

EGU23-8401, updated on 25 Feb 2024

<https://doi.org/10.5194/egusphere-egu23-8401>

EGU General Assembly 2023

© Author(s) 2024. This work is distributed under the Creative Commons Attribution 4.0 License.



The “Brecha da Arrábida”: new historical findings, geographic dissemination, and geotechnical contributions for the classification as Heritage Stone

Jose Kullberg¹, António Prego², Luís Lopes³, and Tiago Alves⁴

¹Earth Sciences Department & GeoBioTec, Faculdade de Ciências e Tecnologia, Campus da Caparica, Universidade Nova de Lisboa, 2829-516 Caparica, Portugal, jck@fct.unl.pt

²Dr. José Afonso Secondary School, Seixal, Portugal, amprego@gmail.com

³Évora University, School of Sciences and Technologies (ECT), Geosciences Department, Portugal & Earth Sciences Institute (ICT), FCT, Portugal, lopes@uevora.pt

⁴Évora University, School of Sciences and Technologies (ECT), Geosciences Department, Portugal, tf.pereiraalves@gmail.com

The “Brecha da Arrábida” consists of an Upper Jurassic intraformational conglomerate breccia, of granular support, with carbonate clasts of different colours, in a carbonate-red clay cement, whose genesis is associated with an immersed karst during the early phases of the North Atlantic opening. It has been exploited both as structural stone since the roman period until the 15th century, the time where it started to be use as an ornamental stone linked to the “Manueline Artistic Style” (a kind of Portuguese specific late gothic style) in the outdoors of the monuments and for the 17th century on, only for interiors purposes.

The first reference know to the “Brecha da Arrábida”, not with in scientific sense, was made by Duarte Nunes Leão (1530-1608): *“From this stone is built all that great village (the city of Setúbal), with houses, temples, walls and towers, because there is no other stone like this, so in the village and its terminus, as in the mountains, neighboring the Arrábida mountain range, [...]”*. And the first reference to Brecha da Arrábida comes from the Baron of Eschwege (1831), when studying the region of Setúbal, designates a type of rock as “Ancient sandstone”, also indicating the corresponding formations in Germany, France and England, respectively: “Rothe-todliegende”, “gréshouiller” and “Grésrouge”. He describes the location of the outcrops, stating that: *“appears at the foot of Setubal, at the foot of the Serra de S. Luiz and Palmella, on the south coast of Serra da Arrábida”* and even though *“this ancient sandstone seems to form the base of all the most modern formations near the Serra da Arrabida, which is still need to check”*. In 1841, Daniel Sharpe, an English geologist who came to Portugal in 1831, publishes in the Transactions of the Geological Society of London a memoir entitled: *“On the geology in the neighbourhood of Lisbon”*, naming the rock as “Old Red Conglomerate”.

One of the most emblematic monuments is the Jesus Church and Convent (Setúbal), distinguished by the European Commission with the “European Heritage Label” (2011), in 2013 was recognized by the Pan-European Federation of Cultural Heritage Europa Nostra” as one of the seven most

endangered monuments in Europe.

In Portugal, from the 88 occurrences listed (on work list), 65 are applications in classified Monuments, 24 of which are National Monuments, and some integrated in UNESCO classifications. Several historical applications can be listed in Monuments in six foreign countries: Austria, Brazil, France, Mozambique, Spain and United Kingdom.

Since this ornamental stone ended the exploitation on the half of the 70's of the last century, before the first generalized publication of the geotechnical properties of ornamental stones, for constructive reasons, do not exist any publication about this thematic. For the full characterization of the "Brecha da Arrábida" (historical importance, geographic dispersion and physic-mechanic properties) to present as a candidate of "Heritage Stone" classification, all that data was deepened and presented to the Heritage Stone Subcommittee, ending successfully its certification on October 2022.