Solid-state Batteries

W. Chen

2024-09-28

目录

# Abstract

# 1. Title

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). …

## 1.1 Introduction

|  |
| --- |
| Figure 1: Timeline of recent earthquakes on La Palma |

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 [1], 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](#fig-timeline)). Data and methods are discussed in [Section 1.3](#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.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 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.

|  |
| --- |
| Figure 2: Map of La Palma |

La Palma is one of the west most islands in the Volcanic Archipelago of the Canary Islands ([Figure 2](#fig-map)).

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

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

## 1.2 Methods

## 1.3 Results and Discussion

## 1.4 Conclusion

## References

[1] P. Albertus, V. Anandan, C. Ban, N. Balsara, I. Belharouak, J. Buettner-Garrett, Z. Chen, C. Daniel, M. Doeff, N.J. Dudney, B. Dunn, S.J. Harris, S. Herle, E. Herbert, S. Kalnaus, J.A. Libera, D. Lu, S. Martin, B.D. McCloskey, M.T. McDowell, Y.S. Meng, J. Nanda, J. Sakamoto, E.C. Self, S. Tepavcevic, E. Wachsman, C. Wang, A.S. Westover, J. Xiao, T. Yersak, Challenges for and pathways toward Li-metal-based all-solid-state batteries, ACS Energy Letters 6 (2021) 1399–1404. https://doi.org/[10.1021/acsenergylett.1c00445](https://doi.org/10.1021/acsenergylett.1c00445).