

Re: a simple(?) probability question...

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- *From:* "Joe" <jconcordia@xxxxxxxxxxxx>
  - *Date:* 29 Jan 2007 09:29:36 -0800
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On Jan 28, 9:52 pm, matt271829-n...@xxxxxxxxxxxx wrote:

[Google is very flaky right now. I apologise if this appears more than once.]

On Jan 28, 11:19 pm, "Joe" <jconcor...@xxxxxxxxxxxx> wrote:

[snip]

My point is this. Do not assign probability of 1.0 or 0.0 to anything, since nothing in nature is absolutely certain nor absolutely uncertain. What does "absolutely uncertain" mean? Did you mean to say "absolutely

impossible"?

These numbers are artifacts in arithmetic formulae. When I said the storm will occur in 100 years, it should not be interpreted that I meant it was impossible to not occur in that time, or that it must occur only once. You've lost me. At one point you claimed that a hundred-year storm

will certainly occur in 100 years. Various people, including me, said that this was wrong. Now you say that a probability of 1 (certainty) should not be assigned to any event in nature, presumably with particular reference to the hundred-year storm allegedly certainly occurring in 100 years. For a moment that seemed like progress, but you then go on to imply that you still think the storm "will occur in 100 years", but that this somehow doesn't mean that it's impossible for the storm not to occur. This makes no sense to me.

Perhaps my language is too imprecise for the discipline of statistical analysis. I agree your statement that the 100 year storm is "likely" to occur is a more appropriate way to state it. I hope I never said

Re: a simple(?) probability question...

anything that vague.

However

if the probability for an event is very high could you accept the notion that it is "virtually certain" and speak of it as if it actually will occur, and likewise if the probability is very low you can speak of it as "virtually impossible". Yes, if I drop a book then it is "virtually certain" that it will fall

to the floor. It is "virtually impossible" that it will turn into a bird and fly away.

The line of discussion for many of these posts following my first comments have been a distraction.

My comments in this dialogue have been directed at whether the Poisson distribution is or is not appropriate to estimate the likelihood of a 100 year storm in an element of time. My contention is that it is not. That is really the whole point of my posts, not a discourse on calculating probabilities using various probability functions. I note that you may feel that a binomial distribution may be a better fit. It would be interesting to hear more commentary on the applicability of the Poisson distribution to the original 100 year storm question.

The 100 year storm is a rare and unique event. "Unique" means happening only once (ever). A hundred-year storm may be

rare, but it is presumed not to be unique.

That is what I mean

when I say it is a discrete event. The fact that an event is discrete has nothing to do with its rarity

or uniqueness.

The process is not a continuous one, it is "discontinuous". The process of 100 year storms has no characteristics like those usually analysed by using the Poisson function. There is no flowing stream of events to be enumerated, there is one occurrence in the time domain of concern. Not true. A hundred-year storm may occur zero, one or many times

Re: a simple(?) probability question...

within the time domain (i.e. interval) of concern, \*provided\* that the interval is of sufficient length for it to be meaningful to experience two separate storms. The potential downside of the Poisson model is that it assumes that in any given time interval, \*however short\*, there may be multiple instances of the event. This is not plausible for storms. If this is the point you have in mind with your talk of discrete, continuous and "flowing streams" then I agree. Otherwise I have no idea what you are talking about.

In contrast to the Poisson model, the binomial method discretises time and says that in each successive fixed-length time interval the event will either happen (once) or it won't (with some stated probability). For example, if a time interval of one day is chosen then every day the storm either happens or it doesn't. The storm may not happen more than once on any given day, but it may happen on successive days. The conceptual downside here is that a storm doesn't happen at a particular instant, and if, say, a single storm stretches from one day into the next it may not make much sense to state that it happens on one day but not the other.

The Poisson model is equivalent to a binomial model with an "infinitely small" time interval. The difference between the results obtained from a Poisson model and a binomial model with a granularity of, say, one day are tiny for the question originally posed.

Both the binomial and Poisson models are perfectly capable of modelling rare events – as rare as you like. In these models there is \*no qualitative difference whatsoever\* between extremely common events and extremely rare events.

My point about virtually certain or virtually impossible when applied to the 100 year storm is that it is virtually certain that one will occur, it is virtually impossible that the storm would occur "many" times in the 100 years. We are not just talking about a big storm when we say 100 years storm. We are talking about a storm intensity that in the prior 100 years only happened one time. Somehow the assignment of a 1/100 probability to this leads to the notion that such storms can be "frequent" events.

Re: a simple(?) probability question...