The Open University

Planetary Science

The Consequences on Earth

Commentary

Around 130 weathered impact craters have now been identified on Earth that range in size from a few tens of metres to over 200 kilometres. Each represents an event that would have had serious consequences for life on Earth at the time. Some may have been large enough to have had a global effect on the Earth's environment. The Earth, it seems, is at the centre of a cosmic shooting gallery.

Fortunately, stones the size of mountains don't fall from the sky very often. Objects the size of the one that formed a meteor crater hit the Earth around once or twice per thousand years. The asteroid that formed the Ries Crater is perhaps a one-in-a-million year event. On the one-in-a-million year timescale, the Earth is hit by a ten kilometre-sized object.

Surprisingly, it is the objects greater than 10 metres that start to become really worrisome. In 1908 a meteor exploded in the atmosphere above Tunguska in central Siberia. The blast flattened trees over an area of 3,000 square kilometres.

Peter Schultz

If you imagine what happened with Tunguska and imagine if you take that from Siberia and put it into downtown London, or into Europe, and imagine the consequences. Now you magnify that to the scale that we see at Rio Quarto up by a factor of 10-100, then you realise that we are dealing with some massive effects on the local populous. This is not causing a global extinction event, but if it was it would cause a regional devastation that would, I think, change not just attitudes, but religions.

I think if we now scale that up to a more, even rarer event, for example I estimate a Rio Quarto would have been about once-in-four million year event to be able to occur on land at that angle. So now let's think about something that is maybe another factor or 5-10 bigger.

Then I think it really depends on where it occurs. Is it on ocean? Is it on land? And I also think it depends on what the angle is. I think you need the big events, the things that are larger than about 2-3 kilometres across to do global mass murder of the Earth. You need to have a much bigger event than Rio Quarto.