



Hawaiian and Azorean volcanic aggregates: a preliminary study of the potential alkali silica reaction

Sara Medeiros (1), Isabel Fernandes (2), Benoit Fournier (3), and João Carlos Nunes (1)

(1) Department of Geosciences, Faculty of Science and Technology, University of Azores, Ponta Delgada, Portugal (sara.mt.medeiros@uac.pt), (2) Department of Geology, Faculty of Sciences, University of Lisbon, Portugal (mifernandes@fc.ul.pt, isabelrc@fc.ul.pt), (3) Geology and geological engineering Department, Université Laval, Québec, Qc, Canada (benoit.fournier@ggl.ulaval.ca)

The alkali-silica reaction is a chemical deterioration of concrete that involves reactive forms of silica. Volcanic glass is one of the potentially reactive forms of silica that can be present in volcanic rocks such as basalts. The aggregates used for concrete purposes from Azores and Hawaii Archipelagos are mainly of basic composition (basalts s.l.). In general, there is no report of damaged structures in both archipelagos. However, in order to evaluate the behavior of these rocks regarding alkali-silica reaction and to compare the rocks from the two archipelagos, a set of methodologies were performed on a total of twenty-one volcanic aggregates. The geochemical analysis, the TAS diagram, the CIPW norm calculation and the petrographic analysis are some of the methods used for the assessment and analysis of the rocks. The study was also complemented by the electron probe microanalysis (EPMA) in order to identify the composition of the volcanic glass.

The results obtained from the studied aggregates showed that there are some differences between the two archipelagos. The rocks from Azores are alkaline while the majority of the rocks from Hawaii archipelago are tholeiitic. The petrography study revealed that the analyzed rocks from Hawaii Islands contain higher quantity of interstitial volcanic glass than those from Azores archipelago. The EPMA analysis done in some samples of Hawaii showed that the volcanic glass has a composition of silica higher than 65%, value that is already considered alkali reactive.