



Springer Nature is making SARS-CoV-2 and COVID-19 research free. [View research](#) | [View latest news](#) | [Sign up for updates](#)

# **Preliminary Analysis of Slope Instability Processes Triggered in the Guilherme Creek Watershed (Nordeste Municipality, S. Miguel Island, Azores)**

Advances in Natural Hazards and Hydrological Risks: Meeting the Challenge pp 55-58  
| Cite as

- Paulo Maciel Amaral (1) Email author (amaral.paulomaciel@gmail.com)
- Rui Marques (2) (3)
- Isabel Duarte (4)
- António Pinho (4)

1. Environment and Society, Department of Geosciences, University of the Azores, , Ponta Delgada, Portugal
2. Centre for Information and Seismovolcanic Surveillance of the Azores, University of the Azores, , Ponta Delgada, Portugal
3. Research Institute for Volcanology and Risk Assessment, University of the Azores, , Ponta Delgada, Portugal
4. Centre GeoBiotec|UA and School of Science and Technology, Department of Geosciences, University of Évora, , Évora, Portugal

Conference paper

First Online: 03 January 2020

- 40Downloads

Part of the [Advances in Science, Technology & Innovation](#) book series (ASTI)

## **Abstract**

The Nordeste Volcanic Complex is located in the NE sector of S. Miguel Island (Azores) and it is composed of geological formations with about 4 million years old, extremely weathered. This fact, allied to the steep slopes on the area, promotes the occurrence of slope instability phenomena. In particular, the Guilherme Creek watershed has a high recurrence of this type of geological hazard, mainly triggered by precipitation, which promotes a high density of landslides in the area. Considering as main objective the landslide susceptibility analysis in the Guilherme Creek watershed, using statistical/probabilistic methods, it is ongoing an inventory process of these phenomena in a GIS, based on the aerial photography interpretation and fieldwork. Currently, the inventory is concluded based on aerial photography from 1982 and

orthorectified aerial photography from 1995 to 2005. In order to validate and update the landslide inventory produced in the office, fieldwork has been carried out using, besides more traditional techniques, a drone (DJI Phantom 4 PRO). This tool has allowed studying steep slopes, which would otherwise be impossible to access in an area with a high forest density and very steep slopes. Until now, 517 landslides have been identified in the study area, mainly belonging to slides and falls typologies.

## Keywords

Landslides Geomorphological evolution Geographic information systems  
Nordeste volcanic complex São miguel island Azores

This is a preview of subscription content, [log in](#) to check access.

## References

Duncan AM, Guest JE, Wallenstein N, Chester DK (2015) The older volcanic complexes of São Miguel, Azores: Nordeste and Povoação. In: Gaspar JL, Guest JE., Duncan AM, Barriga FJAS, Chester DK (eds) Volcanic geology of São Miguel island (Azores Archipelago). Geological Society, London, Memoirs, 44, pp 147–153

[Google Scholar](#) (<https://scholar.google.com/scholar?q=Duncan%20AM%2C%20Guest%20JE%2C%20Wallenstein%20N%2C%20Chester%20DK%20%282015%29%20The%20older%20volcanic%20complexes%20of%20S%C3%A3o%20Miguel%2C%20Azores%3A%20Nordeste%20and%20Povoa%C3%A7%C3%A3o.%20In%3A%20Gaspar%20JL%2C%20Guest%20JE.%2C%20Duncan%20AM%2C%20Barriga%20FJAS%2C%20Chester%20DK%20%28eds%29%20Volcanic%20geology%20of%20S%C3%A3o%20Miguel%20island%20%28Azores%20Archipelago%29.%20Geological%20Society%2C%20London%2C%20Memoirs%2C%2044%2C%20pp%20147%20-%20153>)

Fernandez AL (1980) Geology and petrology of the Nordeste volcanic complex, São Miguel, Azores. Geol Soc Am Bull, Part II 91:2457–2557

[CrossRef](#) (<https://doi.org/10.1130/GSAB-P2-91-2457>).

[Google Scholar](#) ([http://scholar.google.com/scholar\\_lookup?title=Geology%20and%20petrology%20of%20the%20Nordeste%20volcanic%20complex%2C%20S%C3%A3o%20Miguel%2C%20Azores&author=AL.%20Fernandez&journal=Geol%20Soc%20Am%20Bull%2C%20Part%20II&volume=91&pages=2457-2557&publication\\_year=1980](http://scholar.google.com/scholar_lookup?title=Geology%20and%20petrology%20of%20the%20Nordeste%20volcanic%20complex%2C%20S%C3%A3o%20Miguel%2C%20Azores&author=AL.%20Fernandez&journal=Geol%20Soc%20Am%20Bull%2C%20Part%20II&volume=91&pages=2457-2557&publication_year=1980))

Marques R (2013) In: de S. Miguel, Açores): Inventariação, (ed) caracterização e análise da susceptibilidade. Universidade dos Açores, Ponta Delgada (Tese de doutoramento).

[Google Scholar](#) (<https://scholar.google.com/scholar?q=Marques%20R%20%282013%29%20In%3A%20de%20S.%20Miguel%2C%20A%C3%A7ores%29%3A%20Inventaria%C3%A7%C3%A3o%2C%20%28ed%29%20caracteriza%C3%A7%C3%A3o%20e%20an%C3%A1lise%20da%20susceptibilidade.%20Universidade%20dos%20A%C3%A7ores%2C%20Ponta%20Delgada%20%28Tese%20de%20doutoramento%29.>)

Silva RF, Marques R, Gaspar JL (2018) Implications of landslides typology and predisposing factor combinations for probabilistic landside susceptibility models: a case study in Lajedo Parish (Flores island, Azores—Portugal). Geosciences 8(5):153

[CrossRef](#) (<https://doi.org/10.3390/geosciences8050153>).

**Google Scholar** ([http://scholar.google.com/scholar\\_lookup?title=Implications%20of%20landslides%20typology%20and%20predisposing%20factor%20combinations%20for%20probabilistic%20landside%20susceptibility%20models%3A%20a%20case%20study%20in%20Lajedo%20Parish%20%28Flores%20island%20C%20Azores%20E2%80%94Portugal%29&author=RF.%20Silva&author=R.%20Marques&author=JL.%20Gaspar&journal=Geosciences&volume=8&issue=5&pages=153&publication\\_year=2018](http://scholar.google.com/scholar_lookup?title=Implications%20of%20landslides%20typology%20and%20predisposing%20factor%20combinations%20for%20probabilistic%20landside%20susceptibility%20models%3A%20a%20case%20study%20in%20Lajedo%20Parish%20%28Flores%20island%20C%20Azores%20E2%80%94Portugal%29&author=RF.%20Silva&author=R.%20Marques&author=JL.%20Gaspar&journal=Geosciences&volume=8&issue=5&pages=153&publication_year=2018))

## Copyright information

© Springer Nature Switzerland AG 2020

## About this paper

Cite this paper as:

Maciel Amaral P., Marques R., Duarte I., Pinho A. (2020) Preliminary Analysis of Slope Instability Processes Triggered in the Guilherme Creek Watershed (Nordeste Municipality, S. Miguel Island, Azores). In: Fernandes F., Malheiro A., Chaminé H. (eds) Advances in Natural Hazards and Hydrological Risks: Meeting the Challenge. Advances in Science, Technology & Innovation (IEREK Interdisciplinary Series for Sustainable Development). Springer, Cham

- First Online 03 January 2020
- DOI [https://doi.org/10.1007/978-3-030-34397-2\\_11](https://doi.org/10.1007/978-3-030-34397-2_11)
- Publisher Name Springer, Cham
- Print ISBN 978-3-030-34396-5
- Online ISBN 978-3-030-34397-2
- eBook Packages [Earth and Environmental Science](#)
  
- [Buy this book on publisher's site](#)
- [Reprints and Permissions](#)

## Personalised recommendations

© 2019 Springer Nature Switzerland AG. Part of [Springer Nature](#).

Not logged in Not affiliated 87.196.41.100