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Historical and prehistorical volcanic geoheritage in Canary Islands

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1. Historical volcanism in the Canary Islands

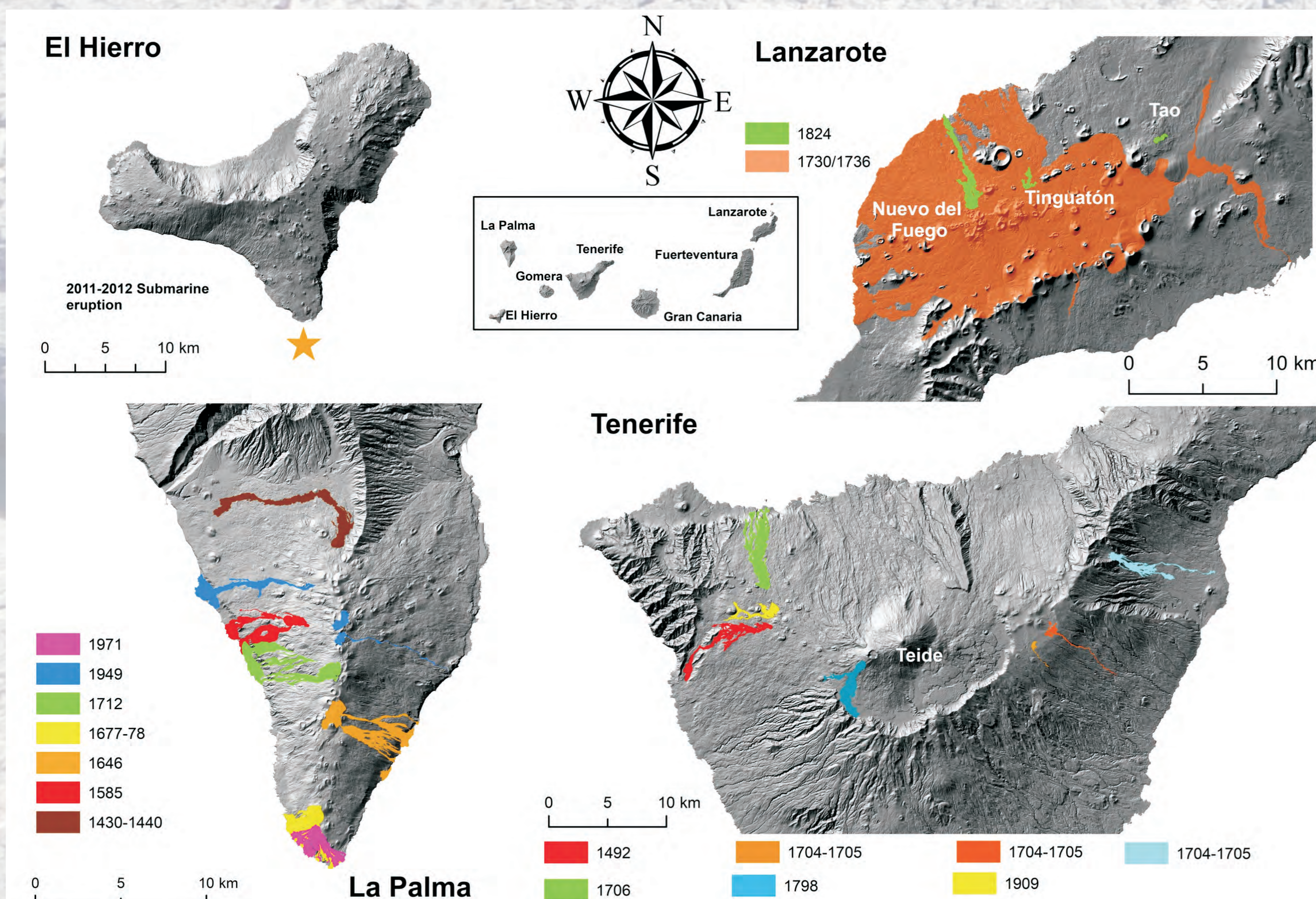
Canary Islands constitute an active volcanic archipelago formed by seven islands. From the time immediately before the Castilian conquest of the islands, 17 volcanic eruptions have occurred in the islands of Lanzarote, Tenerife, La Palma and El Hierro: 2 prehispanic and 15 historical. Some of these eruptions were formed by multiple eruptive vents. The last eruption took place in Las Calmas Sea, close to the southernmost part of El Hierro Island.



Location of Canary Islands.



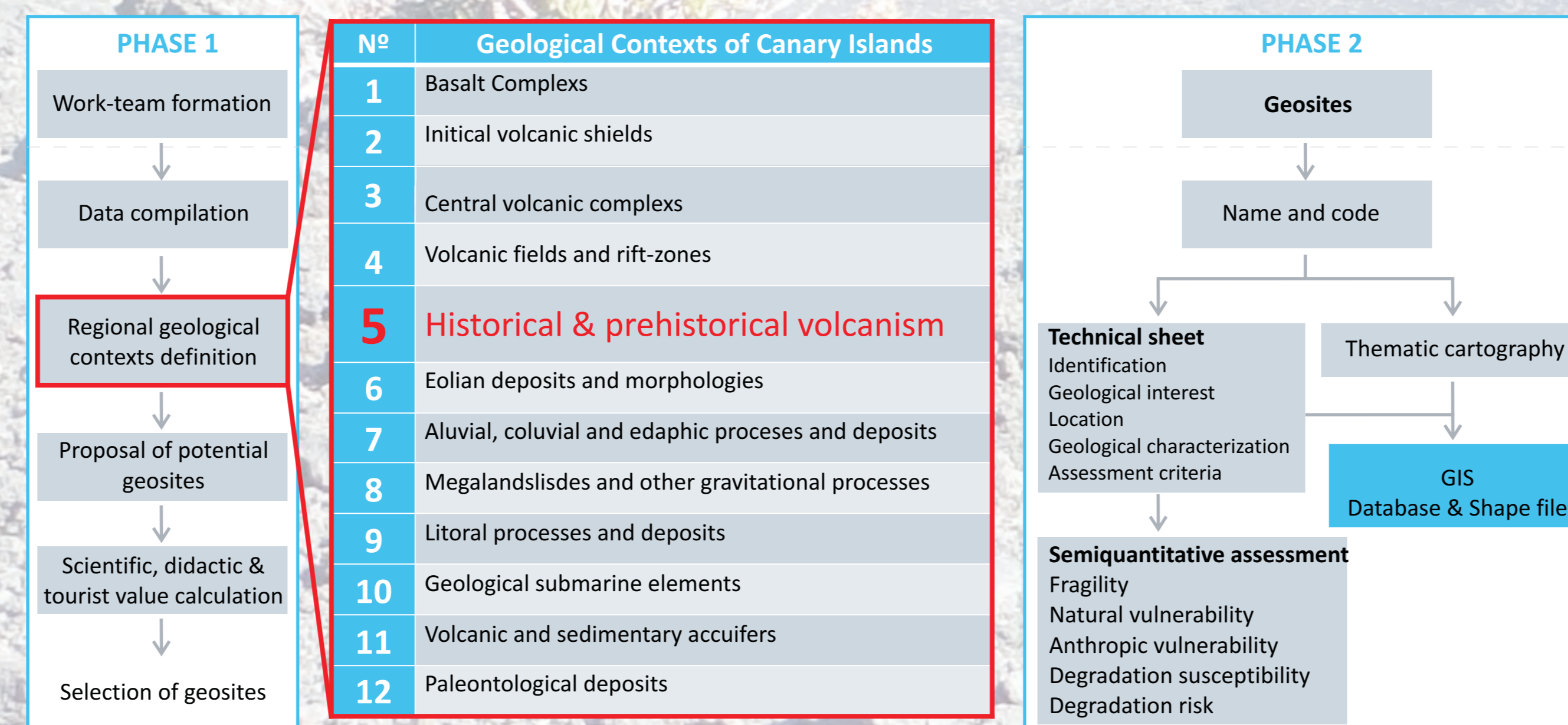
Examples of historical information: A) MS. Letter about the 1646 Eruption in La Palma (National Library of Spain); B) Map of the Timanfaya eruption (Simancas Archive, map, plans and drawings section, sig. XVIII-51); C) Garachico before the 1706 eruption (Torriani, 1588); D) Teneguía eruption postcard (FEDAC, <http://www.fotosantiguascanarias.org/index.php/acceso-a-las-fotografias>).



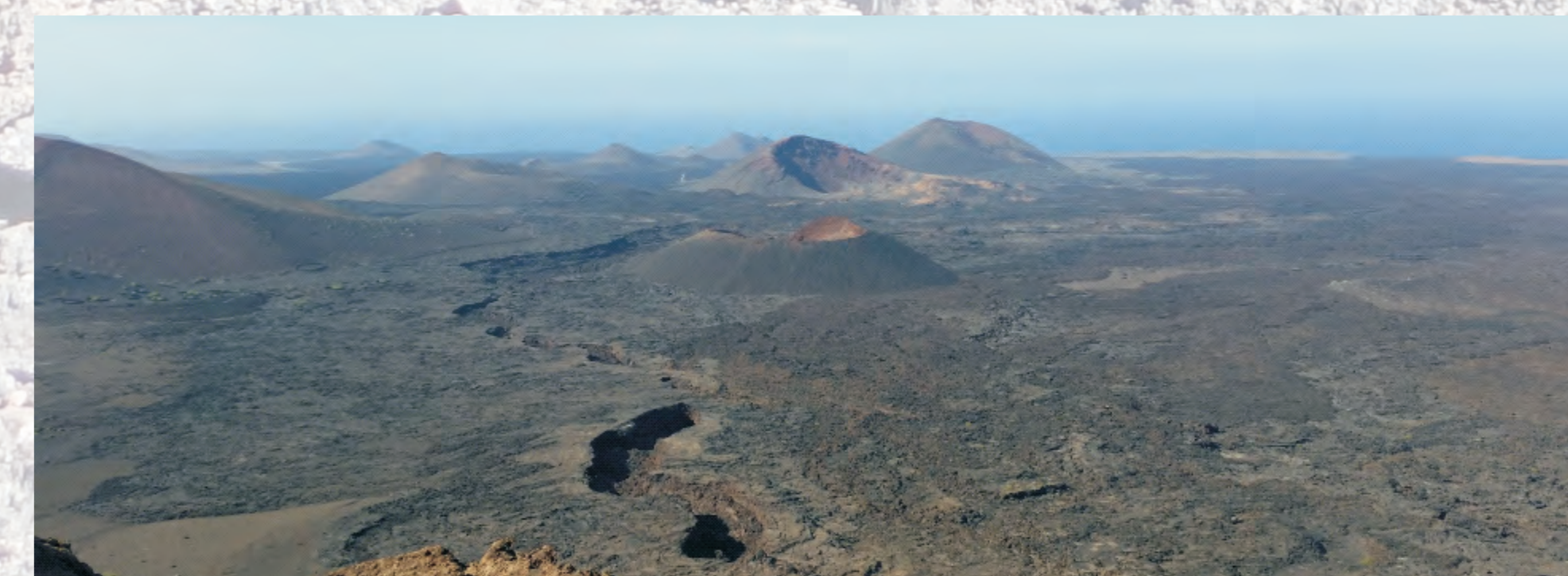
Areas affected by historical and prehistorical volcanic eruptions in the Canary Islands.

2. Methodology

In order to carry out the inventory of geosites for the Canary Islands at a regional scale, it has been applied a methodology consisting of two sequential phases: the first one address the selection of geosites that will be part of the inventory, and the second one deals with the characterization and assessment of the selected geosites. In this methodology, geosites are selected within geological frameworks previously established given their regional significance for Canary Islands. With this aim, 12 geological frameworks representative of the geodiversity of Canary Islands have been identified, which include the essential elements, processes and morphologies of the Canarian geology, covering all stages of construction of the islands as well their geological evolution, including processes, morphologies, fossils and deposits associated both to the volcanism and the external geological agents. The selection of geosites is then constrained and facilitated by its representativeness within each geological framework. One of these 12 geological frameworks corresponds to "Historical and prehistorical volcanism". All of them were basaltic fissure eruption. The last volcanic eruption in the Canary Islands took place in 1971 in La Palma (Teneguía volcano), and erupted basaltic lava flows and pyroclasts.



Methodological phases of geosites identification and defined geological contexts for the Canary Islands.



The 1730-36 Timanfaya deposits are also included into the global inventory of the geological heritage (IUGS-UNESCO)

3. Results and Conclusions

The scarce number of volcanic eruptions, their low frequency and their general characteristics –fissure mafic eruptions, low VEI and strombolian eruptive styles- determine an apparent geological homogeneity. Nevertheless, the high variety of processes, morphologies and deposits associated to this framework, their good conservation status, as well as the information from the historical chronicles, have permitted to identify 19 geosites of high scientific value. They highlight the existence of eruptive styles ranging from hawaian to vulcanian, with short phases of water-magma contact, quiet emissions of water or in geysers, phreatomagmatic explosions, etc. These geosites constitute a unique and representative record of the volcanology, geomorphology, tectonics and petrology characterizing the most recent mafic volcanism of the Canarian archipelago.

Island	Geosite name	Interest	Description
Lanzarote	1824 Chinero-Tinguatón-Tao eruptions	VOL, GEO, TEC	• Representative place of the formation and evolution of large lava channels • Eruptive phases with quiet emission of brackish water but also in the form of geysers in the final eruptive phase, with formation of volcanic chasms by eruptive conduit cleaning
	1730-1736 Timanfaya multiple eruption	VOL, TEC, GEO, PET	• It is one of the largest mafic eruptions in the world • High diversity of geological elements
Tenerife	1909 Chinyero eruption	VOL	• The highest dispersion of ashes emitted during a mafic eruption
	1798 Narices del Teide eruption	VOL	• Its location is influenced by the stress field of the Teide -Pico Viejo stratovolcano
	1706 Garachico eruption	VOL, GEO	• It is the eruption of the greatest socioeconomic impact of the entire Canary Islands • Destruction of part of the city and the port of Garachico
	1704-1705 triple eruption	VOL, TEC, GEO	• Important previous seismicity associated with the site effect • Highest number of victims of the entire historical period of the Canary Islands
La Palma	1492 Boca Cangrejo eruption	VOL, TEC	• Eruption described by Columbus on his first trip to America. Its allocation to the year 1492 is controversial
	Prehistorical (1240±60 ¹⁴ C) eruption of Lavas Negras	VOL	• Last eruption at Pico del Teide summit
	1971 Teneguía volcano	VOL, GEO	• Strombolian eruption with strong morphological changes in the cone during the eruption • Last superficial eruption in the Canary Islands
	1949 San Juan eruption	VOL	• Control of the hydrogeological context in the eruptive style of each of the different eruptive centers
El Hierro	El Charco Volcano	VOL, TEC	• Evolution of the eruptive fissures opening influenced by steep slopes
	1677 eruption	VOL, GEO	• Destruction of previous hot spring of medicinal use
	1646 Martín de Tegalate eruption	VOL, TEC	• Example of a feeding system along the rift simultaneously erupting at the summit and at sea level
La Palma	1585 Tacande eruption	VOL, GEO, PET	• Forced extrusion of phonolite spines during the eruption
	Montaña Quemada Volcano	VOL, TEC	• Eruption of aboriginal tradition
	860 AD La Cucaracha volcano	VOL	• Volcanic deposits that include fragments of human bones
El Hierro	2011-2012 Mar de Las Calmas submarine eruption	VOL, PET	• Last eruption in the Canary Islands • First eruption monitored with actual techniques • Restingolitas

Acknowledgements

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