

Space–time evolution of monogenetic basaltic volcanism in the Garrotxa Volcanic Field, NE Iberian Peninsula.

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We reconstructed the space-time evolution of the central Garrotxa monogenetic Volcanic Field (GVF), the youngest volcanic area of the Iberian Peninsula, by integrating stratigraphy, petrography, geomorphology, and well-log stratigraphy of the volcanic products. The mapping and the study of the volcanic succession has been conducted following the Unconformity Bounded Stratigraphic Units criteria applied to volcanic terrains. The detailed stratigraphy of the volcanic successions shows that the central GVF evolved through four main periods of volcanic activity (Synthems) represented by the eruptive products of the mafic monogenetic volcanoes (Eruptive Units) and by their reworked syn- and inter-eruptive (epiclastic) deposits. The morphology and the architecture of the monogenetic eruptive centres suggest that feeder dykes emplaced responding to the orientation of local structural lineaments according to the present stress tensor, which determines the strike-slip tectonic regime active in the region since the Pliocene-Pleistocene. The facies analysis of the deposits and their distribution show that migration of volcanism toward the center of the basin coincided with a trend of increasing explosivity. Episodic hydromagmatism in the central Garrotxa occurred without a specific neither geographic nor temporal correlation. Basic lava flow units in this sector have been systematically sampled and petrographically and geochemically studied in order to obtain a complete dataset useful for correlation purposes. Finally, integrating field data with the stratigraphy of water wells, we determined the volume of the volcanic deposits. The low average volume of products emitted during each eruptive period and the long quiescence separating them allows classifying the GVF as a low output rate volcanic field.