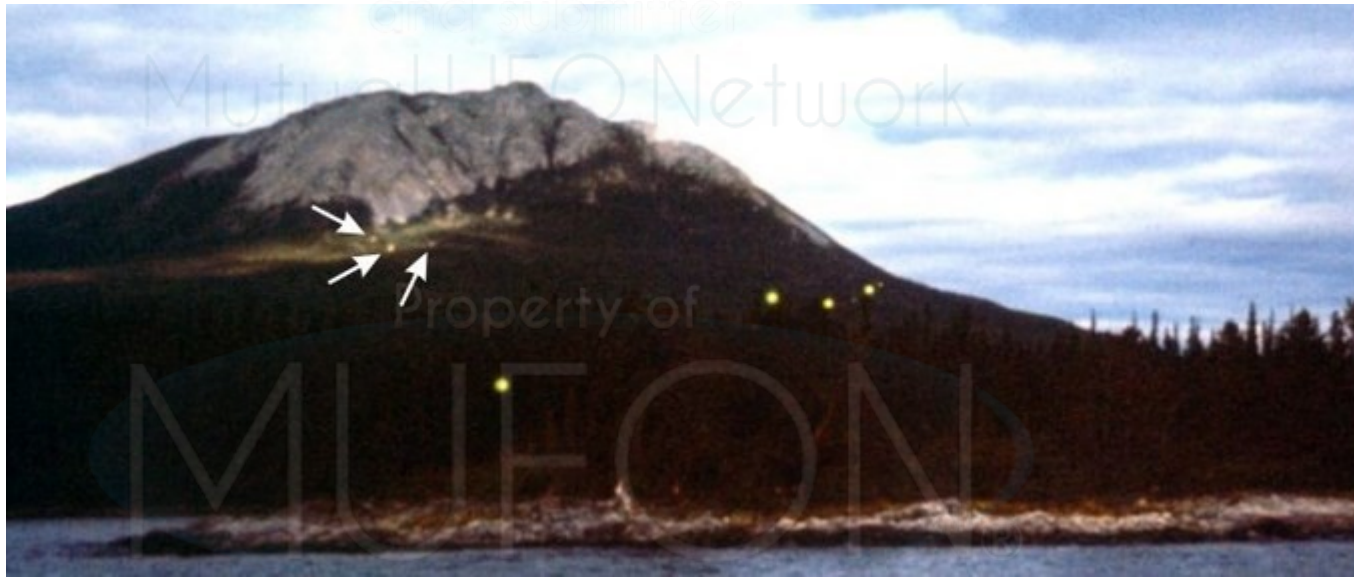


Earthquake Lights

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A new theory to explain them



Wandering balls of light: earthquake lights in Alaska of a diameter of circa one meter (archival picture: 1972 or 1973)

Before the earthquakes, mysterious balls of light sometimes appear. Canadian scientists scrutinized this phenomenon of earthquake lights. Their explanations reach into the depths of the Earth's crust.

Earthquake occasionally occur together with peculiar light phenomena - and may even announce themselves by way of such lights. In some cases, it appears that earthquake lights can appear weeks before any seismic shock, and at a distance of hundreds of kilometers from the epicenter, as Canadian geoscientists are now reporting in the magazine [Seismological Research Letters](#). They are attempting to explain physically a phenomenon which has been controversial among scientists.

A team around **Robert Thériault** from the Ministry of Natural Resources of the Province of Québec has evaluated 65 cases of particularly well documented earthquake lights since the year 1600. Among them, there are four events which occurred in Germany: three of them go back to the middle of the 18th century in Karlsruhe, Aachen and Düren, the fourth case occurred in the late evening of November 16, 1911 near Ebingen, in the Swabian Jura.

A full 110 reports witness to the earthquake lights near Ebingen, some of them at a distance exceeding 100 kilometers from the epicenter of the 5.8 quake. Two

eyewitnesses saw immediately prior to the quake a flash of lightning rise from the earth, which turned itself into a ball as it rose into the air and disappeared after a few seconds in the direction of Ebingen.

Fault lines can move electric charges along

Film records from Peru have also confirmed the mysterious phenomenon: when an earthquake of 8.0 intensity occurred in Pisco, a surveillance camera captured several flashes of light. Analysis later showed that the light phenomena coincided with the seismic shocks. The 65 evaluated earthquakes ranged in force from 3.6 to 9.2.

The lights almost always appeared before or during the seismic shocks, only rarely afterwards. Particularly puzzling are the zones of the continental tectonic plates where the lights appeared most often: they happen mostly in areas in the middle of the plates - despite the fact that only around five percent of earthquakes occur there.

The researchers believe that deep lying, abrupt, vertical faults are an important prerequisite for the phenomenon of earthquake lights to occur. They were present in 97 percent of the evaluated events. Scientists surmise that, under extreme mechanical tension, an electric charge builds up and rises along these steep fissures all the way to the surface, where it charges molecules of air. In subduction zones, where the continental plates slide under each other, this does not happen, evidently due to the fact that the faults are not steep enough.

The lights remain a puzzle

At the occasion of the devastating earthquake which took place in 2009 in L'Aquila, in Italy, it seems that the lights even made it possible for one of the inhabitants to save his family. The man, according to report of the investigators, brought his family to safety outside the house after he had noticed the lights. "This is one of the rare confirmed reports in which earthquake lights have moved someone to proactive action," says Thériault. "Together with other clues evidencing change prior to seismic activity, earthquake lights could one day be helpful in predicting larger earthquakes."

Torsten Dahm, of the *German Center for Geo Research* in Potsdam (**GFZ**) judges this to be an interesting model for the phenomenon. Still, the presented explanation rests on a database of a mere 65 earthquakes, most of which date back to the time before 1900 and are accordingly poorly documented. "Otherwise the database would be even smaller," says Dahm.

Moreover, the study is unable to explain why lights remain absent in most earthquakes. Such as on the occasion of later quakes in the Swabian Jura: in 1943 and 1978, two more quakes rattled the area, of an intensity similar to that of the Ebingen quake of 1911. No light phenomena were reported on these occasions.

Translated by Anne-Marie de Grazia

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