





**DETERMINISTIC VS. PROBABILISTIC MODELING** A Resilient Future: Science and Technology for Disaster Risk Reduction Hi, in this additional material video, Professor David Bresch will explain the difference between deterministic and probabilistic modeling. Yeah--when we talk about natural catastrophe modeling That's an extremely fuzzy thing. I often say, as soon as you take the back of an envelope and put a number down, that's a model. It starts even earlier, when I talk about risk, I try to build a shared mental model with the audience to say, think about hurricanes, think about people on the ground. Think about how they might react to it. That's your idea model of how a hurricane hits an exposed coastal population. And now what you do in modeling is basically, just making that more rigorous. Instead of saying, think about the hurricane, you put down a footprint on a hurricane, on a map. And instead of thinking about people being somewhere, you say, 'That's exactly the coordinate, where these houses are. That's exactly the coordinate of the school building. That's exactly the coordinate of the road connecting them.' So you build the model by basically putting things more precisely in context.

Notes

Summary

0m 00s





And so you can use these models in a deterministic sense, that you could use them as they're often used, for example, in warning application, that you would take a protected path of a hurricane, put it in such a model and say, 'Ah-ha! If the storm comes along that way, these are the people that will be affected and that's how strongly they will be affected.' So that's a deterministic way of using such a model is by putting one single event in. It can also be a historic event, you can also replay say Cyclone Sidr in Bangladesh and see what would happen if that historic storm happened again today. That would still be a deterministic application of a model. Now, since luckily we haven't seen all the bad things happening, but we should be better prepared, very likely. We can use these models also in a probabilistic sense. Probabilistic in the sense to say, What else could happen to a place? Do we really exactly understand where people are? Do we exactly understand how they fare in case of an event? And you can start to play with the parameters in your model. And you can also ask the question, What would happen if the storm comes from another direction?

Notes

Summary

1m 13s







And so you can build a probabilistic set of storms; you can build a lot of artificial storms-- these are physically consistent events, so they're not impossible to happen but luckily we haven't seen them-- and you can play it all through, but now not for a historic event or for single event, for many thousandths of possible manifestations of nature you could say. And therefore, you can test all your risk management options, not only against the past or against a specific single prediction, you can also test your specific options, for example, is it worth to, for example, evacuate earlier, five days early, is that better or worse? Hard to say if you only compare with one event. But in such a model, you can play through all the thousands of possible storms that could hit that coastal stretch. You probably would learn, 'Ah-ha, if you're able to warn a day earlier, you can save so many more lives.' And so you can use these probabilistic models to, in essence, play through many kind of possible future outcomes and therefore you have an ability to play through your options and therefore you have the option to get better at understanding your options, and ultimately, it can help you in decision-making: in a sense, Should I now really implement that option or not?

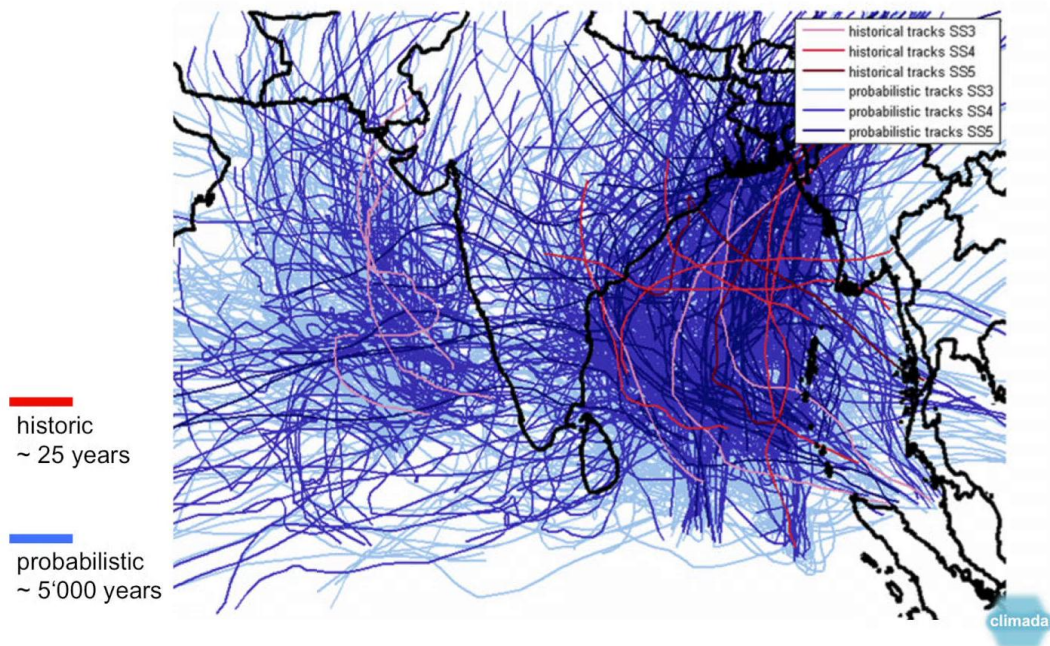
Notes

Summary

2m 24s



## Tropical cyclones in the Indian Ocean



Because I would know cost and benefit much better that way. In order to illustrate the difference between a deterministic and a probabilistic model, the easiest way is to look at the situation in the North Indian Ocean, where you have only a few storms recorded in consistent way in the past-- these few red lines there and that's good enough to get the first impression.

Notes

Summary



3m 45s



It's good enough to figure where there might be people at risk. But it's not good enough to do a proper modeling of risk in a higher spatial and temporal resolution. And that's why when you then build a probabilistic model, you try to generate artificial storms that are physically consistent, and these are all the black spaghettis or dark blue spaghettis, which fill all the gaps. And they basically happen over a timescale of over five thousand years. Not in the future, but more to say, would we repeat next year, five thousand times, then if we would put it all on the same map, it would look that dark blue. So it's not to say the probabilistic storm has more frequency than an historic storm. It's more one way to render the-- you could say the coverage of a probabilistic model on a single slide.

Notes

Summary

4m 10s



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(1) Prof. David Bresch

	Notes

Summary



5m 01s