

RADIATION EFFECTS AND ATMOSPHERIC EROSION INDUCED BY IMPACTS OF LARGE COSMIC BODIES

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The evidence for influence of large cosmic body impacts on the Earth's evolution is apparently obvious now. Most of investigations in this field concern impact cratering and following geological consequences. However such impacts result also in intensive atmospheric processes. Comets and asteroids may contain considerable mass of volatiles which are released in the process of collision. This leads to an increase in the atmosphere mass. On the other hand an explosive-like expansion of impact created vapor accelerates some portion of atmospheric gas to velocities greater than escape velocity. This air mass escapes from the planet. Light impulse and following global wildfires resulted from radiation emitted both by flying impactor and impact created plume are considered to be a probable reason for global mass extinctions. In this study numerical simulations of all stages of huge impact (including a flight through the atmosphere, cratering and plume rising) are used to calculate radiation impulse on the Earth's surface, estimate a probability of global fires and determine atmospheric erosion. These simulations are based on using the SOVA 2D multimaterial hydrodynamic code and detail tables of thermodynamic and optical properties of air and impactor material.