



Geochemical and isotopic study of K-Ar dated volcanics from Basse Terre, Guadeloupe, Lesser Antilles Arc

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Radiometric dating of volcanic lava flows and geomorphological observations have been combined with Sr, Nd and Pb isotopic data to provide a general evolution model of the volcanic island of Basse Terre, Guadeloupe, Lesser Antilles Arc. More than 50 new Cassinot-Gillot K-Ar ages combined with 20 ages (Blanc, 1983; Carlut et al., 2000) previously obtained with the same technique, makes the Guadeloupe Island an ideal location to constrain the evolution of volcanic processes within the Lesser Antilles Arc. Ages obtained on Basse Terre are younger than previously thought. Volcanism started at 2.79 Ma and has been almost continuous since 1.8 Ma. Our results demonstrate a general north-to-south migration of volcanism through time with the identification of six main volcanic stages. All the dated lava flows have been analyzed for major and trace elements and 10 samples covering the main volcanic stages were selected for Sr, Nd and Pb isotopic analyses. Geochemical characteristics similar to that of the central islands of the Lesser Antilles arc are found. Lavas are mainly basaltic andesites and andesites, although a few basalts and dacites have also been dated. All of them are characterized by low MgO values (<6 %), slightly enriched REE patterns with systematic negative Eu anomalies and they are of low K to medium K affinity. Isotopic analyses are characterized by rather uniform Nd isotopic ratios at 0.51290 and unradiogenic Sr isotopes (<0.704) placing the Guadeloupe volcanics among the least enriched islands of the Lesser Antilles arc. A fine scale correlation between $^{87}\text{Sr}/^{86}\text{Sr}$ and $^{206}\text{Pb}/^{204}\text{Pb}$ suggests mixing of three components, including a sedimentary component and a MORB-like mantle source. While the oldest lavas seem to originate from a source characterized by relatively low $^{206}\text{Pb}/^{204}\text{Pb}$ (19.16) and el-

evated $^{87}\text{Sr}/^{86}\text{Sr}$ (0.7039), more recent volcanics display a systematic change through time from an enriched source (0.7038 and 19.21) towards MORB-like values (0.7036 and 19.19) suggesting a decrease of the sedimentary input since 1 Ma. This interpretation is supported by the increase of Ce/Pb ratio from about 5 in the lavas with the most radiogenic Pb isotopes to a value of 9 in the lavas with the least radiogenic Pb isotopes.