

*A Widow's Basket and Dinosaur Poo – Exploring the Chixculub Crater with Professor Joanna Morgan
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The Stoneley Lecture series continues to build on the success of previous years, in particular 2017's highly rated tour by Dr Ken Lacovara, by the presence of Professor Joanna Morgan of Imperial College, speaking eloquently about her work on the Chixculub crater on the Yukatan Peninsula, Mexico.

The Cavendish Conference Hall was full to bursting with delegates keen to hear about the mass extinction event that wiped out the dinosaurs and led to the eventual rise of mammals as the dominant kingdom, and ultimately to humans. Unlike PESGB member lectures, delegates included teenagers and even a few children, all interested in hearing the insights of a member of the team that has drilled down into the crater, searching for evidence to support what had previously been essentially theoretical.

Professor Morgan took us through the evidence, focusing initially on the impact itself. Firstly, the presence of Iridium – an element that is rare in the earth's crust, but appears in anomalously high levels at the impact site, and secondly, the presence of shocked quartz, which is indicative of a high pressure shock wave through the rock, and only occurs in association with impact or nuclear test sites.

We were then taken through the evidence for abrupt extinction, looking in some detail at the record of events supplied by small plankton in ocean sediments, all of which supported the hypothesis of a mass extinction event.

Professor Morgan then talked through the finding of the impact site itself, showing images of gravity and magnetic anomalies taken in 1991. This was followed by video reconstructions of how large the impact was – within one minute the earth was pushed down to form a hole approximately 100km wide and 30km deep, surrounded by Himalayan-sized mountains, and within the next ten minutes it collapsed to form a 200km wide by 1km deep crater. The energy of the impact was around 10 billion times the size of the Hiroshima nuclear explosion, and ejecta was found thousands of miles away. You could almost hear the gasps of amazement in the room as these events were described.

Professor Morgan's theory about the impact was widely scorned at the time, but the evidence that she and her team were able to produce demonstrates that there was, unequivocally, a large impact 66 million years ago; that there is a very good chance that it happened at Chixculub; and the effect of the impact was to create a global nuclear winter, with sub-freezing surface temperatures for between 3-16 years, wiping out all life over a certain size.

We were then treated to some of Professor Morgan's personal involvement in drilling the impact site – the excitement whenever new core was brought up to the rig, the hairy transfers to and from the rig in a Widow's Basket, and how interesting the search to see how quickly life recovered at ground zero. Her closing anecdote was to tell us one of her favourite extinction stories – that a black hole collided with the earth, causing higher levels of gravity so that dinosaurs legs could no longer support them. The evidence for this was apparently that before the extinction event dinosaur poo was formed in little peaks, but afterwards, was in flatter piles!

Professor Morgan was a joy to listen to – her talk was humorous, informative, and engaging, whatever age or level of understanding the audience were. The feedback during the lively reception following the lecture was warm and very positive, and I personally felt sorry that I wouldn't be able to attend the repeat lectures in Aberdeen and Birmingham.