

Tephrostratigraphy of the last 2 ka activity of Etna volcano

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Stratigraphic and facies analysis, conducted in the 90's, on the pyroclastic successions blanking the Etna volcano flanks permitted the reconstruction of the last 100 ka tephrostratigraphic record of the volcano explosive activity. During the Holocene, several strong explosive events occurred, including a basaltic plinian eruption in 122 BC. However, the historical period lacks of detailed investigation on the Etna pyroclastic succession, therefore, we focused our research on this period.

We started with an accurate field work aimed to the description of the pyroclastic deposits cropping out prevalently on the NE flank of the volcano. This tephra succession is characterized by alternations of ash layers, scoriaceous lapilli rich horizons and varicoloured tuffs attributed to a phreatomagmatic activity. Several yellowish volcanoclastic horizons, sometimes rich in charcoal, separate the tephra layers, indicating non-eruptive periods between the eruptions.

We compiled 7 tephrostratigraphic sections having as common base the marker bed "FG" of the 122 BC plinian eruption and we collected 62 tephra samples and 7 charcoals for laboratories analysis. In particular, grainsize, component, chemical and petrographic analysis were carried out on tephra samples, whereas the charcoals were sent to Beta Analytics, Miami, for 14C radiometric analysis. The whole data set permitted us to correlate the tephra layers and to recognised 16 tephrostratigraphic units.

The integration of the radiometric data with historical chronicles regarding the past activity of Etna, allow us to attribute some tephrostratigraphic units to 7 Etna historic eruptions whose distal deposit had never been found before. These eruptions could be considered as belonging to class B of Branca and Del Carlo (2005), characterised by prevalent intense explosive activity producing copious tephra fallouts, as happened during the 2001 and 2002-2003 eruptive events.