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# La Palma Earthquakes

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## Abstract

In September 2021, a significant jump in seismic activity on the island of La Palma (Canary Islands, Spain) signaled the start of a volcanic crisis that still continues at the time of writing. Earthquake data is continually collected and published by the Instituto Geográfico Nacional (IGN). ...

## Plain Language Summary

Earthquake data for the island of La Palma from the September 2021 eruption is found ...

## 1 Introduction

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Figure 1: Timeline of recent earthquakes on La Palma

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Based on data up to and including 1971, eruptions on La Palma happen every 79.8 years on average.

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Studies of the magma systems feeding the volcano, such as Marrero et al. (2019), have proposed that there are two main magma reservoirs feeding the Cumbre Vieja volcano; one in the mantle (30-40km depth) which charges and in turn feeds a shallower crustal reservoir (10-20km depth).

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Eight eruptions have been recorded since the late 1400s (Figure 1).

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Data and methods are discussed in Section 2.

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Let  $x$  denote the number of eruptions in a year. Then,  $x$  can be modeled by a Poisson distribution

$$p(x) = \frac{e^{-\lambda} \lambda^x}{x!} \quad (1)$$

where  $\lambda$  is the rate of eruptions per year. Using Equation 1, the probability of an eruption in the next  $t$  years can be calculated.

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Table 1: Recent historic eruptions on La Palma

| Name                | Year |
|---------------------|------|
| Current             | 2021 |
| Teneguía            | 1971 |
| Nambroque           | 1949 |
| El Charco           | 1712 |
| Volcán San Antonio  | 1677 |
| Volcán San Martín   | 1646 |
| Tajuya near El Paso | 1585 |
| Montaña Quemada     | 1492 |

34 Table 1 summarises the eruptions recorded since the colonization of the islands by  
35 Europeans in the late 1400s.

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Figure 2: Map of La Palma

37 La Palma is one of the west most islands in the Volcanic Archipelago of the Canary  
38 Islands (Figure 2).

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Figure 3: Locations of earthquakes on La Palma since 2017.

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41 Figure 3 shows the location of recent Earthquakes on La Palma.

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## 43 2 Data & Methods

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## 45 3 Conclusion

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## 47 References

48 Source: [Article Notebook](#)

49 Marrero, J., García, A., Berrocso, M., Llinares, Á., Rodríguez-Losada, A., & Ortiz,  
50 R. (2019). Strategies for the development of volcanic hazard maps in mono-  
51 genetic volcanic fields: The example of La Palma (Canary Islands). *Journal of*  
52 *Applied Volcanology*, 8. <https://doi.org/10.1186/s13617-019-0085-5>