

DIRT TALK

Hypervelocity impact effects on Earth: Causes, consequences and future threats

Dr. John Spray, Planetary and Space Science Centre, University of New Brunswick

October 19, 2018, MILLIGAN ROOM, 4:00 PM

Bio: Dr. John Spray will discuss impact cratering, his speciality of frictional processes in earthquakes and the NASA MSL mission in which he is on the science team for the current rover mission on Mars!

Hypervelocity impact effects in our Solar System are now widely appreciated as having contributed to fundamental planet-building and planet-modifying processes throughout geological time. The strain rates at which impact events take place are exceptional relative to the timescales of most geological processes with which we are familiar. Hypervelocity impact can cause intense shock loading resulting in melting, vaporization and even plasma formation in target rocks. Further from the contact and the compression locus (>50 GPa), shock waves cause local melting and solid-state phase transformations with the creation of new structural states and mineral polymorphs. An overview will be presented with emphasis on terrestrial impact cratering. Approximately 200 impact structures are now proven on Earth, which is a shadow of its true historical record. This paucity of craters is due to Earth being an active planet and it having erased the majority of past impact evidence due to plate tectonics, volcanic activity, burial and erosion. Nevertheless, valuable examples have survived: we will tour some of them and explore the intriguing products of hypervelocity impact as we strive to understand these extreme processes. We will also consider the future and what threats are posed to our social infrastructure by asteroids and comets colliding with Earth.

