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IPL Project Proposal Form 2016
(MAXIMUM: 3 PAGES IN LENGTH)

1.   Project title

The construction of a global database of giant landslides on oceanic island volcanoes

2.   Main project fields

(1) Technology development

    B.   Hazard mapping, vulnerability, and risk assessment

(2) Targeted landslides

    A.   Catastrophic landslides

(3) Capacity building

    B.   Collating and disseminating information / knowledge

(4) Preparedness, mitigation, and recovery

    A.   Preparedness

3.   Project leader

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4.   Objectives

The fundamental objectives of the proposed project are:

- To construct the first global database of giant landslides on oceanic island volcanoes
- To investigate spatial and temporal patterns of landsliding and landslide reactivation
- To assess the hazard and potential risks posed by these giant landslides

5.   Background justification

Giant landslides on the margins of oceanic island volcanoes have affected many isolated volcanic archipelagos. Such landslides are generally categorised as slumps or debris avalanches – the latter represent the largest formations which can be generated in a single geological moment [1]. Evidence of both types is often found within a single archipelago [2,3]. They remain poorly understood events, first, because they occur so infrequently and, second, because much of the accumulated material comes to rest at considerable

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depths in the ocean where it is difficult to study. Such an event would not only cause immense losses its immediate vicinity but may also devastate coastal regions thousands of kilometres from its source if it were to trigger a tsunami [1]. However, no efforts to synthesise and interrogate the literature have yet been made, especially at the global scale. Such a study would greatly help to constrain their hazard in much the same manner as has been done recently in relation to deep seated gravitational slope deformations [4].

6. Study area
The database will include information about giant landslides from across the globe.

7. Project duration
The database will be constructed over a three year period from 2016-2018.

8. Resources necessary for the project and their mobilisation
The required personnel and facilities are readily available at the Institute of Rock Structure & Mechanics. To help with the preparation of the database we intend to offer internships to undergraduate students from the oceanic islands affected by giant landslides. Any costs incurred can be mobilised from our ongoing project, "El Hierro megalandslide dynamics analysed using big data to predict the future behaviour of megalandslides on other volcanic islands" (GAČR Project No. 16-12227Y (2016-2018)).

9. Project description
Numerous studies describe the origin and development of specific giant landslides on oceanic island volcanoes while many more describe the successive development of suites of giant landslides within a single volcanic archipelago [2,3,5]. Yet despite this substantial body of literature no efforts have ever been made to synthesise and interrogate this information from a global scale perspective. During the course of the proposed project we will compile information from both published scientific manuscripts and unpublished scientific reports in order to construct the first global database of giant landslides on oceanic island volcanoes. This database is important because, first, it will allow us to investigate the spatial and temporal patterns of giant landslides and their subsequent reactivations and, second, it will allow us to assess the hazard and potential risk posed by giant landslides on oceanic island volcanoes across the globe. The database will provide a complete inventory of giant landslides on oceanic island volcanoes and a description of the research conducted at each site. It will, for example, include information about the location and timing of each giant landslide and its dynamics, whether the giant landslide continues to be monitored, whether the giant landslide has been reactivated, whether any such reactivations have led to further damage, and whether any future reactivations are thought to represent a significant risk to the local population. The database will be constructed in a systematic manner: the first year will synthesise information about giant landslides in the Atlantic Ocean; the second year will synthesise information about giant landslides in the Pacific Ocean; and the third year will synthesise information about giant landslides in the Indian Ocean (Section 9).

10. Work plan / expected results

The database will be constructed systematically on a region by region basis:

- During the first year we will focus on compiling information about giant landslides in the Atlantic Ocean (e.g. the Azores, the Canary Islands, and the Lesser Antilles)
- During the second year we will focus on compiling information about giant landslides in the Pacific Ocean (e.g. the Aleutian Islands, the Fijian Islands, and the Hawaiian Islands)
- During the third year we will focus on compiling information about giant landslides in the Indian Ocean (e.g. the Mascarene Islands, the Greater Sunda Islands, and the Lesser Sunda Islands)

11. Deliverables / timeframe

The database will be accessible during its construction through the website of the Institute of Rock Structure & Mechanics. In the second year of the project we will submit a manuscript within the scope of ICL/IPL activities to the journal Landslides. This manuscript will, first, outline the rationale for the database and, second, present a comprehensive analysis of the information collated during the first year of the project, i.e. regarding giant landslides in the Atlantic Ocean. In the third year of the project we will submit a full manuscript to the journal Landslides. This manuscript will, first, outline the information collated during the first year of the project and, second, present a comprehensive analysis of the information collated during the second and third years of the project, i.e. regarding giant landslides in the Pacific and Indian Oceans. The information included in the giant landslide database will be submitted along with the manuscript as supplementary material.

12. Project beneficiaries

The database is intended to benefit the entire landslide research community: it will represent a research tool for scientists and an educational tool for students. The database will be published alongside the manuscript which is to be submitted at the end of the project and accessible at all times from the website of the Institute of Rock Structure & Mechanics. Thereafter we shall make every attempt to encourage any interested scientists or students to interrogate the information collated in the database in novel and interesting ways.

13. References

[1] Whellan, F., Kelletat, D., 2003. Submarine slides on volcanic islands. Prog. Phys. Geog., 27, 198-216.
[2] Moore, J.G. et al., 1994. Giant Hawaiian landslides. Annu. Rev. Earth. Planet. Sci., 22, 119-144. [3] Masson, D.G. et al., 2002. Slope failures on the flanks of the western Canary Islands. Earth-Sci. Rev., 57, 1-35. [4] Pánek, T., Klimeš, J., 2016. Temporal behaviour of deep seated gravitational slope deformations. Earth-Sci. Rev., 156, 14-38. [5] Carracedo, J.C., 2014. Structural collapses in the Canary Islands. In: Gutiérrez, F., Gutiérrez, M. (eds.), Landscapes and Landforms of Spain. Springer, Dordrecht, pp. 289-306.

Note: Please fill and submit this form by 1 July 2016 to
ICL secretariat <secretariat@iclhq.org> and ICL network <ICL-network@iclhq.org>