó. Valorização dos recursos naturais e criação de emprego a nível local, In CAETANO, L. (coord.), *Territórios, do global ao local e trajetórias de desenvolvimento*, CEGC, Coimbra, pp. 185-198
- DAVEAU, S. (1971), La glaciation de la Serra da Estrela. *Finisterra*, Lisboa, VI/11, pp. 5-40
- DAVEAU, S. (1995), *Portugal Geográfico*. Edições João Sá e Costa, Lisboa
- DEBARBIEUX, B. (2001), La montagne: un objet géographique?, In VEYRET, Y. *Les montagnes. Discours et enjeux géographiques*, SEDES, DIEM (Dossier des images économiques du Monde), Liège, pp. 11-34
- DEVY-VARETA, N. (1993), *A Floresta no espaço e no tempo em Portugal*. Diss. Doutoramento, Porto, 459 p.
- FERNANDES, G. (1998), *Regiões de montanha: dinâmicas territoriais no extremo ocidental da Cordilheira Central – A Serra da Estrela*. Diss. Mestrado, Covilhã
- FERREIRA, A. B. (1978), *Planaltos e montanhas do Norte da Beira. Estudo de Geomorfologia*, CEG, Memórias, 4, Lisboa

- FERREIRA, N. and VIEIRA, G. (1999), *Guia geológico e geomorfológico do Parque Natural da Serra da Estrela*. ICN e IGM, Lisboa
- LOURENÇO, L. (1995), *Serras de xisto do Centro de Portugal. Contribuição para o seu conhecimento geomorfológico e geo-ecológico*. Diss. Doutoramento, Coimbra
- MARTINS, A. F. (1949), *Maciço Calcário Estremenho. Contribuição para um estudo de Geografia Física*. Diss. Doutoramento, Coimbra
- NUNES, A. (2001), *Incêndios florestais no Parque Natural da Serra da Estrela*. Diss. Mestrado, Coimbra
- PEDROSA, A. S. (1993), *Serra do Marão. Estudo de Geomorfologia*. Diss. Doutoramento, Porto
- PEREIRA, J. V. (1988), *Serra do Caramulo. Desintegração de um espaço rural*. Diss. Doutoramento. Coimbra
- REBELO, Fernando (1975), *Serras de Valongo. Estudo de Geomorfologia*. Biblos (supl. 9), Coimbra
- RECLUS, E. (1998), *La montaña* (tradução para castelhano do original de 1873 por Modesto Blanco Sánchez). Amarú Ed., Salamanca
- RIBEIRO, Orlando (1937), *A Arrábida – esboço geográfico*. Revista da Faculdade de Letras, IV/ 1 e 2, Lisboa
- RODRIGUES, L. (1998), *Evolução geomorfológica quaternária e dinâmica actual. Aplicações ao Ordenamento do Território – exemplos no Maciço Calcário Estremenho*. Diss. Doutoramento, Lisboa
- ROUGERIE, G. (1990), *Les montagnes dans la biosphère*. Armand Colin, Coll. U, Paris
- VEYRET, Y. (2001), Introduction. In VEYRET, Y., *Les montagnes. Discours et enjeux géographiques*, SEDES, DIEM (Dossier des images économiques du Monde), Liège
- VEYRET, Yvette (2001), Risques et gestion de l'environnement. In VEYRET, Y., *Les montagnes. Discours et enjeux géographiques*, SEDES, DIEM (Dossier des images économiques du Monde), Liège
- VIEIRA, António (2001), *A Serra do Montemuro. Contributo da Geomorfologia para a análise da paisagem enquanto recurso turístico*. Diss. Mestrado, Coimbra

¹ O. RIBEIRO (1937), A. F. MARTINS (1949), F. REBELO (1975), A. B. FERREIRA (1978), L. CUNHA (1988), A. S. PEDROSA (1993), L. LOURENÇO (1995), L. RODRIGUES (1998), among others.

² To promote the sustainable development of mountain areas the General Assembly of the United Nations (UN) proclaimed 2002 to be a **International Year of Mountains**.

³ Refuge for some marginal communities or even for political or freedom fighters. Let us cite two paradigmatic cases in Portuguese History: the occupation of the *Montes Hermínios* for the *Lusitanos* in its fight against the Roman invaders, or, more recently, the resistance against the Indonesian occupation in mountains of Timor.