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Britain's tsunami: 'It will happen at some point'

What a tsunami hitting London would look like Lionsgate Films

A woodcut of the great surge at the Bristol Channel in 1607 that killed 2,000 people Hulton / Getty

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We think our land is safe from tsunamis, but it is possible that one could hit Britain. We assess the risk

The water arrived as “mighty hills, tumbling one over another”. The churning, foaming, deluge “so dazzled the eyes of the spectators that they imagined it some fog or mist, as if mountains were all on fire. It came with such swiftness, that the fowls of the air could scarcely fly so fast”. In Monmouth, a milkmaid was saved from drowning only when “two lustie strong men” made a boat from a water trough and rescued her. By the time the flood had retreated back into the Bristol Channel, more than 2,000 were dead.

The people of Britain, in 1607, were in no doubt of the provenance of the disaster. It was, in the words of a pamphlet, one of God’s “most Wonderfull and Miraculous workes”. Today’s scientists are more prosaic: it was a huge storm surge. But, in recent years, a more controversial explanation has been mooted. The Bristol Channel disaster, Britain’s worst ever coastal floods, was actually a tsunami.

Earthquakes happen in Britain, but at worst they topple chimney pots. Our largest recorded quake, 6.1 on the Richter scale, had many thousands of times less energy than the one that has struck Japan. Surely tsunamis are something other nations worry about?

Initially, the evidence suggests as much. Of the recorded British tsunamis in the past century, the last one to register a verified height, in 1975, came in at 6cm (2.3in). In 1941, a tide gauge in Cornwall recorded a monster 20cm. And even if the Bristol Channel floods were a tsunami — caused, proponents argue, by a vast underwater landslide in the Irish Sea — it must, surely, have been a freak event. Go back farther, however, and the historical record tells a more nuanced story. While Britain may be in one of the least seismically active parts of the world, you don’t need to be close to an earthquake to suffer its effects. The 2004 Boxing Day tsunami killed more than 30,000 people in Sri Lanka, despite the earthquake being 1,500 miles away.

In 1755, a magnitude 8.7 earthquake devastated Lisbon: the first Britain learnt of it was the 50mph tsunami wave that, historical sources claim, caused “great loss of life and property upon the coasts of Cornwall” .

This, says Professor Simon Haslett, of the University of Wales, gives us an idea of the most likely source of any future large tsunamis to hit the UK. “The biggest risk we have is a repeat of the Lisbon event,” he says. “The Gibraltar-Azores faultline is quite active.”

How would Britain cope with a repetition today? Would our young men, lusty or otherwise, pull together? Given the improvements in coastal defences, would they need to? Alternatively, since one of the biggest changes in our coastline is that it is now ringed by nuclear power plants, could the situation prove even more treacherous?

The Environment Agency plans for severe flooding, protecting our cities from events that it considers to have a 1 in 1,000-year probability. It does not, though, have any specific tsunami plans. Before asking how we would cope with tsunamis, it is perhaps more appropriate to ask whether those that have reached our shores are one-off calamities, 1 in 1,000-year curiosities, or once-a-century disasters.

As far as Haslett is concerned, an earthquake off Portugal is still just one of several potential triggers for future tsunamis — perhaps the most insidious of which is a landslide in the Irish Sea. “We don’t have any tsunami warning systems along the European Atlantic coastline,” he says. “If there is an earthquake, we will know about the wave before it arrives. If it is something like 1607, which I believe was due to an undersea landslide, we won’t know until it hits. Landslides can be totally silent.”

To him, the history of the past millennium provides ample cause for, if not panic, then concern. “One of the most startling tsunamis was in April 1885,” he says. “From newspaper reports, a 5.5 magnitude earthquake caused a tsunami in the Colne estuary, Essex. In London the same event created a wave that propagated up the Thames a metre high. It proves the principle — nowhere is immune.” And what was the result?

“A vessel rolled heavily,” Haslett says, “without any apparent cause.” As a tsunami expert in the UK, you take your drama where you can get it. However, if we are seeking proof of principle — that a tsunami of the kind that battered Japan is possible here — then it comes from Norway. Twenty-five years ago Professor David Smith, of the University of Oxford, hit upon the significance of the mysterious layer of sand found beneath peat bogs all along the Scottish coast. “If you look at photographs of the tsunami in Japan, you can see that the water is black,” he says. “That’s the sediment it is carrying.” It was that same process, he realised, that had deposited Scotland’s prehistoric sand layer. And the cause, 8,000 years ago, was a vast chunk — 20,000 cubic km — of Norway slipping into the sea.

“The energy involved was enormous,” he says. “In some places the water could have run up to 20m.” The most popular theory to explain what happened was that it was a consequence of the end of the Ice Age. “With the glaciers in full retreat, the land was rising upwards. That would have caused earthquakes.”

Does this have any relevance today? Such a wave would have horrific effects on Scotland’s coastal towns and cities. Fortunately, Scandinavia is looking stable. Unfortunately, the same cannot be said of all the Atlantic’s landmasses. “We don’t know when it will go,” Professor Bill McGuire, of University College London, warns. “But it will happen at some point.” McGuire is talking about the Cumbre Vieja volcano on La Palma, in the Canary Islands. It has the potential to be one of the largest landslides in history: 3,000 cubic km of volcano biding its time, waiting to fall into the sea. When it does fall all that separates it and the UK is sea. “In the worst scenario we’d be looking at waves of six to seven metres hitting the south coast,” McGuire says.

The threat from the Canaries is serious enough for the US to set up tsunami early-warning systems on its Atlantic coast, to complement those facing the Pacific. The UK has taken a different approach. Alison Baptiste is the national coastal manager for the Environment Agency, and it is her job to protect against and prioritise threats to the UK coastal defences. Her primary concern is storm surges, when low pressure systems cause the water level to rise. “Our system, Flood Warnings Direct, phones and texts a million people in the UK to warn of flooding. We would use that: we don’t call it a tsunami warning system.”

Last week, Baptiste was part of a major operation called Exercise Watermark when, in collaboration with emergency services, the Environment Agency modelled the effect of a 3m storm surge — a height that corresponds to many of the reasonable upper estimates of what Britain could face from a tsunami.

One aspect of concern during the exercise, she says, was national infrastructure, including nuclear power stations. “During the 2007 floods, an electricity substation was very nearly submerged, which would have caused a big outage. That brought it home that we have to look at infrastructure, and the utilities companies are very aware of the need to have contingencies.”

There is a particular problem with nuclear power stations: because they need a lot of coolant water, they are all on the coast. “It is a difficulty,” Baptiste says. “They are covered to at least the level of a 1 in 1,000-year flood though. If that happened, Sizewell, for instance, would become an island — dry, but surrounded on all sides.”

So is that it? Do we have no need to worry about the risks of a catastrophic tsunami on the scale of that in Japan? Are our cities safe from that great destructive tide that a thousand home videos have shown in the past few days sweeping cars and homes in its path? Not quite. There is one threat against which

tide defences would be powerless. McGuire's professional speciality is how climate change is linked to geological hazards and, when it comes to tsunamis, this means only one thing: Greenland.

"The ice sheet is several kilometres thick," he says. "It pushes the crust down so far that the central part of Greenland is below sea level. If we see a rapid break-up of the ice sheet due to climate change, it will bounce back. Then we could see a landslide pushing tsunamis on to our coasts."

Does he consider the threat severe enough to start bolstering our defences? "No, it's not something I would spend money on. But I would spend money on cutting emissions. If we tackle climate change, we won't have to bother with Greenland's ice sheet."

"Mind you," he adds. "I live 800ft up in the Peak District. So I'm fairly safe."

We can survive — if we help each other

The worst disasters are, by definition, unpredictable, yet we all want to be protected from their devastating effects. Government policy, however, works on the assumption that such catastrophes just won't happen.

When we don't have a recent example of a calamity, we underestimate the probability of it happening. Thus we're very bad at dealing with high-impact, low-probability problems.

What we should be aiming for in Britain is building a resilient society, one capable of handling disruption. A crucial part of this is having a good civil society. In disasters more people are saved medically by neighbours than by doctors. There are also practical policies we can apply in Britain's case, which might include flood protections around the coast, or building sea walls to deal with the eventual effects of climate change.

But you also need to have a defence inside the system, in case that sea wall gets breached. Networks are important in this respect: it's vital to make sure that people can communicate in a crisis. It is also a good idea to decentralise energy sources to localised forms such as hydrogen and solar power, rather than having a power grid that relies solely on one or two power stations.

In comparing Japan with the Chernobyl disaster there is one big difference. During Chernobyl vital information about the sources was not discovered for days; now it happens in minutes. This communication infrastructure enables us to react quickly, exchange solutions and set up trust. The real problem in a disaster is that people don't trust the authorities. A largely wireless form of communication has been a positive step in this regard.

Ultimately, we will always underinvest in these kinds of disasters. This gets to the real problem of our rationality. In fast-moving economies, you'll always have pressure to allocate resources to urgent areas. Taxpayers would rather see their money directed towards preventing traffic accidents than an asteroid strike.
Dr Anders Sandberg,* James Martin Research Fellow, University of Oxford and Oxford Martin School, was talking to *Stephen Hussey

Taken from the The Times