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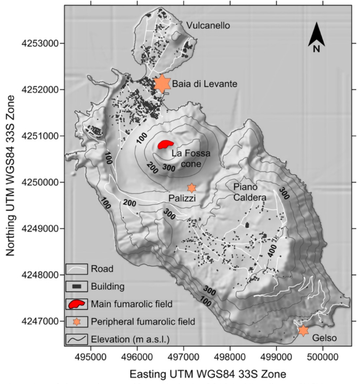
D2530 | EGU2020-13567 Erosional processes in the natural-anthropic geosystem of Vulcano Island (Italy)

Paolo Madonia (INGV, Sez. di Palermo – Italy, email: paolo.madonia@ingv.it)
Cipriano Di Maggio (DiSTeM, Università di Palermo – Italy, email: cipriano.dimaggio@unipa.it

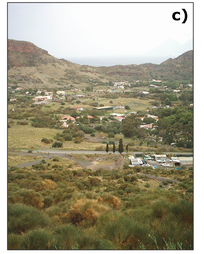
Vulcano, the southernmost island of the Aeolian Archipelago, has been characterized by an intense fumarolic activity since its last eruption from La Fossa cone (1888-1890). This island has a strong touristic vocation and frequentation, and here volcano-hydrothermal activity represents, at the same time, a landmark, one of the main causes of hydrogeological instability and a severe risk for human health. The space-time dynamic of this complex system is controlled by the mutual interactions among micro-meteorological, volcanic, tectonic and morphogenetic (natural and anthropic) processes.

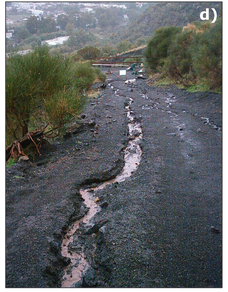


Location of the study area (*from Madonia, 2019 in Miscellanea INGV, Abstracts Volume INGV Workshop on Marine Environment , Rome, 26th-27th June 2019).*

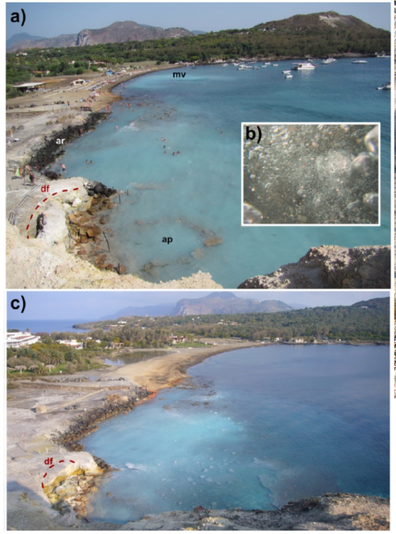
View of La Fossa cone. In evidence, the grey ashes of the 1888-90 eruption, overlying older, argillified pyroclastic deposits.

La Fossa cone is affected by intense water erosion phenomena (**a**), also controlled by fumarolic activity as an obstacle for the growth of vegetation (**b**) and a weathering factor. Man-made structures, as buildings (**c**) and rough (**d**) and paved (**e**) roads alter the natural stream network, intercepting and concentrating the surface run-off it into high-flow rate channels, along which suspended solid transport is enhanced (**f**). Soil erosion is further increased by denudation as a consequence of episodic wildfires (**g**).





Another relevant theme is the acceleration of the coastal erosion processes in the Baia di Levante area, driven by the circulation of chemically-aggressive hydrothermal fluids, which transforms the pristine volcanic minerals into phases like gypsum, anhydrite and clay minerals, significantly reducing the mechanical resistance of the rocks to the action of sea wave erosion. A general retreatment of the coastline (several meters in some locations) has been observed in the last twenty years, caused by the combined effect of volcanic activity, anthropic modifications, and changes in sea level.



On the left: Detail of the coastal cliff (df in pictures a-c) with evident signs of hydrothermal circulation (yellowish sulphur deposits).

On the left: a) The Baia di Levante area in September, 2015 (mv = main vent, ar = artificial reef, df = detachment front, ap = artificial pool); b) Underwater picture of the main vent of Baia di Levante (September, 2015); c) The Baia di Levante area in March, 2007 (df is the same trace of picture a) (*From Madonia, 2019 in Miscellanea INGV, Abstracts Volume INGV Workshop on Marine Environment , Rome, 26th | 27th June 2019)*