A MONTE CARLO MODEL OF LUNAR REGOLITH. Jac Cashore & Alex Woronow, Dept. of Geosciences, U. of Houston, Houston, Texas 77004.

Earlier Monte Carlo models, in attempting estimates of the thickness of the lunar regolith, have not allowed for the effects of superposed cratering events either in an earlier-formed crater bowl or on an earlier-formed ejecta blanket (1) (2). This model does not relevel the surface after each impact, instead it continually updates the topography after each impact. The ejecta blankets we use exponentially decay from the rim heights given by Pike (3).

Oberbeck et al. (4) introduced an ejecta blanket into their calculations, but fail to allow for edge effects (where craters exterior to the simulated surface can contribute ejecta and partial-crater bowls to the results). In our improved model edge effects are included.

The grid size of the current model is limited to 400 km by 400 km with 1600 sample points for recording information on current elevation, cumulative number of impacts, and maximum excavation depth. Crater centers are randomly located from a continuous, uniform distribution function, not constrained to grid points. The production function used is for the lunar maria, run to densities ranging from the lunar maria to the lunar highlands. Only craters 8 km in diameter or larger are produced. All craters are drawn from a continuous size-distribution function. A large number of independent runs are made and averaged in order to achieve statistical reliability. The preliminary results indicate different regolith thickness values from those obtained in the earlier models. Production rates and variations in the assumed crater-bowl geometry appear to be the main reasons for the observed differences. The present model uses only large craters which makes it more appropriate for highlands modeling.

As our model evolves, we will include the effects of detailed crater geometry and impacts into ejecta and regolith in order to determine factors affecting the regolith thickness and structure.

References: