

RADIOACTIVE DISEQUILIBRIUM SYSTEMATICS APPLIED TO THE STUDY OF THE VOLCANIC ROCKS FROM THE TRINDADE-MARTIN VAZ ISLANDS

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The Trindade and Martin Vaz islands are located in the southern Atlantic Ocean, 1100 km east of the Brazilian coast. Previous geological and K-Ar geochronological studies identified five magmatic episodes in Trindade, with ages from 3.6 Ma to Present. The three youngest volcanic events are represented by the Morro Vermelho, Valado and Vulcão do Paredão Formations, which occurred in the last 0.27 Ma. The rocks from the Martin Vaz are virtually unknown, and the K-Ar dating of one phonolite constrained its age to less than 0.7 Ma. Alpha spectrometry, epithermal neutron activation analysis and high resolution gamma-ray spectrometry were used to determinate the concentrations of radionuclides that belong to the uranium and thorium decay series, in rocks from the Trindade and in one peralkaline phonolite from the Martin Vaz. The analysed radioisotopes were U-238, U-234, Th-234, Th-232, Th-230, Ra-226, Ac-228, Bi-214, Bi-212, Tl-208, Pb-214 and Pb-212. The obtained data indicate that the uranium decay series is not in secular radioactive equilibrium in the ultrabasic rocks from the Morro Vermelho, Valado and Vulcão do Paredão Formations, as well as in the Martin Vaz phonolite. Although it is not yet possible to determine the ages of those rocks, the results constrain their ages to less than 300,000 years. The thorium decay chain is in secular radioactive equilibrium for all the investigated samples.