

Tsunami hit Geneva in AD 563: scientists

October 28 2012, by Richard Ingham And Veronique Martinache



Sunlight makes its way through heavy clouds over Lake Geneva. Nearly 1,500 years ago a tsunami triggered by a rockfall swept Lake Geneva, engulfing its shores with a wall of water up to 13 metres (42 feet) high, Swiss scientists reported on Sunday.

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The incident suggests Geneva and Lausanne remain vulnerable today, as do other cities on the edge of mountain lakes and high-sided fjords, they

said.

"The risk is underestimated because most of the people just do not know that tsunamis can happen in lakes," Katrina Kremer, an [Earth scientist](#) at the University of Geneva, told AFP.

In a letter to the [journal Nature](#) Geoscience, Kremer's team said they delved into the "Tauredunum Event," an episode that occurred in AD 563.

A contemporary account by a French bishop, Gregory of Tours, described a catastrophe that was as bewildering as it was terrifying.

A giant wave charged down the lake, destroying villages and herds of animals, and then passed over the city walls of Geneva, on the western tip, where it drowned several people.

Was this a "lake tsunami"? Some experts have argued so.

They point to evidence that part of a mountain slipped into the River Rhone about five kilometres (three miles) from where it flows into [Lake Geneva](#) at the lake's eastern point.

Keen to find out more, Kremer's team swept the deepest part of lake with high-resolution radar.

They uncovered a huge, oval-shaped pile of sediment, more than 10 kilometres (six miles) long, five km (three miles) wide and five metres (16 feet) thick.

The thickest point was in the southeast, indicating an origin in the "delta" where the River Rhone flows into the 73-km (45-mile)-long lake.

The team then took four cores of the sediment and carbon-dated tiny vegetal remains embedded in it. The estimated age of this debris is between AD 381 and AD 612.

"Since the AD 563 event is the only significant natural event recorded in historical accounts within our calculated age interval, we consider our dating results to be a strong indication that the deposit is linked to the AD 563 [rockfall](#) and tsunami," the letter said.

On that fateful day, believes Kremer, the shock of the rockfall caused the nearby delta's built-up slopes to collapse.

Long, narrow and crescent-shaped, Lake Geneva created ideal conditions for funnelling the maelstrom of mud and water into coherent, amplified waves.

"Our numerical simulations with a shallow water model show that delta collapse in the lake generates a large tsunami at various locations along the shore, where a wave of 13 metres (42 feet) is observed after only 15 minutes, and at Geneva where a wave of eight metres (26 feet) arrives 70 minutes after the mass movement is initiated," the researchers wrote.

In the 6th century, a wave of this height would certainly have had the impact on Geneva that Gregory described, and today would completely inundate large parts of the inner city, they warned.

Over the last 10,000 years, several big slips have occurred, and they could happen again as sediment is building up on the delta slopes—posing a threat to more than a million people living on the lake shores, said the letter.

"Our study highlights that not only cities located on sea coasts and fjords are at risk from destructive tsunamis, but so are densely-populated [lake](#)

shores," it said.

Tsunamis are usually associated with an earthquake on the sea floor that occurs close to a coast. The quake raises or lowers the sea bed, and the displaced water forms waves.

But research since the 2004 Indian Ocean tsunami suggests that amplified waves can be created in a range of other scenarios, ranging from volcanic eruptions to dam breaks.

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