



# olelog

What on earth

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## Storegga Tsunami Flooded Doggerland

Sunday, October 3, 2010 6:23:10 PM

[submarine landslides](#), [Sea level change](#), [geology](#), [tsunamis](#), [natural hazards](#)

Dogger Bank is a name I remember from when I was a teenager. It was regularly mentioned in a weather forecast especially for the fishers, broadcasted just before the morning news. Yes, on the radio, we had no TV when I was a teenager, which was back in the 1950's.

Dogger Bank is a large sandbank in a shallow area of the North Sea. It extends over approximately 17,600 km<sup>2</sup>. The water depth ranges from 15-36 m, about 20 m shallower than the surrounding sea. It is a productive fishing bank. The location of the Dogger Bank is marked with a red line in the following satellite image.

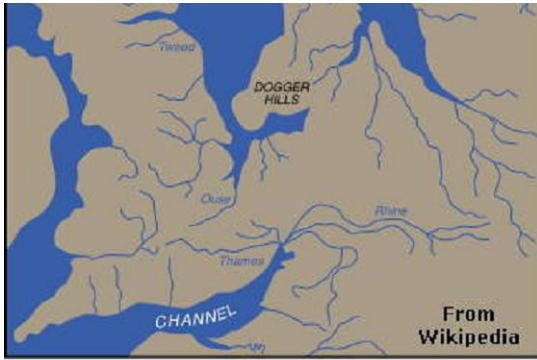


10,000 years ago, which means just after the latest glacial, or in other words the Early Holocene, the Dogger Bank was a range of hills in a land area covering a large part of what is now the southern North Sea. You could walk from Denmark or Germany to England - well you would have to cross a few rivers, of course, as there were no bridges - and archaeologists have documented that the land was populated. The archaeologists have named it "Doggerland". I don't know how appropriate the name Doggerland is considering that "dogge" is an old Dutch word for fishing boat (better related to the fishing bank!). The following map shows the hypothetical extent of Doggerland about 10,000 years ago.

As sea levels rose after the end of the last glacial, and the level of the land sank due to isostatic adjustment after the Scandinavian ice cap had melted, Doggerland became submerged beneath the North Sea, cutting off what was previously the British peninsula from the European mainland around 8500 years ago. The Dogger Bank, which had been an upland area of Doggerland, is believed to have remained as an island until at least 7000 years ago.



I would like to highlight two events with special



impacts on Doggerland.

First the drainage of the large North American glacial lake, Lake Agassiz. The catastrophic meltwater release from Lake Agassiz may have caused an abrupt 0.25-0.5m sea-level jump around 8300 years ago, and triggered the so-called '8200 calBP' cold event around the Atlantic. This would have inundated a large part of Doggerland and furthermore it may have become unusually cold and windy on the remaining coasts of Doggerland.

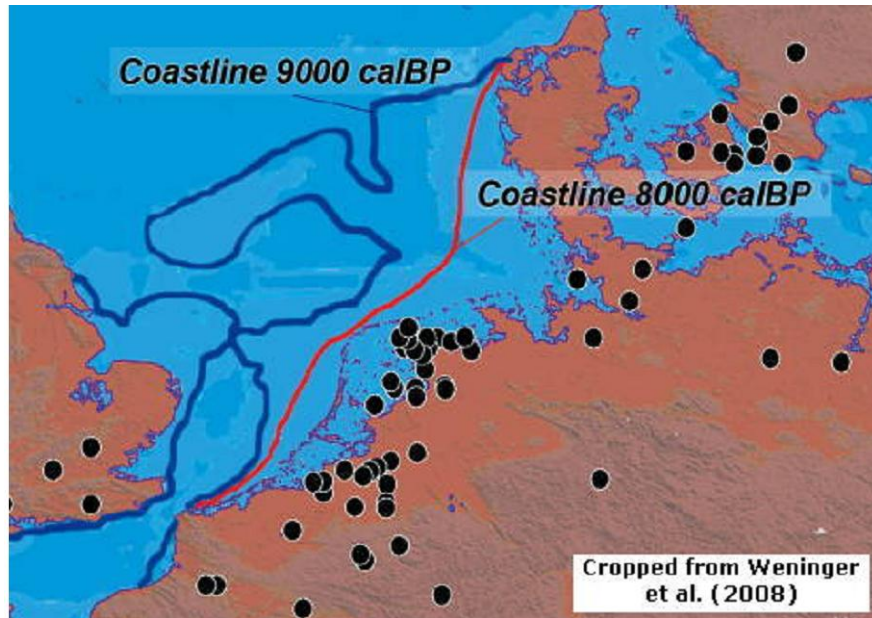
Secondly the Storegga Slide Tsunami about 200 years later or around 8000 years ago, which would have had a catastrophic impact on the contemporary coastal Mesolithic population. Following the Storegga Slide tsunami, it appears, Britain finally became separated from the continent and, in cultural terms, the Mesolithic there goes its own way.



The submarine Storegga landslide off the Norwegian coast is now usually described as three subsequent slides. The second of these generated a tsunami that apparently involved some 2400-3200 km<sup>3</sup> of material that spread across the North Atlantic sea floor, altogether covering an area of around 95 000 km<sup>2</sup>. Traces of this tsunami have been identified in many regions in the North Atlantic, including Scotland, England and Denmark, but it also seems to have propagated as far as to the east coast of Greenland. The slide occurred at a time when the sea level in the southern North Sea stood about 17 m higher than the present level.

As we are talking about a coastal area Doggerland was probably relatively densely populated for that time - I am talking about near 1 inhabitant per km<sup>3</sup>. Maybe some 700 to 3000 individuals were affected. This does not necessarily imply that all were killed immediately, although given the likely rapidity and scale of the event, a significant number of people would almost certainly have been caught and drowned by the rapidly rising waters, while many others would have been displaced. The consequences would not have been limited to the wave's immediate impact, as productive coastal areas could have been devastated, shellfish beds destroyed and covered by sands, together with any fixed fishing facilities, well-attested for the Late Mesolithic period. There are signs that the tsunami probably occurred during late autumn, so that any stored foods meant to last over the winter may also have been lost, with subsequent starvation among survivors. It is conceivable, particularly in the context of continuing rising sea-levels at this time, that the final abandonment of the remaining remnants of Doggerland as a place of permanent habitation by Mesolithic populations was brought about by the Storegga tsunami. Following the Storegga Slide tsunami, it appears, Britain finally became separated from the continent and, in cultural terms, the Mesolithic there goes its own way.

The following map, extensively cropped from Weninger et al. (2008), show the estimated coastlines around 9000 years ago (blue line) and around 8000 years ago (red line).



Just two final remarks:

1. Tsunamis can be extremely dangerous, and may occur in places, where they were never expected.
2. Sea level rise can be an extremely serious problem for coastal and island populations.

I am not selling this as the truth and nothing but the truth, but it does seem to fit rather well with the available data, and that is more or less what science is about - it remains a working hypothesis.

**Note:**

*calBP* is short for calibrated years before present, where present means the year 1950 - calibration converts dates like radiocarbon or other dates to calendar years.

**Main reference:**

Weninger et al.

*The catastrophic final flooding of Doggerland by the Storegga Slide tsunami*

Documenta Praehistorica XXXV (2008)

Freely available online at

<http://sprint.clivar.org/soes/staff/ejr/Rohling-papers/2008-Weninger%20et%20al%20Documenta%20Praehistorica.pdf>

**PS:**

I intend to write something about the third Storegga Slide in a forthcoming [post](#).



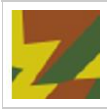
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## Comments



**Doggerland** # Thursday, October 28, 2010 9:40:05 AM

Have a look at a project I'm working on, to mark Doggerland on the contemporary map of Europe. The basic idea is that Doggerland would be mapped as any land that has been reclaimed from the North Sea over the centuries.

There are a few interesting maps of Doggerland on the site. Here is the link - <http://doggerland.net>



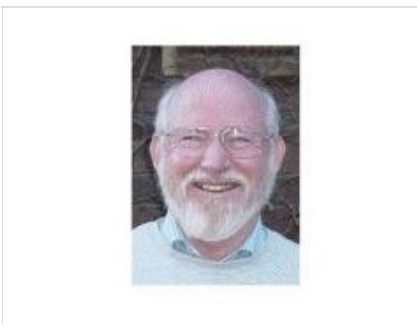
**Ole Nielsen** (nielsol) # Thursday, October 28, 2010 2:34:37 PM

A great site. Thank you!

[Write a comment](#)

New comments have been disabled for this post.

Ole Nielsen



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## About.com Geology

### [Oregon Looks Hard at Its Cascadia Quake](#)

In April 2011, right after the giant Tohoku earthquake in Japan, the Oregon state legislature instructed the Oregon Seismic Safety Policy Advisory Commission to research ways for the state to help cope with a similar quake in Oregon. This week the commission issued its report, called the Oregon ...

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### [How Earthquakes Affect Water](#)

Earthquakes shake the ground, and the effects we typically associate with earthquakes—shaking, liquefaction, landslides—are things that happen to rocks and soil. But there's a whole other set of effects that earthquakes have on streams and groundwater, so I thought I'd write about se ...

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### [First Move, Copernicus](#)

Nowadays, all of us who are taught the history of science learn that Nicolaus Copernicus, in 1543, put the sun at the universe's center and demoted Earth into just another ...[Read Full Post](#)

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### [Why Earth Don't Get No Respect](#)

It's a common complaint among teachers I've talked to, especially at the secondary-school level, that geology is an underdog subject. We all cheered when the state of Texas added an Earth-science requirement to its curriculum a few years ago. That was an exception. Probably the best thing would ...

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### [This Week's Geo-Quiz: Volcanoes](#)

Volcanoes are a favorite of kids, along with large-toothed dinosaurs of course. Most of us

move on to smaller and gentler things, but a hardy few men and women persist and become volcanologists. Those people might get through this Geo-Whiz quiz on the subject of volcanoes, but I'll bet you can't ...

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Isen omkring Nordpolen forsvinder hurtigere, end selv de mest skeptiske...

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Jordskred, som det der onsdag aften rev 400 meter af motorvej E6 og 300 meter...

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## "allgeo" via Chris

### [Southwest Teaser...](#)

I'm back from an awesome week in the Southwest -- Death Valley and Grand Canyon, to be specific. It was a spring break field trip for the Earth Science Department at Syracuse University, and it was a much needed (for me) chance to spend time in the sunshine, under the big skies, at outcrops. I ...

### [Not-so-serious Sunday 39: Bliss on Earth](#)

By Kelly After my enormously successful week on the instrument I discovered I had a lot of rather mindless data reduction to perform. To help pass the time I downloaded a bunch of podcasts produced by Radiolab in New York City. All the podcast tie together a number of loosely related science bas ...

### [Using Photoshop for Stream Table Image](#)

#### [Analysis](#)

Yet another wonderful thing about the color-coded plastic media is the ability to analyze stream features over time. The colors tend to organize themselves into patterns based on where the water is flowing that correspond to areas of erosion, transport, and deposition. My hope is that I can use ...

### [Geo 365: March 16, Day 75: Looking Back](#)

Looking back to the far end of the amphitheater at Fort Rock, you can see that the far, higher-based walls have not been as modified by erosion as much as the cliffs at the "mouth" of the feature. They're above the high stand of the pluvial lake. I've always kind of assumed that the lower mound ...

### [Media hype gets you more citations? Well, it d](#)

...

I loves me some metrics. That's why I'm addicted to this new PLoS ONE paper, published by Trevor Branch at the University of Washington. Also, because Figure 1 is a Wordle: "Word clouds showing the relative frequency of words (A) in Worm et al. [7], (B) in the press release associated with Worm ...

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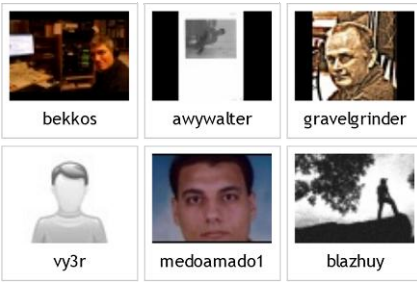
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