Re: Meteoric and Cometary impacts in historical times − Hard Evidence

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From: Joe Jefferson (*jjstrshp_at_mindspring.com*)
Date: 10/25/04

Date: Mon, 25 Oct 2004 17:02:27 GMT

Eric Stevens wrote:
>
> On Fri, 22 Oct 2004 19:20:44 GMT, Joe Jefferson
> <jjstrshp@mindspring.com> wrote:
>
> >Eric Stevens wrote:
> >>
> >> On Fri, 22 Oct 2004 01:50:31 GMT, Joe Jefferson
> >> <jjstrshp@mindspring.com> wrote:
> >>
> >> >Eric Stevens wrote:
> >> >>
> >> >> 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.

> >
> >*People might notice a bolide of that size, but it wouldn't be likely to*
> >*have much of an effect on their lives.*
>
> *Don't forget we are talking about >10 kilotons. Most people would tend*
> *to be affected by an explosion of that magnitude in thei vicinity.*

Yes. An explosion of 10 kilotons that takes place many kilometers high
in the atmosphere. The damage radius never even comes close to the
Earth's surface.

> >*They'd see a bright flash high up*
> >*in the air, or if they happened to be looking in just the right*
> >*direction they might see a fireball cross the sky and disappear in a*
> >*bright flash. Maybe, MAYBE, something nearby might be hit be a small*
> >*piece of debris. In the modern era there might be a story about it in*
> >*the local newspaper. As you said, these events occur fairly commonly.*
> >*They do not do anything that could be considered historically significant.*
> >
> >> *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.*
> >
> >*Your numbers are too high by a factor of three, probably because the*
> >*chart you're looking at is poorly designed. Try the NASA diagram at*
> >*http://liftoff.msfc.nasa.gov/academy/space/solarsystem/meteors/ImpactHazard.html*
> >*and the trend is much clearer. For every tenfold increase in explosive*
> >*power, there is a tenfold decrease in frequency, starting with a 10 kt*
> >*blast about once a year.*
>
> *Thats a good page but its 4 years old.*

The page you posted was 8 years old.

> *The estimate of the number of*
> *potential impactors has increased exponentially since then. Right now*
> *they are arguing about whether there is even a larger number of*
> *virtually indetectable dark bodies out there which will increase the*
> *numbers even again. This question won't really be answered until after*
> *NASA launches its orbiting infrared telescope called the Wide−field*
> *Infrared Survey Explorer (WISE) in 2008.*

A first approximation of the answer can be had be counting the number of
impacts large enough to do significant damage within the past 50 years −
the time frame in which large meteors hitting anywhere in the northern
hemisphere should have been detected by the radar networks set up to
detect nuclear missiles.

> >> 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.
> >
> >Integration is the wrong procedure. You can't treat these numbers as a
> >continuum; that's just an artifact in the charts to make the trend more
> >obvious.
>
> That's why I didn't. But it was late at night and I didn't feel up to
> the effort of delving into the underlying probability distribution to
> enable a proper analysis. Another reason is that current theory
> predicts that these things come in bursts and that impact events were
> much more common in the past than they are now.
>
> >(The observed frequency of events similar in size to Tunguska
> >over the past century should make this very obvious.) You'll get a much
> >better approximation by turning the chart into a histogram with the bars
> >each covering a factor of ten, then simply adding together the ones big
> >enough to be interesting.
>
> In effect, that's what I did.

Even treating it as a histogram is not correct, as I realized only after
I posted the above. Just read the number off the graph as the total
frequence of all impacts of that size or larger.

> >> 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.
> >
> >You're enormously overestimating the average blast radius. For anything
> >less that a 1 megaton event, the blast radius at the Earth's surface is
> >likely to be zero; the explosion occurs so high in the atmosphere that
> >the blast doesn't reach the surface at all. Remember that we do have
> >pretty good data on damage caused by meteor impacts for at least the
> >past 100 years, and any estimate of past effects needs to take that into account.
>
> http://nai.arc.nasa.gov/impact/news_detail.cfm?ID=137 suggests the
> lower limit is 2 Mtons. Maybe, I should have not picked the 10 Ktons
> that I used originally. I plead lack of sleep. :−)

Great! Now we've got a starting point. The NASA chart indicates an
impact of that magnitude about once every 50 years. Since you say that

the estimated frequency has increased recently, lets say instead that an event this size or larger happens about every decade. So in the past 3000 years we should expect there have been about 300 such impacts, of which 29.3% hit on land and about 7.0% of the ones that hit land would have been in Europe (to pick the continent with the best documented history available in a language I read). So 300 x 0.293 x 0.07 = 6.153. So figure about 6 in Europe in the past 3000 years. Does that sound about right to you?

Chiemgau is one − and a damned impressive one at that. (Possibly the largest impact on Earth, and almost certainly the largest on land since the appearance of genus Homo.) So we're looking for about five more, keeping in mind that at least some of those are likely to have been in parts of Europe (like Chiemgau) that were still pre−literate.

> >> 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.
> >
> >What do you base that suspicion on? Ancient peoples were able to
> >describe volcanoes as big fiery explosions coming from the ground. Why
> >do they think they couldn't just as easily describe a big fiery
> >explosion in the sky?
>
> I think they did, but they had nothing in their cosmology to explain
> such events. Instead they come down to us as, for example, 'Jupiter's
> bolts' (changed in later translations to Jupiter's lightning bolts).
> How do you think they would describe a repeated bombardment of up to
> Tunguska size events? What about:

A *repeated* bombardment of Tunguska size events? As in more than one being visible from a single place within a human lifetime? I don't believe there's any evidence something like that has happened since the very earliest days of the solar system.

> ... and the infinite great sea
> moaned terribly
> and the earth crashed aloud,
> and the wide sky resounded
> as it was shaken, and tall Olympos rocked
> on its bases
> in the fan of the wind of the immortals,
> and a strong shudder drove deep
> into gloomy Tartaros under the suddenness
> of the footrush
> and the quenchless crashing of their feet

> and their powerful missiles.
> So either against either they threw
> their re−echoing weapons
> and the noise of either side outcrying
> went up to the starry
> heaven as with great war crying
> they drove at each other.
> Now Zeus no longer held in his strength,
> but here his heart filled
> deep with fury, and now he showed
> his violence entire
> and indiscriminately. Out of the sky
> and off Olympos
> he moved flashing his fires incessantly,
> and the thunderbolts,*
> the crashing of them and the blaze
> together came flying, one after
> and spinning whirls of inhuman
> flame, and with it the earth,
> the giver of life, cried out
> aloud as she burned, and the vast forests
> in the fire screamed....
>
> The wonderful conflagration crushed Chaos, (line 700)
> and to the eyes' seeing
> and ears' hearing the clamor of it,
> it absolutely
> would have seemed as if Earth
> and the wide Heaven above her
> had collided, for such would have been
> as Earth wrecked and the sky came piling down
> on top of her,
> so vast was the crash heard
> as the gods collided in battle.
> The winds brought on with their roaring
> a quake of the earth and dust storm,
> with thunder and with lightning,
> and the blazing thunderbolt,*
> the weapons thrown by great Zeus,
> and they carried the clamor
> and outcry between the hosts opposed,
> and a horrible tumult
> of grisly battle uprose,
> and both sides showed power in the fighting.

Very poetic, but how does this compare to the total body of Greek religious texts from that era?

I'm reminded of a time years ago when I saw a book that claimed two gold artifacts from Colombia represented an airplane and a piece of earth moving equipment. And I'll admit, they looked that way to me too.

However, shortly afterward I happened to find a big book filled with pictures of hundreds of different gold artifacts from Colombia and Panama. After spending about two hours looking at those pictures I went back to the original book, and suddenly the artifacts looked to me very much like a manta ray and a jaguar. The difference was that I had become more accustomed to the artistic conventions of that time and place.

*> * A more accurate translation may just be 'bolt'.*

Based on what, exactly?

> Have you ever heard 'the vast forests in the fire screamed....'?
> They do just that as all the trees flash into flame at the same
> instant. Its a terrifying sound if you are anywhere near when that
> occurs.
>
> What do you think the author was talking about?

When in doubt, begin with the obvious. Hesiod was describing the origin of the gods. It's certainly possible that his description was influenced by something he had actually seen, but nowhere does he himself claim that it was. (And I think we are entitled to doubt that anybody has ever seen all the trees around them in a forest literally "flash into flame at the same instant" and survive to tell us about it.)

> Hesiod's Theogony by the way. 8th century BC.

So are you saying that there was an impact event in 8th century Greece? Do you have any other evidence?

> >> By the way, talking of disasters, would you care to have a crack at
> >> the etymology of 'disaster'? :−)
> >
> >It comes from Greek astrology by way of Latin; loosely meaning "opposed
> >by the stars". It can be compared with Shakespeare's "star−crossed lovers".
>
> Try 'dis' = evil, and 'aster' = star.

Where do you get dis = evil? The references I checked have it as 'apart' or 'asunder', or simply as a prefix signifying reversal.

−−
Joe of Castle Jefferson
http://www.mindspring.com/~jjstrshp
Site Updated November 25th, 2001
"Defend the cause of the weak and fatherless; maintain the rights of the poor and oppressed. Rescue the weak and needy; deliver them from the hand of the wicked." − Psalm 82:3−4