GRAVITATIONAL AND OTHER EFFECTS ON IMPACT CRATERING FLOW FIELDS DEDUCED FROM COMPUTER SIMULATION STUDIES, Michael G. Austin, Physics Int. Co., San Leandro, Ca.94577; Correspondence address-POB 679,Benicia, Ca. 94510

In order to further understanding of the role played by gravity in the formation of impact craters, a series of simulations are being performed with different values of gravitational acceleration (Table 1) for the impact of a one kilometer diameter iron meteor into an anorthositic crust. Previous work by Austin et al.(1) has indicated that for laboratory-scale experiments and simulations at 10 g and ~500 g gravity effects were not significant during the dynamic compression and excavation stages of crater growth and that in particular a large transient cavity was formed in both cases. The present study is aimed at extending this analysis to planetary-scale impacts. Material models and calculational techniques used are similar to those used by Schultz et al.(2).

Preliminary results (e.g. Fig. 1) indicate no significant differences due to gravitational effects for the first few seconds. Further analysis (e.g. (3)) of the effects of different gravitational accelerations on the material flow fields will be conducted as the simulations are continued to the tens of seconds necessary for complete crater formation of these multi-kilometer craters. Significant differences are expected.

Table 1. Parameters employed in the simulations.

Simulation Identification	Projectile Diameter	Projectile Velocity	Projectile Kin.Energy	Gravitational Acc. (x lunar gravity)
FEAN1	1 km	15 km/sec	4.64×10^{27} ergs	1
FEAN2	1 km	15 km/sec	4.64×10^{27} ergs	100
FEAN3	1 km	15 km/sec	4.64×10^{27} ergs	10000

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Refs: (1) Austin M. G. et al.(1981) Proc. Lunar Planet. Sci., 12B.,p.1689-1701.,(2) Schultz et al. (1981) Proc. Lunar Planet. Sci.,12A.,p.181-195., (3) Austin M. G. et al. (1981) Proc. Lunar Planet. Sci., 12A.,p.197-205.

Figure 1. FEAN1 at 0.14 sec. Velocity vector: 0.1 inch represents 3.0 km/sec. Distance scale: 1.0 inch is 1.0 km. Pressure contours in Mbar.