The Tsunami That Wasn't

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We recently wrote about the snowstorm that "never happened" in New England. The predictions were for substantial snow, but those predictions proved wrong and only rain or very light snow occurred in much of the region. The perspective of the meteorologists in the area was, "sorry we missed it – these things happen." The previous note discussed how a deviation in track of a few miles – not that big a mistake – could create substantially different outcomes on the ground where it matters to people (stakeholders, if you will).

Now we have just had a major earthquake, 8.8 on the Richter scale, in Chile. This is among the biggest earthquakes recorded in history. One of the after-effects of earthquakes can be the development of devastating tsunamis, which can wreak havoc around the globe, thousands of miles away. With an earthquake this large, there was real concern about what might happen in the Pacific basin, including places like Guam, the state of Hawaii, and even Japan. The authorities made predictions of a substantial tsunami but, in a similar outcome to the New England snowstorm, those very strong tsunamis did not develop; rather, much more modest waves were felt, creating virtually no problems in the affected communities.

What was different here were the comments of the scientists who had made the tsunami prediction. They expressed regret for the "false alarm," but went on to say they now understood why that tsunami was less intense than predicted and they were going to "change their models" of tsunami behavior and expected to do better in the future. I heard no such commentaries from the meteorologists in the Boston situation—they regretted the poor prediction but didn't talk about what they had learned and how they would try to do better in the future, although I grant I could have missed it.

These different reactions may reflect the state of the art of prediction in these two domains. Perhaps with tsunamis we are still learning at a fundamental level what drives the intensity of the tsunami, while perhaps in the case of snowstorms our models have reached the point where more instantiations will do very little to allow us to make better predictions. One could say (maybe) that in the case of snowstorms, we have reached the point of "irreducible uncertainty". It would be interesting to ask some domain experts in the two fields.

I imagine in the case both of snowstorms and the tsunamis that the predictors are risk-averse. They would rather make predictions that are too severe, allowing people to prepare for the worst, as opposed to missing on the low side with the snowstorm and tsunami being bigger than the predictions.

Another point on tsunamis: I wonder when we first hypothesized the relationship between tsunamis and earthquakes and were able to empirically link a particular earthquake with a

corresponding tsunami. One can have "local" tsunamis, in the vicinity of the earthquake; this happened in the Chile earthquake. So we have known that for some time.

But what about a tsunami occurring at a substantial distance from the earthquake? In 2010, we are able to pass on tsunami warnings in real-time around the globe when an earthquake happens. 200 years ago, the warning would have been impossible, and even the linking of an earthquake in Chile to a tsunami in Japan, after the fact, would have been quite difficult given the period of time between an earthquake in Chile and news of the earthquake reaching Japan – on the scale perhaps of months after a tsunami generated by that earthquake had occurred. Someone would have had to "remember" a tsunami occurred in Japan some hours later than the earthquake occurred back in Chile. Just a thought.

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