



The Earth's Fiery Heart

Ring of Fire

The power of a volcano can't be compared to anything else on the earth.

You will never comprehend it.

Carsten Peter, photographer and expert on volcanoes

When we think of the terrestrial globe we are living on, most of the time we have the impression of having a firm and solid sphere of stone under our feet. An illusion: the soils of the earth, the mountains and rocks and the ocean floor – all this is not more than a waferthin crust over a partly liquid, partly doughy and above all very hot core. And even this crust is not a closed, coherent unity but consists of individual plates or floes constantly in motion: they drift towards another or move apart - and sometimes even shove over each other.

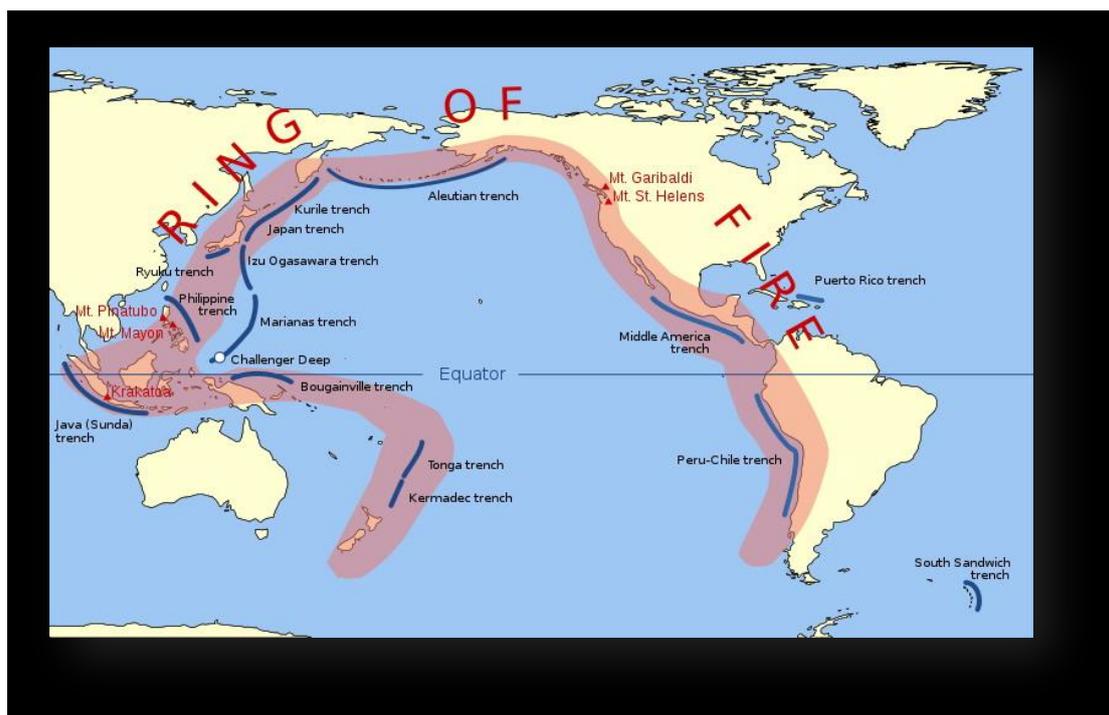
Earthquakes are the result. Every day, our earth shakes in some place – usually, we don't even perceive it or only to a small extent. Not until stronger quakes make us realize the constant movement of the plates of

the earth. And on these spots liquid magma pushes from the core to the surface, the cones of volcanoes rise.

There is one region of the earth especially afflicted by the movements of tectonic plates and therefore, by earthquakes and volcanic activity: the Pacific region. Where the Pacific Plate – the largest of all tectonic plates – touches its neighbors, particularly many oceanic trenches and volcanoes can be found, and the velocity of 10 centimeters per year with which this plate moves towards northwest, contributes to a constant unrest in this area.

On maps, one can easily spot how volcanoes align on the seams of this plate, and although its shape reminds more of a horseshoe, this string of volcanoes is called the Pacific Ring of Fire.

Altogether 452 active or dormant volcanoes are concentrated here – 75% of all volcanoes of the earth. Some 90% of all earthquakes here take place, and 81% of the strongest earthquakes ever can also be located on this region.



Pacific Ring of Fire

The as famous as infamous San Andreas Fault, a latent threat under Californian soil, is a part of it, just as Mount St. Helens. The Tōhoku earthquake on March 11, 2011, resulting in the catastrophe of Fukushima, was due to the Pacific Plate shoving under the North American Plate at the Japanese Trench. With the eruption of Tambora in 1815, the world experienced the most devastating volcanic eruption of modern times and because of the clouds of ash dispersing through the atmosphere, the world saw a year without a summer in

1816. And Krakatoa, playing a major role in the later part of my novel, is also a part of this Pacific Ring of Fire.

In spite of all research, of all technological progress, we still don't know everything about volcanoes and the seismic activity of the earth; predictions are still difficult. And every time the earth shakes, a volcano erupts, we become aware of how unstable and fragile the ground is on which we walk around every day. Just as unstable and fragile like our human existence on this earth that most of the time seems to be so unshakeable and solid but in fact is untameable and wild.



Volcanoes in Indonesia

Night without morning

A chronology of the events around the eruption of Krakatoa on August 27th, 1883

The eruption of Krakatoa is considered the first global event. By means of the new technology of the telegraph, this catastrophe was the first to be known throughout the world, almost in real-time. And in turn, information about things seen and heard could be gathered from all over the world: sounds, changes in air pressure, flood waves, weather phenomenons.

The eruption of Krakatoa constitutes the first comprehensively documented natural disaster in history.



Coast near Merak (Banten, West Java)
after the eruption, 1883

Nevertheless, there are gaps and contradictions in this documentation - in a period having to get along without film cameras, when objects to be photographed still had to be stationary. Especially as the eruption came fully as a surprise and mainly was accompanied by flood waves. And it is all too human that there are contradictions in the accounts of eyewitnesses.

The clouds of smoke ascending from the crater of Perboewatan on early afternoon of August 16th were described as shining white by some observers, as pitch-black however by others. Some people reported feeling crest-

fallen without discernible reason in the hours before the eruption, others experienced at the same time and also seemingly without any reason being in high spirits, almost euphoric.

And for most people, it was an utterly ordinary Sunday, just like all Sundays before.

Some reports from the eruption seem almost incredible: of women giving birth while running for their lives and of one man being carried by a flood wave out of the window, still in his bed, and being washed safely in the same bed onto the peak of a mountain.

Fact or fiction?

There are no means to verify such reports; only the hard scientific facts are reliable with such a catastrophe. And in this case, there aren't too many; partly, because everything occurred so quickly and the destruction by water was enormous.

Those who found themselves right in the middle of it didn't survive; those who escaped only experienced what was happening immediately in front of his eyes - biased by fear and panic, blurred by darkness, smoke and lightning.

As an addition to the events depicted in the novel - not as dry facts, but from the perspective of each character and based on the accounts of eyewitnesses - , here the attempt to reconstruct the events on the southern coast of Sumatra between August 26th and 30th, 1883 - as accurately as scientific and historical research allow.



Pumice stone, hurled on land
by the eruption, 1884

Sunday, August 26th

| | |
|-----------------------------|---|
| 1.00 p.m. | sudden crack of thunder; a white (or black) column of smoke ascends from Perboewatan |
| 2.00 p.m. | noises like from an explosion; the sky darkens (here also the statements diverge: according to reports, it has become deepest night in the course of a few minutes, and yet many eyewitnesses were able to tell what they had been able to observe in the hours afterwards) |
| Afternoon | more crack of thunder and explosion-like sounds; it is raining ash and pum-ice stones |
| 6.30 p.m. | first flood wave hits Ketimbang |
| Between 9.00 and 10.00 p.m. | second flood wave, higher than the first |

Monday, August 27th

| | |
|-------------------------------|---|
| 2.00 a.m. | third flood wave hits Ketimbang and destroys it completely; estimated height of this wave: 40 meters (for comparison: the tsunami of 2004 was 30 meters high) |
| 5.30, 6.44, 8.20 a.m. | the last heavy explosions on the island of Krakatoa |
| Shortly before 10.00 a.m. | loud hissing noise |
| 10.02 a.m. | massive explosion of Perboewatan, a part of Rakata and of two thirds of the island of Krakatoa; up to the present day, the loudest sound ever documented |
| Between 10.15 and 10.30. a.m. | arrival of a pyroclastic flow or surge on the southern coast of Sumatra |

Tuesday, August 28th – Wednesday, August 29th

persistent darkness over Sunda Strait

Thursday, August 30th

first visible sunrise after the eruption; in the evening, the first of countless especially colorful sunsets all over the world, caused by a high density of particles of dust and other substances in the air

A pyroclastic flow consists of boulders and magma, grounded to ash by pressure, leaking together with gases being formed during a volcanic eruption. Such a surge can be imagined like some sort of hurricane consisting of ashes, gases and embers, with temperatures between 300 and 800 degrees Celsius at the eye of this hurricane, moving forward with a velocity of up to 400 kilometers per hour – a phenomenon of an enormous and deadly destructiveness.

Most probably, a pyroclastic flow accompanied the eruption of Mount Vesuvius in 79; also in the eruptions of Tambora in 1815 and of Mount St. Helens in 1980, pyroclastic flows were involved.



Pyroclastic flow of Merapi, Indonesia, 2007

Volcanologists distinguish between pyroclastic flows and surges, differentiated between their respective density and gas content: surges are of lower density and of a higher ratio gas to rock, rather resembling clouds of embers and ash.

From a scientific point of view, there is no proof that a pyroclastic flow or surge hit the coast of Sumatra after the final explosion of Krakatoa.

But based on the accounts of eyewitnesses, one has to come to the conclusion that the slopes of Rajabasa, where the hut of the Beyerincks stood, was hit by such a hurricane of hot ashes and gas – a death-trap for several dozens of people around the house as well as within.

Literature:

Simon Winchester: *Krakatoa. The Day the World Exploded.*
HarperCollins, New York, 2003

Film:

The Last Days of Krakatoa
Docudrama, BBC, 2006

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