Figure 1. Geologic setting of Chicxulub crater in the Yucatan [1]. Inset map is gravity data which reveals the crater structure. Each point within the map is a drilled site.

Figure 2. a) iSALE 2D set up of simulation. Left panel shows materials and the right panel shows the starting temperatures (geotherm of 10 K/Km). **b)** End step of simulation (600 s). Left panel shows melted material in red, unmelted material in grey, based on 56 GPa total melt threshold in [7]. Melted materials are excluded from porosity, fragmentation and permeability computations. Right panel shows the final temperature profile.

Figure 3a. Porosity with depth for M0077A drill site. The purple lines are the simulated values from this work. The dark black line with salmon error bounds is the drill core data for M0077A from [8,9]. The blue line and shaded region is the previously simulated porosity computed with iSALE from [9]. The colored background represents the various units in the drill core as described in [8]: notably, pink is granitoid, and blue is impact melt.

Figure 3b. Cross-section of outer crater region which highlights the two drill cores (note that while this simulation is axi-symmetric, Yax-1 is on the opposite side of the crater as M0077A. The crater rim is also denoted at about 72 km.

Figure 3c. Simulated cross-section of Chicxulub crater, panel shows fragment size (red = larger blocks, blue = smaller blocks) right panel shows permeability. Fragment size decreases with depth, consistent with overturn layers and observations.

Figure 3d. Simulated cross-section of crater showing the computed permeability. The peak ring material around 45 km from center depth down to 1.3 km is ~$10^{15}m^2$.

Figure 3e. Porosity with depth as measured by Elbra et al 2011, grey dots and simulated in this work (orange lines). Colored background indicates the various limestone units as described in [14]