Abstract

Mount Etna, Sicily, Italy, is Europe's largest and most active volcano. It is also one of the most studied volcanoes on Earth. But despite this great research effort, the question of its origins remains an open matter of debate. Etna is located at the convergence between the African and European plates, close to a subduction zone. But the volcano is not linked to this subduction; it is located too much n front of the subduction front. In the past, numerous researchers have proposed tectonic models allowing large quantities of magma to rise up in this area. But none of these theories is really conclusive in terms of geophysics and/or geochemistry.
The present study, based on the geochemical analyses of samples collected throughout the whole eruptive record of Mount Etna (i.e. more than 500'000 years) and on geochemical models, suggests a new tectonic model for the formation of Etna. Furthermore, this model is also capable of explaining the formation of the neighbouring Hyblean Plateau volcanics, and the close relationship that ties Mount Etna and the Hyblean Plateau. It is also closely bound to the petit-spot volcanoes that were recently discovered in Japan, and implies the presence of small amounts of melts below the lithosphere, giving birth to what has been named the Low Velocity Zone bygeophysicists.