Evidence for crustal contribution to recent compositional changes at Mt. Etna volcano

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Numerous studies have shown that lavas erupted in the last 4 decades at Mt. Etna are characterized by abrupt geochemical changes. Recent (post-1971) lavas are enriched in some alkali elements, have higher $^{87}Sr/^{86}Sr$, and have lower plagioclase to clinopyroxene modal abundance ratios than historic eruptions (i.e. 1329-1971). *In situ* plagioclase compositional and isotopic data provide crucial insights into possible causes for these changes. Core to rim electron microprobe transects were performed on 133 plagioclase crystals from 11 different samples with eruption dates between 1329 and 2005. Plagioclase An (mol%) ranges from 32 to 92, and cores of recent plagioclase tend to exhibit higher An than historic cores. Core and rim $^{87}Sr/^{86}Sr$ for 87 of these crystals, collected by LA-ICP-MS, augment TIMS whole-rock and groundmass data. Plagioclase $^{87}Sr/^{86}Sr$ range from 0.7030 to 0.7036, and with the exception of 7 analyses, are less radiogenic than whole rock $^{87}Sr/^{86}Sr$ (0.7033 and 0.7036), which, in turn, are less radiogenic than groundmass values (0.7035-0.7037). While a majority of crystals from all samples exhibit core to rim increases in $^{87}Sr/^{86}Sr$, recent rims have higher $^{87}Sr/^{86}Sr$ and larger Sr isotope gaps between rim and whole rock compared to their historic counterparts. In addition, recent plagioclase exhibits more potassic rims for a given An % than the rims of historic crystals, despite having similar core values; this indicates that potassium enrichment must occur during the timeframe of plagioclase crystallization. We propose that an increase in H_2O content of recent parental magmas suppressed plagioclase crystallization to shallower depths, yielding lower plagioclase to clinopyroxene modal abundance ratios and higher An cores. This delayed crystallization enhanced production of latent heat at shallow depths, causing a higher degree of contamination by sedimentary country rock. The Sr isotope disequilibria among plagioclase, whole-rock and groundmass, along with the K enrichment documented in recent rims, strongly suggest that late-stage crustal assimilation, together with other differentiation processes and features inherited from the source, contributed to generate the final signature of recent magmas at Mt. Etna.

Impact of Saharan dust and polluted aerosol on the microbial food web of the Eastern Mediterranean – a mesocosm approach

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The impact of Saharan dust and polluted aerosol on the microbial food web of the oligotrophic Cretan Sea was studied during a mesocosm experiment that took place at the mesocosm facility of HCMR in Crete (http://mesoaqua.eu/cretacosmos), in May 2012, in the framework of the projects ATMOMED-MESOAQUA and ADAMANT-THALIS. "Pure" Saharan dust (1.6 mg/l) and mixed aerosols (1 mg/l), collected in Crete and elsewhere, were each added to 3 mesocosms of 3 m^3, while 3 more mesocosms were used as control (no addition). Preliminary results of primary production and phytoplankton biomass (mainly *Synechococcus*) indicate a net response of the autotrophic community to both Saharan dust and mixed aerosol additions between days 1 and 4. The response of the heterotrophic bacterial community to both treatments was also clear but was faster than the one of the phytoplankton and lasted only from day 0 to day 2. The above-mentioned biological parameters were related to the temporal distributions of numerous chemical species, such as inorganic and organic nutrients, total proteins, total mono- and poly-saccharides and their molecular composition profiles, in order to highlight the production and degradation dynamics of organic matter.

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