

## Re: Meteoric and Cometary impacts in historical times – Hard Evidence

**Source:** <http://sci.tech–archive.net/Archive/sci.archaeology/2004–10/1307.html>

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**From:** Eric Stevens (*eric.stevens\_at\_sum.co.nz*)

**Date:** 10/22/04

Date: Fri, 22 Oct 2004 20:24:07 +1300

On Fri, 22 Oct 2004 01:50:31 GMT, Joe Jefferson  
<jjstrshp@mindspring.com> wrote:

>Eric Stevens wrote:

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>> On Thu, 21 Oct 2004 23:39:38 GMT, Joe Jefferson

>> <jjstrshp@mindspring.com> wrote:

>> >

>> >Eric Stevens wrote:

>> >>

>> >> On Wed, 20 Oct 2004 17:20:05 GMT, Joe Jefferson

>> >> <jjstrshp@mindspring.com> wrote:

>> >>

>> >> >Jim Webster wrote:

>> >> >>

>> >> >> plenty of events, but they have very little effect.

>> >> >> Perfectly happy to say that these things were comparatively regular, but it

>> >> >> is very difficult to find any of these impacts that have any effects on

>> >> >> populations that would be noticeable from outside.

>> >> >

>> >> >According to the FAQ page for the American Meteor Society at

>> >> ><http://www.amsmeteors.org/fireball/faqf.html> there are several thousand

>> >> >meteors large enough to form fireballs entering Earth's atmosphere every

>> >> >DAY, with somewhere between 10 and 50 of them being large enough for the

>> >> >object to actually reach the surface. There's no question that these

>> >> >things happen in large numbers, and that people see them (I've seen a

>> >> >daylight fireball myself), but they don't have any noticeable effect on

>> >> >the society. These small meteors may be of interest to astronomers, or

>> >> >even possibly to geologists, but they don't really have much to do with

>> >> >either history or archaeology.

>> >>

>> >> Its not that so much, its the fact that they don't really \*seem\* to

>> >> have much to do with either history or archaeology. This is the problem

>> >> because statistically they should do.

>> >

>> >Why do you say they should? It would help me understand your objection

>> >if you would "show the math" so to speak. How many impacts of historical  
>> >significance do you say there should have been, and how did you come up  
>> >with that number?

>>

>> I didn't come up with the number but if you follow the link to figure

>> 1–1. Asteroid Size/Impact vs. Frequency from the site

>> <http://www.au.af.mil/au/2025/volume3/chap16/v3c16-1.htm> you will end

>> up with

>> <http://www.au.af.mil/au/2025/volume3/chap16/v3c16-1.htm#figure%201-1>

>>

>> Alternatively, if you go to

>> <http://www.spaceguardindia.com/Impact.html> you will find an almost

>> illegible graph which gives much the the same information.

>

>I've seen those before. NASA has a very similar one on their web site.

>But that doesn't answer my question.

>

>> As to how many, it depends upon the size range you have in mind.

>

>What size do you have in mind? You're the one who suggested that there's

>a problem.

>

>> It

>> certainly appears as though there should have been a Tunguska size

>> impact about once every century with even more of smaller bolides.

>

>Okay, we'll take your figure of once a century. That's within the same

>degree of magnitude as the figure I've seen. Going back to the NASA web

>site, I see that the explosion flattened trees within about a 40km

>radius, so call it 5,026 square kilometers. According to my home atlas,

>the total surface of the Earth is 512,175,090 square kilometers. So the

>critical missing factors are, first the average percentage of the

>Earth's total surface that was inhabited during the time period you're

>interested in, and second the percentage of those inhabited regions

>about which we know enough to be able to tell whether or not they were

>affected by an impact event. My gut feeling is that neither of these is

>very large for most of human history, but it's not my gut that matters

>here. What percentages were you using when you concluded that

>statistically there should have been more significant impacts than

>archaeologists and/or historians have believed?

I think you are trying to oversimplify the problem. Lets use the figure 1–1 I referred to above. If we assume the smallest noticeable impact is a mere (?) 10 kilotons (I mean most people would notice a 10 kiloton explosion in their neighborhood) you read from the graph that there should be about 8 to 10 per year. That is say 27,000 in the last three millennium. If you go to the say 100 kilotons you get about one every 3 years. Say 1000 in the last 3000 years. At the 1 megaton level we get an impact about once a decade. Say 300 in the last 3000 years. Tunguska is about once per century – say 30 in the last 3000 years.

What I have done is so crude that it doesn't even amount to Simpson's rule but if you integrate the probability curve between the 10 kiloton and Tunguska range you end up with (have a guess) 60,000 impacts in the last 3000 years.

Not all of them are going to do damage and it depends upon whether they are predominantly icy, rocky, or iron. This will determine whether they will end up as an air blast (Tunguska), a shower of stones (China 500 years ago) or a hole in the ground. But leaving that out, if the impacts are evenly distributed (which they will not be) it gives rise to one impact per 8536 sq km. In terms of circular area, that is one impact per 100 km diameter circle. Now, if the blast area covers only a 20 km radius (one quarter of the area of Tunguska), that means that 4% of the earth's surface has been within the blast zone of an impact within the last 3000 years.

In fact the affected area is much larger than that in which trees are laid flat. It is likely that on average every one of those 100 km diameter circles will have contained an impact sufficiently close to the people (if any) living there to make them realise that something rather drastic has happened.

My suspicion is that most people would have so little understanding of what had happened that they could not describe it in terms which are comprehensible today. In fact, because the ideas of such disasters are beyond the knowledge of most of us, I strongly suspect that some of their stories have come down to us even today in a form which we presently cannot readily recognise. The question is whether or not some of the physical evidence is unrecognisable to us for much the same reason.

By the way, talking of disasters, would you care to have a crack at the etymology of 'disaster'? :-)

Eric Stevens