



## Flavours of Uncertainty

Uncertainty comes in different flavours – few imply we have no knowledge at all. This exhibit deals with two important flavours of uncertainty.

### Probability

Sometimes we don't know exactly what will happen, but we do have probabilities to work with. Like when you roll a dice – there is a normal probability of one chance in six for any number you choose.

The uncertainties can be very large – but the probabilities enable us to decide how much risk we are willing to take. How much would you bet on rolling a 5 on a dice? Or a 1? Or an 8?

### Ambiguity

Here, we don't have probabilities for different outcomes. If you were rolling dice with a cheat, you might expect the dice to be loaded, so one number would come up more often. But unless you roll the dice lots of times, you can't know the probabilities so it is hard to bet confidently.

The problem is that for some ambiguous systems, like the climate under climate change, we only get one roll of the dice.

Even with ambiguity, we can have knowledge of what is possible and what is not – sometimes we even know that some things are more likely than others. With a loaded dice, we can be certain that we can only roll a number that is shown on the dice – a good look at its sides tells us how the possibilities are limited.

## Uncertainty and Confidence in Climate Predictions

Climate change predictions are ambiguous. We don't know any exact outcomes, or how probable any individual outcome might be. But we do know that humanity's greenhouse gas emissions are leading to global warming and will carry on doing so – and that this will cause serious problems.

### Confidence from Physical Understanding

We also know a few more things, such as that land is likely to warm up faster than sea, because of their physical properties - their heat capacities.

### Confidence from Models?

All our climate models show that the Mediterranean region might have a greater increase in its summer temperatures than the average global change. Should we trust this?

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