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# Ab initio strewn field for small asteroids impacts

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In recent years, nine small near-Earth asteroids were discovered a few hours before the collision with the Earth: these are about one meter in diameter objects that have all disintegrated in the atmosphere, generating bright fireballs without causing damage. In some cases, several meteorites have been recovered. In cases like these, it is not always possible to triangulate the fireball generated by the asteroid's fall to circumscribe the strewn field position. For this reason, it can be important to compute a strewn field ab initio", i.e. propagating the asteroid's trajectory in the atmosphere starting from the initial conditions obtained directly from the heliocentric orbit, coupled with some reasonable hypothesis about the mean strength and the mass of the fragments tosample" the strewn field. By adopting a simple fragmentation model coupled with a real atmospheric profile, useful results can be obtained to locate the strewn field, as we will show for the recent falls of asteroids 2023 CX1, 2024 BX1 and 2008 TC3. It was possible to locate the strewn field of our study cases with an uncertainty of the order of one kilometre with the mean strength in the range 0.5-5 MPa and the mass of the possible final fragments in the range 1 g - 1 kg.

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