

Volcanic eruptions in La Garrotxa are more recent than expected

- A new study by IDAEA-CSIC, New Mexico Tech University, GeoNat, and UNAM reveals that the Montsacopa volcano in Catalonia was active just 20,000 years ago, significantly younger than the previously established age of over 75,000 years.
- This discovery reshapes the geological history of the region and underscores the need to monitor these volcanic systems to mitigate future risks.



Croscat Volcano, La Garrotxa | Joan Martí Molist

Barcelona, February 5, 2025. A new study led by an international team of researchers from the [Institute of Environmental Assessment and Water Research \(IDAEA-CSIC\)](#), New Mexico Tech University, GeoNat, and the National Autonomous University of Mexico (UNAM) has revealed that volcanic activity in Catalonia's La Garrotxa region is more recent and frequent than previously thought. New dating, conducted using advanced radiometric techniques, indicates that the Montsacopa volcano was active as recently as 20,000 years ago, while other eruptions date back 248,000 years. This discovery provides crucial insights into the evolution and recurrence of eruptions in the region and improves the assessment of its potential risk.

The study, whose findings have been published in the prestigious journal *Quaternary Science Advances*, is based on the analysis of 14 samples taken from different volcanic cones and lava flows. These samples have revealed unprecedented data and improved age estimates through the use of advanced radiometric technology, based on the ratio of isotopes $^{40}\text{Ar}/^{36}\text{Ar}$. The sample analysis was carried out at the Geochronology Research Laboratory of New Mexico Tech University in the United States, which is renowned for its expertise in radiometric dating of young basaltic volcanic rocks.

Researchers have determined that the earliest recognizable eruptions in the area, corresponding to the lower lava flow at Molí Fondo de Sant Joan les Fonts, date back 248,000 years. However, **the Montsacopa volcano, previously thought to be older than 75,000 years, actually erupted just 20,000 years ago**. Additionally, the study revealed that lava flows in La Moixina (Olot) and Bosc de Tosca formed 26,000 and 17,000 years ago, respectively, while the Croscat volcano had its last eruption between 13,000 and 15,000 years ago.

"Obtaining these data represents a significant breakthrough in understanding the Garrotxa volcanic field, providing new information that improves the previous relative stratigraphy of the region's volcanic units. It reveals that eruptions were more frequent and occurred more recently than previously believed," explains **Joan Martí Molist**, a researcher at IDAEA-CSIC who led the study.

The study also highlights that the morphology and preservation state of volcanoes are not necessarily indicative of their relative age, as urbanization and various erosion factors may have altered their characteristics, leading to misinterpretations. La Garrotxa is a clear example of this, as its volcanic field is predominantly concealed by dense vegetation and partially eroded by human activity. Moreover, researchers emphasize the need for more comprehensive geological and geochronological research to understand these volcanic fields and, more broadly, the European Rift System, which, due to its relative youth and current manifestations of activity (seismicity, fumarolic activity, etc.), should be monitored to mitigate future volcanic risks.

This research represents the second phase of a broader study on the ages and evolution of volcanism in the region. The first phase involved analyzing volcanic ashes in the paleolake of Vall d'en Bas (remnants of a lake believed to have formed from multiple lava flows over the past 20,000 years), with findings published in [Scientific Reports](#) and [The Holocene](#). Currently, a third phase is underway, incorporating new datings that will complete the evolutionary framework of volcanic activity and eruption frequency in La Garrotxa. This will enable the establishment of a precise model for the functioning and associated risk of Quaternary monogenetic volcanism, the most abundant type of volcanism on our planet.

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