

# EUROPEAN GEOPARKS

14TH/CONFERENCE

7TH - 9TH SEPTEMBER 2017

PONTA DELGADA, AZORES, PT

EGNAZORES2017

Abstracts Book



# EUROPEAN GEOPARKS

**14TH/CONFERENCE**

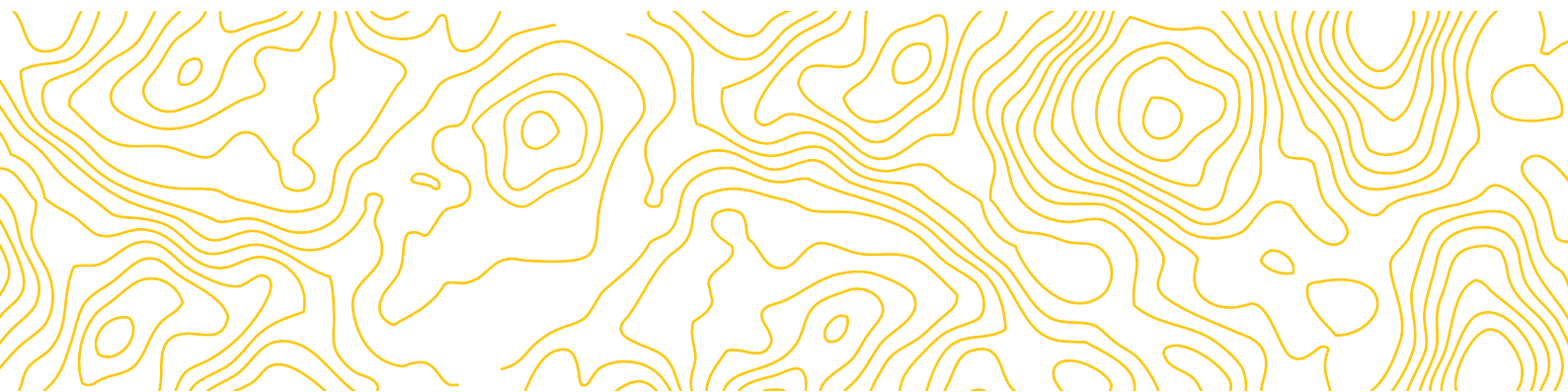
7TH - 9TH SEPTEMBER 2017  
PONTA DELGADA, AZORES, PT

**"GEOPARKS: PATHWAYS OF SUSTAINABLE  
TOURISM FOR DEVELOPMENT"**

## Abstracts Book

Eva Almeida Lima, João Carlos Nunes, Patrícia Meirinho & Marisa Machado

**Editors**



## RAISING AWARENESS OF GEODIVERSITY SERVICES IN TERRAS DE CAVALEIROS UNESCO GLOBAL GEOPARK

Diamantino Insua Pereira<sup>1,2</sup>

<sup>1</sup>Earth Science Department, Minho University, Campus de Gualtar, 4710-057 Braga, Portugal.

E-mail: insuad@dct.uminho.pt

<sup>2</sup>Terras de Cavaleiros Geopark Association, R/C Centro Cultural 5340-302 Macedo de Cavaleiros, Portugal.

**Keywords:** geodiversity, services, geosite, sustainability

Nature provides all the goods, conditions and services for the maintenance of life, societies and human well-being. Most of the approaches (e.g. United Nations Millennium Ecosystem Assessment) advertise these benefits as ecosystem services, mostly associated to the renewable resources on a biological basis. More recently, non-renewable and renewable geodiversity services are being framed into the MA ecosystem services categories: regulating, supporting, provisioning, and cultural services (Gray et al., 2013). In order to promote the geodiversity values, the Terras de Cavaleiros UNESCO Global Geopark (TCUGG) is now introducing the geodiversity services concept in the educational and touristic programmes.

All geosites can be presented within the scope of the geodiversity cultural services taking into account that they provide data to develop our scientific knowledge. In the most important TCUGG geosites, the educational approach stress the contribution of these sites to the knowledge of the Earth history. Geodiversity cultural services also include aspects like recreation or spiritual experiences, with numerous examples in TCUGG, as well as in all other geoparks.

The TCUGG promotes the understating of the sustainable use of geodiversity provisioning services and offers teachers training and educational programmes focused on geological resources. These programmes include the visit to active quarries exploiting construction materials, and mines exploiting industrial minerals like talc (active) and tungsten (inactive). Other provisioning services like freshwater and mineral water are mentioned in the geosites related with thermal springs in the geopark. This topic is also addressed in the geopark interpretative centre dedicated to the characteristics, origins and uses of ore minerals.

The geodiversity supporting services refers to the geology as an essential foundation for biodiversity (services to the ecosystems) and human activities (direct supporting services). Locally, the Earth dynamics is expressed by a diversified landscape with mountains, plateaus and valleys sculpted on a variety of rocks, which results on a remarkable biodiversity. One of the TCUGG educational programmes is focused on the relief as the structuring element of the landscape and on the relationship between geodiversity and biodiversity. Soil processes, especially weathering and soil profile development, are well observed in many outcrops and geosites. The understanding of the slow soil formation, on the scale of the geological time, raises awareness for the importance of its conservation. The habitat provision is also clearly comprehensive in the Morais massif, the core of the geopark, were the endemic vegetation is clearly related to the occurrence of exotic ultramafic rocks.

Direct geodiversity supporting services to human well-being are represented by the hydroelectric dam in Tuela river gorge and by the wind power on the top of Bornes Mountain.

Finally, examples of geodiversity regulation services are scattered throughout the TCUGG. These services can be illustrated with the importance of rocks as essential natural filters for water quality regulation in the context of the hydrological cycle, and the importance of the rock cycle as a nature regulation service, attending to its importance for carbon sequestration, storage and climate regulation.