



Black and red granites in the Egyptian Antiquity Museum of Turin. A minero-petrographic and provenance study.

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The University of Turin, in cooperation with the Egyptian Antiquity Museum, has recently undertaken several projects aimed at developing a scientific approach to the analysis of ancient Egyptian finds.

In particular, a straightforward project to investigate the stony handcrafts preserved in the statuary rooms started in 2006 to obtain their systematic petrographic classification and their possible geological sources. The main intent of the project was to understand the provenance of the materials used in Pharaonic period, setting the base for the identification of the ancient quarry sites and for a correct interpretation of the extraction and working techniques, in order to provide fundamental information about economical and social development of Egyptian civilization through historical times.

The choice to focus attention on black and red granites came from the statement of the percentage relevance (40 of the 54 sculptures actually exposed) of these materials in the statuary rooms. Moreover, especially for black granites, the need of detailed minero-petrographic analysis arose from the difficulty in making a macroscopic classification of the fine-grained dark-coloured rock varieties.

Therefore, five black granite statues, belonging to the Drovetti collection were sampled in a micro-invasive way: three sculptures of goddess Sekhmet (cat. 260, 251, 247), the statue of Ramses II (cat. 1380) and the statue of goddess Hathor (cat. 694).

The choice to analyse even three of the twenty-one statues of goddess Sekhmet (cat. 247, cat. 251, cat. 260), originally located in the same Egyptian temple but ichnographically different, derived from the need of answering the archaeological questions about their provenance. On the other hand, the opportunity of studying the fine-grained black rocks used for the sculptures of goddess Hathor (cat. 694) and of Ramses II in Majesty (cat. 1380), symbol of the Egyptian museum of Turin, provided the opportunity to analyse and classify the materials used for two of the best known masterpieces of Egyptian art.

As regards to red granites, it has been observed that most of the exposed sculptures were made of rocks closely akin to Aswan granite. Just in one case, the Ram headed sphinx (cat. 836), macroscopic differences in colour index, grain size and isorientation of feldspar phenocrysts, suggested a different provenance of the source material and determined the choice of picking up a small fragment for minero-petrographic analysis. The sample collected from the sarcophagus of Nefertari (suppl. 5153) during the recent restoration of the sculpture, was analysed in order to test the accuracy of the results, as the provenance of the material used for its realization was already certain.

Petrographic observations and chemical analysis were undertaken by a scanning electron microscope equipped with an energy-dispersive spectrometer.

Minero-petrographic data primarily showed that all samples vary in composition from granite (red granites) to granodiorite and tonalite (black granites). The main sialic phases are represented by plagioclase (albite to oligoclase), alkali-feldspar (microcline) and quartz, while femic phases are amphibole (green horneblende) and biotite (Fe- to Mg-biotite), always coexisting in variable relative percentages. Minor amount of apatite (≈ 1 wt.%), magnetite, ilmenite, often associated to sphene, zircon, pyrite and allanite also occur. The identification of some compositional markers in all samples suggested a common provenance for all the rocks used for the sculptures. Thus, it was supposed that they could all have been quarried in the famous district of Aswan, well known at least since Dynastic period. This provenance hypothesis was confirmed by geological literature and archeological evidences, considering the relative proximity of Aswan quarries to Nile river and to the key centres of power in the New Kingdom.

Therefore, several geological samples were collected in Aswan area, in order to perform a minero - petrographical and geochemical comparison with the rocks of the statues.

According to the petrographic and minero-chemical results, it was possible to define the provenance of the granitoids used for the realization of the sculptures and finally to highlight the importance of an archaeometric approach to historical and archaeological problems.