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TITLE: When worlds collide: How collisions affect water delivery to Earth-like planets

ABSTRACT BODY:

Abstract Body: The late stages of terrestrial planet formation are dominated by giant impacts that collectively influence their growth, bulk composition and potential habitability. Hitherto, N-body models of planet accretion and water delivery have assumed that all collisions lead to perfect mergers. We employ the widely-used Mercury integration package but include a state-of-the-art collision model that allows fragmentation and hit-and-run collision events in addition to perfect accretion. We performed several hundreds simulations of terrestrial planet formation around the Sun, with and without giant planets, to produce a statistically valuable sample of planetary systems. Several models of water transfer during collisions were implemented and we have quantified the types of planets that form and the water accreted by Earth-analogs in each model. In addition, since the occurrence rate of giant planets is suppressed relative to terrestrial planets for low-mass stars, we have performed additional simulations examining the formation of planets orbiting a low-mass star without giant planets to identify how water delivery is impacted.

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