

Characterization of tuff in rock-hewn churches of Cappadocia Region (Turkey): preliminary results

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This work deals with the petro-mineralogical and physical characterization of the stone materials coming from some rock-hewn churches of Cappadocia Region (Turkey), that is an important part of Turkey's heritage, due to its historical past.

The analyses were carried out within the research project "Rock paintings in Cappadocia. For a project of knowledge, conservation and valorization of the church of the Forty Martyrs at Şahinefendi and its territory" that is a part of the biggest project called "For a data bank of wall paintings and mosaics of Asia Minor (4th-15th centuries: images, materials, techniques of execution)".

Fairy chimneys and rupestrian churches excavated in pyroclastic deposits, are unique features of this area. From a physical point of view the Cappadocian tuff may be classified as a rock characterized by a poor to very poor durability. In fact, this material undergoes strong weathering phenomena such as erosion, deep fractures and exfoliation.

The scientific analyses carried out in Cappadocia support the researches on the rock hewn wall paintings, in their entire lifetime and in their various aspects. In particular, the study of the stone materials is strictly connected with the plan of conservation on the wall paintings that is going to be developed in Cappadocia.

In the field of conservation, the understanding of the materials, of the techniques and of the environment that houses the wall paintings must be investigated in order to carry out the intervention in the most appropriate way. This statement is particularly relevant as concerns Cappadocia's wall paintings that are deeply linked to the rock. Stone materials from the Open Air Museum in Göreme and from the area near the Forty Martyrs Church in Şahinefendi, were sampled and examined through several laboratory analyses. In particular, mortars were taken from the Forty Martyrs Church to evaluate the past restoration interventions. Moreover the stone materials were investigated through petrographic and porosimetric analysis. Water absorption tests were also performed.

To underline the main results, it is possible to state that the decay processes are tightly linked to the physical properties of the material. These findings provide useful information to choose the most appropriate consolidation method, that should be able to slow down the stone decay processes and so to preserve these extraordinary and striking structures.