

1

La Palma Earthquakes

2

Steve Purves¹, Rowan Cockett¹

3

¹Curvenote,

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 ...

0.1 Introduction

Source: [Article Notebook](#)

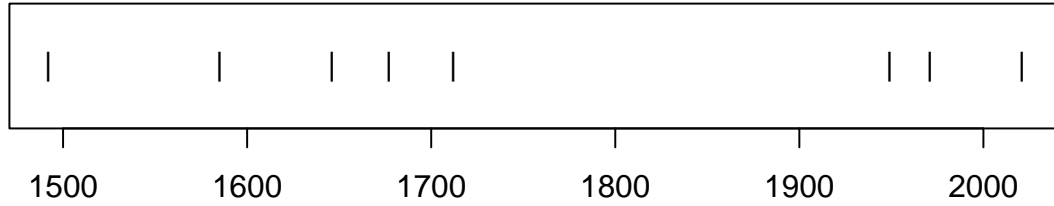


Figure 1: Timeline of recent earthquakes on La Palma

Source: [Article Notebook](#)

Source: [Article Notebook](#)

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

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).

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

Data and methods are discussed in Section 0.2.

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

Table 1: Recent historic eruptions on La Palma

Name	Year
Current	2021
Teneguía	1971
Nambroque	1949

Name	Year
El Charco	1712
Volcán San Antonio	1677
Volcán San Martin	1646
Tajuya near El Paso	1585
Montaña Quemada	1492

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

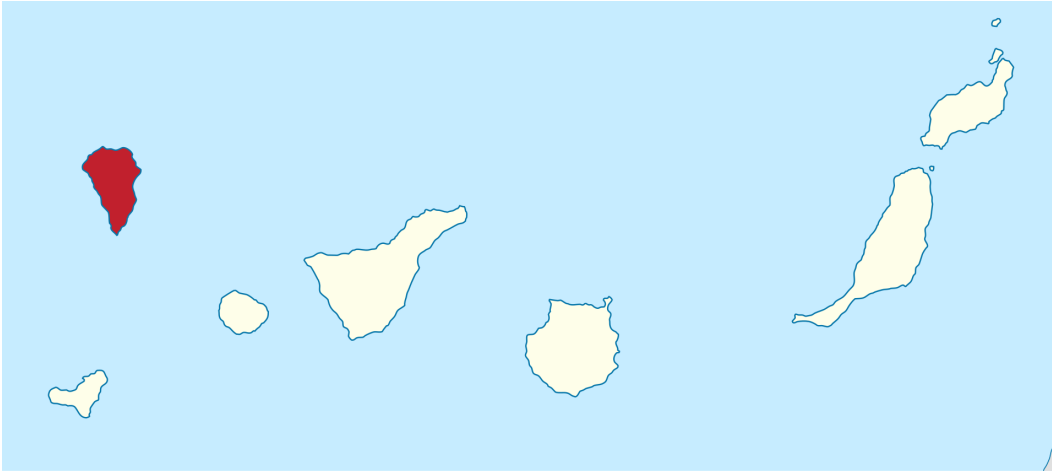


Figure 2: Map of La Palma

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

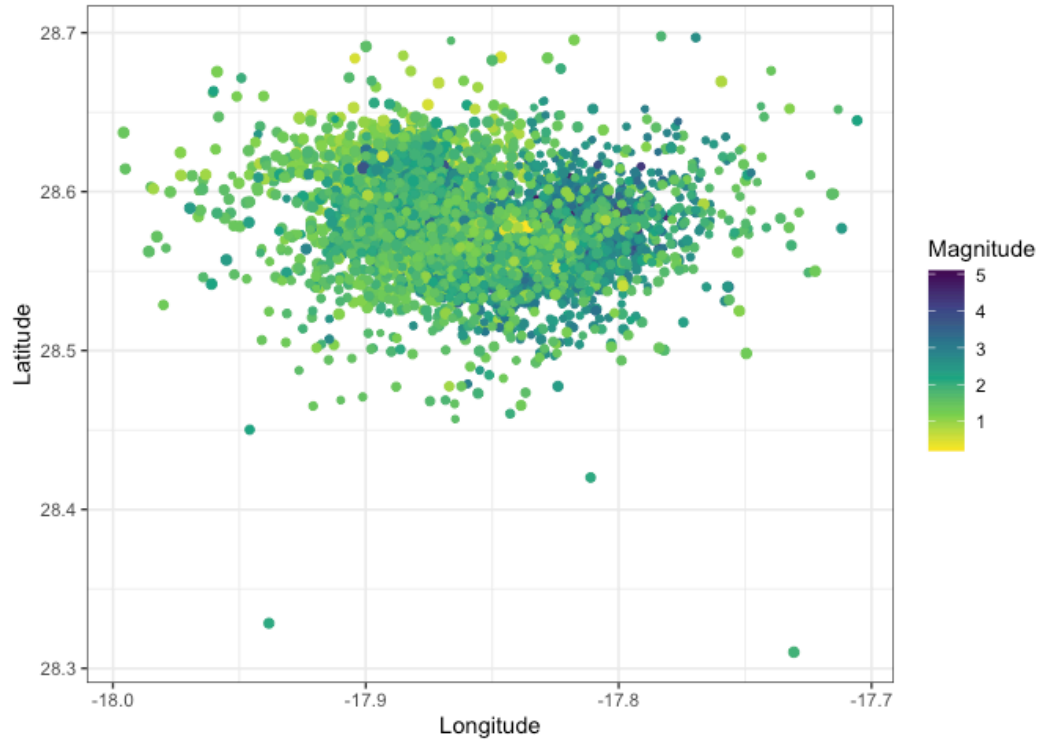


Figure 3: Locations of earthquakes on La Palma since 2017

Source: [Explore Earthquakes](#)

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

0.2 Data & Methods

0.3 Conclusion

1 Introduction

This is a boooooook created from markdown and executable code.

See [Knuth (1984)] and Knuth (1984) for additional discussion of literate programming.

Regular markdown and $E = mc^2$ equations.

1.1 Quarto

Quarto enables you to weave together content and executable code into a finished document. To learn more about Quarto see <https://quarto.org>.

1.2 Running Code

When you click the **Render** button a document will be generated that includes both content and the output of embedded code. You can embed code like this:

```
2
```

You can add options to executable code like this

```
4
```

The `echo: false` option disables the printing of code (only output is displayed).

```
2
```

More markdown.

1.3 ToDo's

// Double slash creates a new task

Source: [Introduction](#)

References

Knuth, D. E. (1984). Literate programming. *Computer Journal*, 27(2), 97–111.

<https://doi.org/10.1093/comjnl/27.2.97>

Marrero, J., García, A., Berrocoso, M., Llinares, Á., Rodríguez-Losada, A., & Ortiz, R. (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. <https://doi.org/10.1186/s13617-019-0085-5>