



Contribution of Portuguese two-mica granites to stone built heritage

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The present study deals with the importance of the application of natural stone in monuments in urban setting, both as the main building material during the historical evolution of a city and as a means to increase the public awareness of the social role of geological resources of a specific region.

The City of Oporto, World Heritage of the Humanity, has been selected to illustrate the use of the local granite since ancient times to the present day, a two-mica peraluminous granite, classified as syn-tectonic relatively to the third tectonic deformation phase of the Hercynian orogeny, included in an expressive group that occurs extensively in northern Portugal. The Oporto granite has been the object of several geochemical, structural and geotechnical approaches. Despite the urban development, outcrops of this granite can be observed in different areas of the city, side by side with the urban constructions, and particularly in the imposing and intensely fractured escarpments carved by the river Douro.

Oporto monumental heritage goes back to Roman occupation and the profile has been developed by the construction of granite buildings, following history and the social evolution, of an impressive grey architecture according to different styles of granite work that characterize the city in all its aspects, namely the old city wall, the medieval and baroque churches, the neoclassic houses but also the small humble habitations.

The Oporto granite is always affected by weathering processes and the buildings exhibit various aspects of stone decay such as granular desintegration, plates, flakes, black crusts, thin black layers, efflorescences and biological colonization.

The description of selected sites within the historical centre, where it is possible to recognize the importance of the granite in the character of the city, aims to call the attention to the inextricable role of geology in built heritage and in the culture, as well as to diagnose the deterioration processes that affect houses and monuments as consequence of the intrinsic properties of the granite and of the anthropogenic activity.