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 Geográphico Nacional (IGN). …

## 1 Introduction

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| Figure 1: Map of La Palma |

La Palma is one of the west most islands in the Volcanic Archipelago of the Canary Islands ([Figure 1](#fig-map)).

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 Martin | 1646 |
| Tajuya near El Paso | 1585 |
| Montaña Quemada | 1492 |

[Table 1](#tbl-history) summarises the eruptions recorded since the colonization of the islands by Europeans in the late 1400s.

Data and methods are discussed in [Section 2](#sec-data-methods).

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

Where is the rate of eruptions per year. Using [Equation 1](#eq-poisson), the probability of an eruption in the next years can be calculated.

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| Figure 2: Timeline of recent earthquakes on La Palma Source: [Article Notebook](https://cwickham.github.io/manuscript-template-rstudio/index.qmd.html) |

Based on the eruptions up to and including 1971, we would estimate to be .

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).

A prior study of the magma systems feeding the volcano proposed that there are two main magma reservoirs feeding the Cumbre Vieja volcano (Marrero et al. 2019).

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| Figure 3: Locations of earthquakes on La Palma since 2017. Source: [Article Notebook](https://cwickham.github.io/manuscript-template-rstudio/index.qmd.html) Source: [Data Screening](https://cwickham.github.io/manuscript-template-rstudio/notebooks/data-screening.ipynb.html#cell-fig-spatial-plot) |

[Figure 3](#fig-spatial-plot) shows the location of recent Earthquakes on La Palma.

## 2 Data & Methods

## 3 Conclusion

## References

Marrero, José, Alicia García, Manuel Berrocoso, Ángeles Llinares, Antonio Rodríguez-Losada, and R. Ortiz. 2019. “Strategies for the Development of Volcanic Hazard Maps in Monogenetic Volcanic Fields: The Example of La Palma (Canary Islands).” *Journal of Applied Volcanology* 8 (July). <https://doi.org/10.1186/s13617-019-0085-5>.