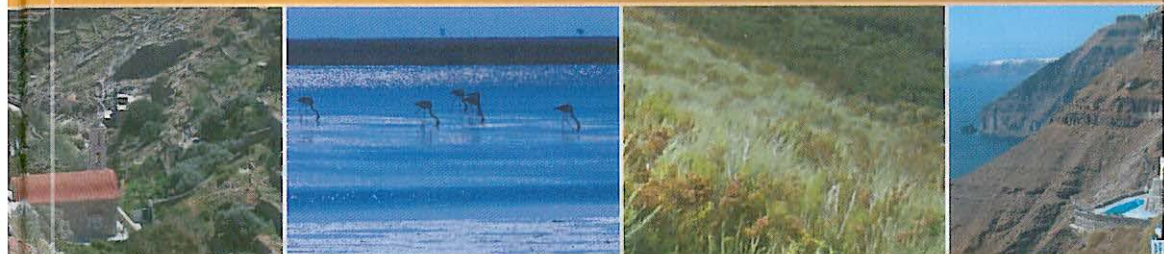


N. Evelpidou
T. de Figueiredo
F. Mauro
V. Tecim
A. Vassilopoulos



Natural Heritage from East to West

Case studies
from 6 EU countries



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Editors

Dr. Niki Evelpidou
National and Kapodistrian
University of Athens
Faculty of Geology
and Geoenvironment
Department of Geography
and Climatology
Panepistimiopolis, Gr-15784
Athens, Greece
evelpidou@geol.uoa.gr

Dr. Vahap Tecim
Dokuz Eylül University
Faculty of Economics
and Administrative Science
35160, Buca/Izmir, Turkey
vahap.tecim@deu.edu.tr

Dr. Tomás de Figueiredo
CIMO, Escola Superior Agrária
Instituto Politécnico de Bragança
E. S. Agrária
CIMO-Mountain Research Centre
Apartado 1172, 5301-855
Bragança, Portugal
tomasfig@ipb.pt

Dr. Andreas Vassilopoulos
Geoenvironmental Institute
Flias 13, Maroussi
151 25, Athens, Greece
vassilopoulos@geoenvi.org

Dr. Francesco Mauro
Università Telematica
Guglielmo Marconi
Via Plinio 44, 00193
Rome
Italy
mauro_sustainability@yahoo.com

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Greece: Evelpidou N., (National and Kapodistrian University of Athens, Faculty of Geology and Geoenvironment, Department of Geography and Climatology, Panepistimiopolis, 15784, Athens, Greece),

Vassilopoulos A., (Geoenvironmental Institute, Flias 13, Maroussi, 151 25, Athens, Greece),

Italy: Mauro F. (Università Telematica "Guglielmo Marconi", Via Plinio 44, 00193 Rome, Italy),

Malta: Integrated Resources Management Company Ltd., Malta,

Portugal: de Figueiredo T. (Instituto Politécnico de Bragança, E. S. Agrária, CIMO-Mountain Research Centre, Bragança, Portugal),

Romania: Ioane D., Marunteanu C. (University of Bucharest, Romania),

Turkey: Tecim V. (Dokuz Eylül University, Faculty of Economics and Administrative Sciences, 35160 Buca, Izmir-Turkey)

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Montesinho and the Mountains of Northern Portugal

Tomás de Figueiredo

Portugal has a singular geographic position in the European context (Ribeiro et al., 1987). Set on the most western coast of the Iberian Peninsula, Portugal faces the Atlantic in an area where it is already characterized by the cold and rough waters so well known to northwestern Europeans. This coast looks due west, as can be seen from the continental map outline; and it certainly contributed to Portugal's leading role in the fifteen to sixteenth centuries and later. As a maritime power Portugal provided Europe with the wonders from across the seas, and as a cultural melting pot Portugal, at that time, reshaped the European view of the world. The vision of a maritime destiny drove the policies and common thinking of Portugal for a long time. Portugal shares the Atlantic with other western European countries; and nowadays also shares their strategic agenda, in which marine environmental threats and sustainable resource use rank highly (Ferreira, 2005b).



Portugal, a singular geographic position: facing the Atlantic, rooted in the Mediterranean world

T. de Figueiredo (✉)

Instituto Politécnico de Bragança, Escola Superior Agrária, Mountain Research Center – CIMO,
Campus Sta Apolónia, 5301-855, Bragança, Portugal
e-mail: tomasfig@ipb.pt

In spite of its peripheral position, Portugal is part of the Mediterranean world (Ribeiro, 1986). Mediterranean climatic features are found in almost all the Portuguese continental territory. The exception is the northwestern tract, from the coast to an impressive mountain range inland, whose crests are the wettest spots in all Europe and where Mediterranean character is drowned out by the western oceanic influence (Azevedo et al., 1998). Climate broadly determines vegetation distribution and thus Portugal hosts the flora also found around the Mediterranean basin, although with specificities and endemic features that give it a characteristic richness and variety (Guerreiro, 1991). Crops, crop systems and cultivation techniques also came from the East (Caldas, 1998). The cultural matrix of Portugal has been influenced from far. Greek, Phoenician and Carthaginian settlers, Roman, Germanic and Arab conquerors: all sought the products of this land; all left their intangible imprint and material legacy; all added a layer, thicker or shallower, to the firm cultural ground Portuguese step on. And all but the German came from the Mediterranean basin (Mattoso, coord. 1992).

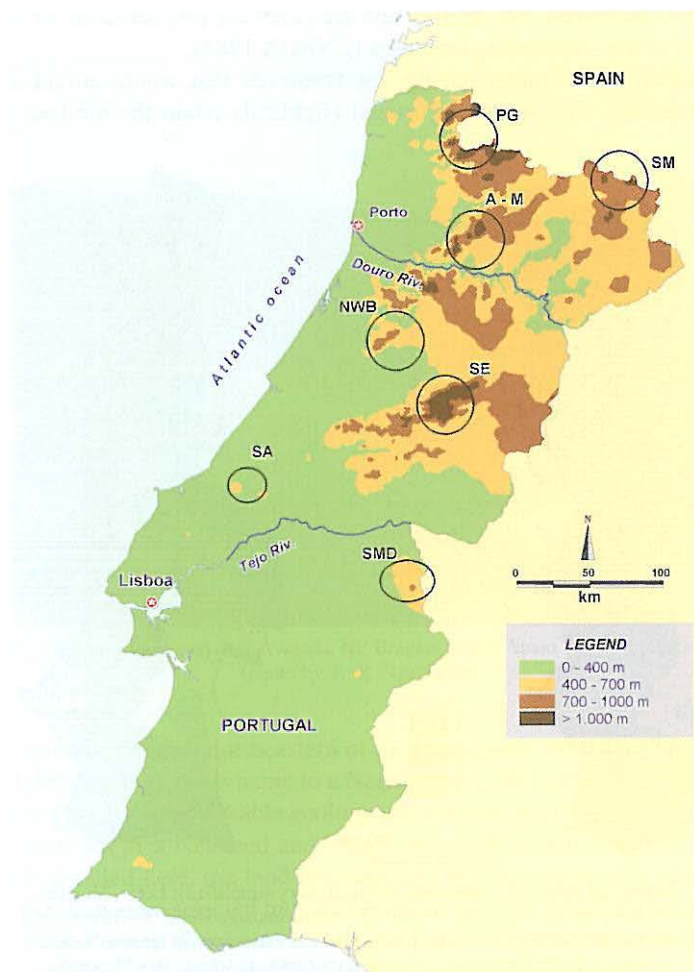


The olive tree, symbol of the Mediterranean: on a grove at Valbom dos Figos, near Mirandela, NE Portugal (photo by A. Guerra)

In Portugal, Atlantic and Mediterranean, the sea is an ever-present geographic feature (Medeiros, 2005). The coastal sands and cliffs, however, form a narrow strip, and sea winds are hardly felt inland, where continental effects originating in the core of the Iberian Peninsula progressively replace those of the ocean, and seasonal climatic contrasts become wider (Daveau, 1985). Orography is the main factor explaining climatic gradients from the coast inwards, as altitude increases and mountain ranges block the eastward trajectory of the humid air (Ferreira, 2005a).

However, Portugal is not globally a highland country, as 70% of the territory is below 400 m, average elevation being 240 m (Medeiros, 1987). But the North (average 370 m) and the South (160 m) clearly differ in elevation and any orographic effect on climate mainly concerns the area north of the Tagus River, where 75% of the land is above 200 m. The maximum elevation (1,993 m) is in the top of Serra da Estrela, in the Central Cordillera, whereas the south the highest Serra barely exceeds 1,000 m (S. Mamede in eastern Alentejo, 1,027 m).

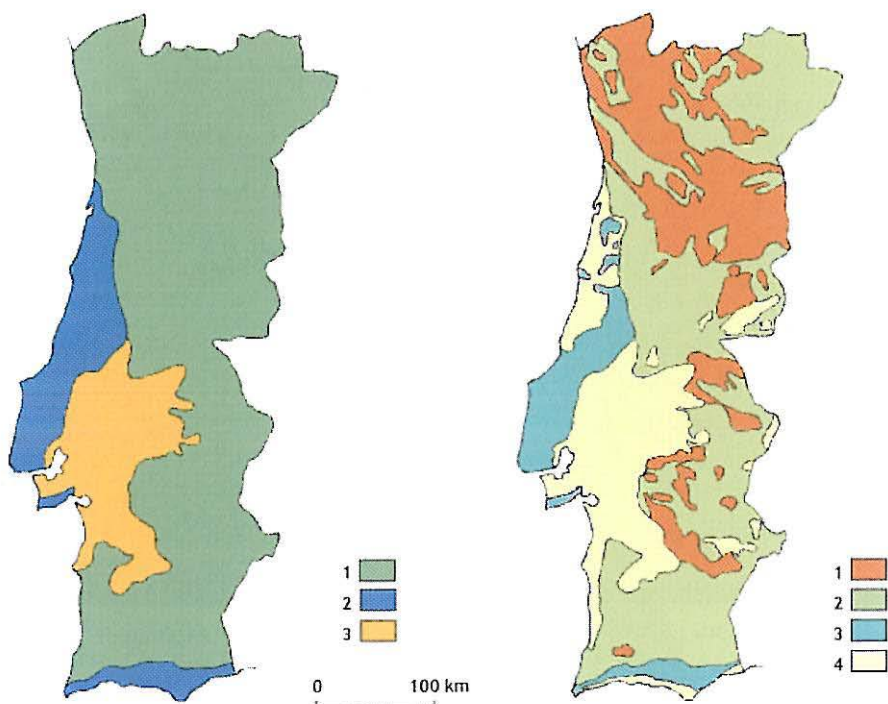
The Northern Portugal Highlands are thus the most important Portuguese mountain areas. They all belong to the same geo-structural unit: the Hesperic Massif. The other two units are the Mesocenozoic rims (western and southern belts with, dominantly, Secondary limestone and sandstones) and the Tagus basin (actually the



Hypsometry and the highlands of Portuguese continental territory (SM – Serra de Montesinho; AM – Alvão-Marão; SE – Serra da Estrela; NWB – Northwest Beira Highlands; PG – Peneda-Gerês; SA – Serra d’Aire; SMD – Serra de S. Mamede) (adapted from Ribeiro 1986; map by N. Evelpidou)

ancient basement depressed and covered with thick Tertiary or younger sediments, mostly loose). The Hesperic or Ancient, Paleozoic basement outcrops in most of the Portuguese continental territory. However, north of the Tagus, it is part of the Iberian Meseta northern block, a large plateau where average altitude is around 700m, in contrast with the southern block that does not exceed 400 m in elevation (Medeiros, 1987). Hypsometry is the outcome of this structure and of its very long history, which dates back to Paleozoic times and includes Hercinian (Variscan) orogenic activity and later lithospheric block rearrangements (Medeiros, 1987). Sedimentary rocks barely lasted so as to contribute significantly to the lithology of the Northern Portugal Highlands, which are composed of metamorphic (schists) and magmatic rocks (granites). Prevailing morphology and lithology do not favour pedogenesis, and so the soils are, for the most, incipiently developed. The shallow, stony and acid soils of these areas have low fertility and are generally only suitable for forestry or other less resource-demanding land uses (CNROA 1983).

Cold, windy and remote, having few resources that would attract and invite human settlement, the Northern Portugal Highlands retain the remnants of those



Geological sketch of continental Portugal (very simplified): Left – Morpho-structural units (1 – Hesperic Massif; 2 – Mesocenozoic Rims; 3 – Tagus-Sado Cenozoic Basin); Right – Main lithologies (1 – Variscan acid igneous rocks, as granites; 2 – Paleozoic metasedimentary rocks, as schists; 3 – Mesozoic sedimentary deposits, mainly hard, as limestones, marls, sandstones and clays; 4 – Cenozoic sedimentary deposits, mainly loose, as sands, clays, sandstones, marls and limestones) (adapted from Ferreira 2005)

ancient people to whom the area, with its valleys containing thick barriers of tall bushes, was a refuge from a menacing world. The Castros and Citânias archeological sites give us a picture of life before the Romans, who took so long to make these brave and rude highlanders their subjects (Mattoso, coord. 1992). The mountains are still a home for the few prepared to live under harsh conditions, a territory for shepherds and moving herds till recent times, with relicts of communal land use and wide forest areas, not always sharing peaceful co-existence (Ribeiro 1991, Caldas 1998). This is a changing land, less and less populated, more and more sought after by visitors seeking recreation, adventure, nature, tradition and culture. It is also a land increasingly in demand for energy production: hydropower, wind energy and biomass. New challenges and conflicting interests are changing this land, while seeking opportunities to test sustainability and related concepts applied in practice.



Montesinho: shrubland near Aveleda, NE Bragança, with Spain in the far horizon
(photo by T. de Figueiredo)

Montesinho is the most northeastern of the Portuguese mountains and the fourth highest (1,487 m). It gives its name to a Natural Park, one of the largest in Portugal. The Natural Park has a remarkable geology and relevant natural values, and includes singular examples of a balanced and long-lasting relationship between the human communities settled here, the land they use, and the landscape they helped create. This was the study area selected by the Portuguese team in EDUNatHer, a Leonardo da Vinci Pilot Project. The team is, in fact, part of the team responsible for the Management Plan of Montesinho Natural Park (IPB/ICN 2006); this is a document recently produced by the Polytechnic Institute of Bragança (IPB), under contract to the Institute for Nature Conservation (ICN). Furthermore, Montesinho is, or has

been, a study area for a large number of IPB researchers during the last 20 years or more. Scientific expertise, experience in converting it to decision support documents, and the involvement in EDUNatHer, all together explain the importance given to Montesinho in this context.



Zêzere River in Serra da Estrela: a Tagus tributary running in a U-shaped old glacier valley (photo by C. Aguiar)



Montalegre area in Peneda-Gerês National Park (photo by J. Vicente)

Besides Montesinho, the chapter describes each of the major mountain ranges north of the Tagus River (excluding those on the Mesocenozoic western rim with a maximum of 679 m elevation, in Serra d'Aire). Gerês is the most northwestern and it is the most humid of all, with summit elevation at 1,545 m. It is in the oldest protected area of Portugal, the National Park of Peneda-Gerês. Although actually distinct, Alvão and Marão are two neighboring peaks (1,339 m and 1,415 m, respectively) with similarities that justify being treated together. If Montesinho, Alvão-Marão and Gerês are, strictly speaking, northern highlands, the others considered here have the same label in a wider sense. Serra da Estrela, or simply Estrela, is the highest peak in Portugal, and gives its name to the largest Portuguese Natural Park. The Northwest Beira (an old province name, with no current administrative meaning but still commonly used) comprises a series of summits with lower altitude than those just mentioned (Caramulo, the highest, 1,200 m); nevertheless this is a typical highland area.

Photos By

A. Guerra. alzira.guerra@gmail.com

References

- Azevedo, A. L., Gonçalves, D. A. & Machado, R. M. A. 1998. *Enclaves de clima Cfs no Alto Portugal: a difusa transição entre a Ibéria Húmida e a Ibéria Seca* (Série estudos N 39). Bragança: Instituto Politécnico de Bragança.
- Caldas, E. de C. 1998. *A Agricultura na História de Portugal*. Lisbon: Empresa de Publicações Nacional.
- CNROA. 1983. *Carta de Capacidade de Uso do Solo de Portugal* (7th ed.). Lisbon: Centro Nacional de Reconhecimento de Ordenamento Agrário (Soil Mapping Office), Ministry of Agriculture.
- Daveau, S. 1985. *Mapas Climáticos de Portugal. Nevoeiro e Nebulosidade, Contrastes Térmicos*. Lisbon: Centro de Estudos Geográficos (Centre for Geographical Studies), University of Lisbon.
- Ferreira, A. de B. 2005. Formação do Relevo e Dinâmica Geomorfológica. In A. de B. Ferreira (coord) *Geografia de Portugal: I – O Ambiente Físico* (dir. C. A. Medeiros): 53–255. Mem Martins: Círculo de Leitores.
- Ferreira, D. de B. 2005a. O Ambiente limático. In A. de B. Ferreira (coord) *Geografia de Portugal: I – O Ambiente Físico* (dir. C. A. Medeiros): 305–385. Mem Martins: Círculo de Leitores.
- Ferreira, D. de B. 2005b. O Espaço Atlântico Oriental. In A. de B. Ferreira (coord) *Geografia de Portugal: I – O Ambiente Físico* (dir. C. A. Medeiros): 257–303. Mem Martins: Círculo de Leitores.
- Guerreiro, M. G. 1991. *O Mundo Mediterrâneo: sua diversidade e seu futuro*. Loulé: University of Algarve.
- IPB/ICN 2006. *Plano de Ordenamento do Parque Natural de Montesinho: I – Relatório de Caracterização*. Bragança: Instituto Politécnico de Bragança.
- Mattoso, J. (coord.) 1992. *História de Portugal: I – Antes de Portugal* (dir. J. Mattoso). Mem Martins: Círculo de Leitores.
- Medeiros, C. A. 1987. *Introdução à Geografia de Portugal*. Lisbon: Editorial Estampa.

- Medeiros, C. A. 2005. O território e o seu conhecimento geográfico. In A. de B. Ferreira (coord) *Geografia de Portugal: I – O Ambiente Físico* (dir. C. A. Medeiros): 18–45. Mem Martins: Círculo de Leitores.
- Ribeiro, O. 1986. *Portugal, o Mediterrâneo e o Atlântico* (4th ed.). Lisbon, Livraria Sá da Costa Editora.
- Ribeiro, O. 1991. Montanhas pastoris de Portugal: Tentativa de representação cartográfica. In *Opúsculos Geográficos: IV – O Mundo Rural*: 257–272. Lisbon, Calouste Gulbenkian Foundation.
- Ribeiro, O., Lautensach, H. & Daveau, S. 1987. *Geografia de Portugal: I – A Posição geográfica e o Território*. Lisbon: Edições João Sá da Costa.