ON THE ROLE OF SHOCK WAVE REFLECTIONS
IN IMPACT CRATERING**.**

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When studying the formation of impact craters, a remarkable attention has been paid to the excavation stage and in detail to the horizontal displacement of target rocks and ballistic ejecta. From this point of view, the importance of the roughly hemispherical shock wave, which propagates deeply downwards into the target sequence, has possibly been underestimated.

When the shock wave encounters a deep rock horizontal discontinuity, e. g. a stratum with different nature or transmission characteristics, a reflected wave is generated, which propagates in the opposite direction, namely upwards. Moving through the recently shattered crater fill deposits, the reflected wave transmits to the rock fragments an upward impulse, whose effects depend mainly upon their size. Under certain conditions, even in the presence of small wave reflection coefficients, the broken rocks receive an impulse which is sufficient to throw them upwards with variable (even supersonic) speed and direction.

To back up these statements, we have developed some basic calculations, grounded upon numeric assumptions which are open to debate but seem reasonable, with regard to the impact of a supposed 500 m wide lithic asteroid against limestone sedimentary strata overlying a cristalline basement. Our results suggest that fragments of various size can be thrown with oblique trajectories up to levels (much) higher than the original ground level and so can play the main role in the creation of a crater rim with circular symmetry. Moreover, projected deeper (older) fragments can eventually land over less deep (younger) ones, creating a stratigraphic inversion; others, after a vertical up-and-down projection, may take part to the rise of the central uplift.

The purpose of the proposed paper is therefore to stimulate further research as concerns the verification of our hypotheses and suggestions, encouraging interdisciplinary consideration of these phenomena, which could represent but the start of new approaches to the problem of the formation of impact craters.