

The Granite Market in Greece

Papadopoulos A., Christofides G. and Koroneos A.

Department of Mineralogy-Petrology-Economic Geology, School of Geology, Aristotle University of Thessaloniki, 541 24, Thessaloniki, argpapad@geo.auth.gr, christof@geo.auth.gr, koroneos@geo.auth.gr

The extraction, exploitation and trade of marble are among of the most important comparative advantages of Greek economy. However, despite the presence of many granitic bodies of various sizes in Greece, no granites are extracted systematically. As a result, the domestic demand of granites is almost totally covered by imports of either raw or processed granite. This has a serious impact to the trade gap of granites, which increases over the last fifteen years. Data on the Greek granite market are presented and evaluated, in order to elucidate the current trends. According to these, the demand for granites and the penetration of granites in the marble-granite market appear to increase over the period 1992-2008. The main factors that affect the demand for granites are the number of hotels built and the net per capita disposable income of the consumers and to a less extent the number of new and renovated dwellings.

Natural radioactivity of granites from Aegean islands (Atticocycladic Zone)

Papadopoulos A.¹, Christofides G.¹, Papastefanou C.², Koroneos A.¹ and Stoulos S.²

¹*Department of Mineralogy-Petrology-Economic Geology, School of Geology, Aristotle University of Thessaloniki, 541 24, Thessaloniki, argpapad@geo.auth.gr, christof@geo.auth.gr, koroneos@geo.auth.gr*

²*Laboratory of Atomic and Nuclear Physics, School of Physics, Aristotle University of Thessaloniki, 541 24, Thessaloniki, papastefanou@physics.auth.gr, stoulos@auth.gr*

Twenty three granite and granodiorite samples from the Atticocycladic Zone have been measured for their natural radioactivity in order to assess the radiological impact in case they are used as building materials. More specifically, the activities of ⁴⁰K, ²²⁶Ra and ²³²Th in Bq kg⁻¹ were measured. The investigated samples have been taken from Tinos, Mykonos, Paros, Delos, Serifos, Lavrio, Naxos and Ikaria, including any possible rock type found in these regions. The activity concentrations of ⁴⁰K, ²²⁶Ra and ²³²Th of the investigated samples exceeded the average level of these radionuclides in soil and other kinds of building materials. However, this is typical for granitic rocks, because they contain U- and Th-rich minerals in higher amounts than other building materials. In order to assess the health risk of using the above samples as building materials, the following indices proposed by the EC and UNSCEAR were calculated: absorbed gamma dose rate (D_a), annual effective dose (H_E), activity index (AI) and gamma-ray index (I_γ). The calculation of the above indices is based on the standard room model, proposed by UNSCEAR which implies a room with dimensions of 3X3X3m, having infinitely thin walls, without doors or windows and being fully constructed of granite. The absorbed gamma dose rate (D_a) of all the investigated samples lies above the limit proposed by the EC which is 80 nGy h⁻¹. However, two samples from Ikaria and one sample from Naxos exceed the acceptable limit for the absorbed gamma dose rate which is 160 nGy h⁻¹ (199, 172 and 176 nGy h⁻¹, respectively). As far as the annual effective dose (H_E) is concerned, no sample exceeds the limit of 1 mSv y⁻¹. The activity index (AI) of the samples is below or equal to the limit of 1 Bq kg⁻¹, except one sample from Ikaria (1.2 Bq kg⁻¹). Finally, no sample exhibits gamma-ray index (I_γ) higher than 6 which means that the use of all the samples investigated could be recommended. More specifically, all the investigated samples from Tinos, Paros, Serifos, Lavrio and Delos should be exempted from all restrictions concerning their radioactivity, together with one sample from Mykonos, one from Naxos and two from Ikaria. On the other hand, the use of the rest of the samples taken from Mykonos, Naxos and Ikaria is recommended in local level, in exceptional cases. The average values of the above indices of the samples investigated is below the world average as it was taken from the literature, in the case of all indices. Moreover, the indices of the samples of