

How Meteorite Impacts Shaped the Evolution of Planets - Insights from Numerical Modelling, Laboratory Experiments, and Observations

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The accretion of planets and their thermochemical evolution, the formation of the Moon, cratered landscapes, the origin of habitable environments and atmospheres, and at least one mass-extinction event (K-Pg-boundary) on Earth are direct consequences or, presumably, indirect implications of hypervelocity collisions of asteroids and comets with planets and other cosmic bodies. Impacts may be considered as one of the most fundamental processes in the solar system and it is a key question whether stochastic impacts of large bodies (giant collision) may have significantly changed the course of the evolution of individual planets or whether the evolution of planets was more or less determined after its formation. The presentation comprises examples of multi-scale numerical modelling, laboratory impact experiments and morphological and geophysical observations on the Moon to disentangle the collision history of the inner solar system and to quantify the role of impacts in the evolution of planets.