Scaling relations for hazardous effects from small cosmic objects impacts

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The atmospheric entry was modeled for 29 asteroidal and 21 cometary bodies with different entry angles and velocities with energies 0.5-500 Mt TNT [1, 2]. Based on these simulation results scaling relations for the most important parameters of the shock wave and radiation effects are constructed. Suggested scaling relations are dependent only on the properties of the entering object (size, density, velocity and entry angle). Precise impact risk assessment is a significant computational challenge. This motivates the usage of simplified approaches and fast assessment of effects, which can be based on suggested scaling relations. Such calculator has been developed and it is available via internet: http://AsteroidHazard.pro

The Tunguska event (June 1908) is famous for area of fallen and burnt trees, broken windows and injures [3,4]. The Chelyabinsk air-burst resulted in little structural damage, other than broken windows, window frames and doors [5]. The Bering Sea event (December 2018) could cause noticeable damage if it did not occur over the sea. Suggested scaling relations were applied to these events and compared with observational data.

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