EGU21-14794
https://doi.org/10.5194/egusphere-egu21-14794
EGU General Assembly 2021

The southernmost occurrence of the volcanic-rich layer of 5.5 Main the Northern Apennines: clues on its deposition

Davide Potere[1], Gianluca Iezzi[1,3], Vittorio Scisciani[1], Anna Chiara Tangari[2], and Manuela Nazzari[3]

[1]Università degli Studi G. D'Annunzio Chieti-Pescara, InGeo - Ingegneria e Geologia, Italy
[2]Dipartimento di Scienze Psicologiche, della Salute e del Territorio, Università G. d'Annunzio, Via dei Vestini 30, 66100, Chieti, Italy
[3]Istituto Nazionale di Geofisica e Vulcanologia, Via di Vigna Murata 605, 00143, Roma, Italy

A volcanic-rich horizon crops along the Northern Apennines chain for about 200 km, in the post-evaporitic sedimentary sequence with an age of 5.5 Ma. Its thickness ranges between 30-200 cm and has been interpreted either as a primary fallout or a giant gravity flow in seawater (Aldinucci et al., 2005; Trua et al., 2010; Cosentino et al., 2013). Here, we focus on the two southernmost occurrences in the Abruzzo region (Central Italy): Castiglione a' Casauria (CAC 42°14'10'' 13°53'29') and San Vittorino (SVT 42°12'10'' 13°53'29'') villages.

The SVT and CAC deposits are lithified with thickness of 80 and 220 cm, respectively, mildly fractured and greyish to light brown in colour. Four (SVT) and fifteen (CAC) oriented samples coaxial to the field, were cut and polished to expose about 470 and 700 cm^2, respectively, of their vertical mesoscopic surfaces. The oriented thin sections and powders were prepared according to these mesoscopic attributes.

The XRPD (X-ray powder diffraction) spectra show the presence of a peculiar prominent large shoulder reflecting significative silicate non-crystalline phase, i.e. volcanic glass, plus faint Bragg reflections indicative of minor amounts of quartz, two feldspars (anorthite and sanidine), clinopyroxene, biotite and montmorillonite. The latter mineral results from post-emplacement and secondary crystallization. In addition, calcite and dolomite XRPD peaks occur with intensity inversely proportional to that of the silicate glass, reflecting the abundance or paucity of sedimentary versus volcanic fractions in sub-layers.

The microscopic 2D textures plus compositional features were investigated by SEM and EPMA. Both volcanic layers are very rich in fine-grained (averaging on 200 mm) and highly sorted glassy ashy clasts, while minerals are very poor (< 5 area%) in agreement with XRPD outcomes. Lithified ashes are mainly blocky in shape and un-broken. The ashes plot in the rhyolitic TAS field and overlap those already reported from other Northern Apennine sites. The amount of volatiles (H_2O + CO_2) estimated from EPMA average on about 6 wt.%, in agreement with the quantities of LOI determined on both bulk samples.

Field observations coupled with analysis on mesoscopic polished rock slices and thin sections do

not shown any significant vertical size gradation and sorting, while fossils are almost absent. By contrast, both volcanic-rich deposits show: sedimentary- and volcanic-rich sub-layers, cm-sized volcanic clasts dispersed prevalently on the uppermost sedimentary sub-layers, cm-sized convolute laminations and slumped pseudo-beds. All these features demonstrate mass transport, soft-sediment deformation and fluid escape in seawater. Nonetheless, the absence of rounded ashy clasts, lithic sedimentary rock and classic Bouma sequence features (typical in coeval and adjacent deposits) mirror for local remobilization of poorly consolidated to loose carbonate and tephra deposits. In parallel, the high sorting of fine ashy clasts suggest a primary deposition from a distal fall-out eruptions. The location and features of both SVT and CAC volcanic-rich layers extend the previously inferred distribution of this ancient volcanic eruption.

References

Aldinucci et al., 2005. GeoActa, 4, 2005, pp. 67-82

Cosentino et al., 2013. Geology, 41, pp. 323-326

Trua et al., 2010. Italian Journal of Geosciences, 129, pp. 269-279