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Comparative behaviour and evolution of the caldera forming active volcanoes of São Miguel (Azores): Sete Cidades, Fogo and Furnas

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São Miguel, with its E-W elongated shape, is the largest and the most volcanically active of the nine islands of the Azores archipelago. From West to East Sete Cidades, Fogo and Furnas are three active central volcanoes with calderas. Each of these three calderas evolved through several phases of collapse generated by Plinian scale explosive eruptions over the last 40 ka. The most recent Plinian scale eruption was that of Fogo A, c. 5ka, from Fogo volcano.

In this report, we summarise the results of more than two decades of research on the geology of these volcanoes. More specifically we compare: the evolution of each caldera; and the styles of recent eruptions. It is of note that there is a pattern of a change in eruptive behaviour from around 5 ka shown by all three volcanoes to eruptions displaying a style involving switching between magmatic and phreatomagmatic sub-Plinian activity. This is well displayed in the historic sub-Plinian eruptions of Fogo and Furnas.

Keywords: Azores, São Miguel, Sete Cidades, Fogo, Furnas, Calderas, Explosive eruptions