

New research puts 'killer La Palma tsunami' at distant future

20 September 2006

The volcanic island of La Palma in the Canaries is much more stable than is generally assumed, Dutch scientists working at the TU Delft have found. The southwestern flank of the island isn't likely to fall into the sea (potentially causing a tsunami) for at least another 10,000 years, professor Jan Nieuwenhuis states in the September edition of the university's science magazine Delft Integraal.

The TU Delft research findings should be a relief for people living at or near the Atlantic coasts of the US, Africa and Europe. Six years ago, geologists proposed that La Palma is so unstable that it might lose one of its flanks during a volcanic eruption in the near future. This would cause a 'mega tsunami' with massive waves up to hundreds of meters in height. Cities like New York, Boston, Lisbon and Casablanca would be all but wiped from the face of the planet, according to the more pessimistic estimates.

But according to the new TU Delft research, the Cumbre Vieja volcano on the island simply isn't large enough to fall apart... yet. In a first of its kind study, the Dutch researchers modelled the inside of the flank and then simulated several volcanic eruptions and watery 'steam explosions'. In every simulation, the volcanic flank stayed firmly in its place. 'This is simply a very stable island', says team leader professor Jan Nieuwenhuis in the September edition of the TU Delft science magazine Delft Integraal.

According to Nieuwenhuis' calculations, it would take the strength of about 600 million modern fighter jet engines to pull the flank apart: at least 12,000 to 28,000 billion Newton. That is much more than can be expected from a volcanic outburst on La Palma, the team concludes. Only under very extreme conditions, the flank could become unstable, Nieuwenhuis has calculated. This would require unusually heavy rainfall during an exceptionally strong magmatic outburst, or

some other highly unlikely combination of circumstances. 'Based on what we know now, so many things must go wrong that a disaster seems very, very unlikely', says Janneke van Berlo, who recently graduated in the group of prof. Nieuwenhuis.

The researchers calculate that the surest way to cause a landslide is to wait for at least another 10,000 years. The Cumbre Vieja volcano steadily grows and this causes the flanks of the volcano to become steeper and less stable. 'A combination of substantial vertical growth and eruption forces will most probably act to trigger failure. To reach substantial growth, a time span in the order of 10,000 years will be required', Van Berlo states.

At a glance, La Palma doesn't look very solid even today. It has lost chunks of its flanks at least twice in prehistoric times already. And during the last eruption, in 1949, a two kilometer long rip appeared at the top of Cumbre Vieja's southwestern flank. But the Delft researchers point out that the cut is nothing more than the result of an innocent, shallow phenomenon, for example local adaptive settlements of the volcano. What's more, the ancient collapses are good evidence La Palma is stable now: the collapses only occurred when La Palma was much higher than today, at least 2,000 and 2,500-3,000 meter respectively.

Even if the volcanic flank did become critically unstable, it isn't likely it will go with a splash. 'Of course the flank won't go in one piece, but break up first', Nieuwenhuis said. 'And it could very well slide down a little and then settle in a more stable configuration, just like our dykes in Holland often do when they go unstable.' The plunge won't be a fast and sudden event, Nieuwenhuis stresses. 'It will more be like a steam locomotive powering up. The first meter of movement should take several days.'

Source: Delft University of Technology

APA citation: New research puts 'killer La Palma tsunami' at distant future (2006, September 20)
retrieved 6 March 2021 from <https://phys.org/news/2006-09-killer-la-palma-tsunami-distant.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.