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Wave breaking for the Stochastic Camassa-Holm equation

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The Camassa–Holm equation is a model for shallow water waves with non-hydrostatic pressure and a water layer on a horizontal bed. In this work we show that wave breaking occurs with positive probability for a suitably chosen stochastic perturbation of the Camassa-Holm equation. This means that temporal stochasticity in the diffeomorphic flow map for SCH does not prevent the wave breaking process which leads to the formation of peakon solutions. In particular we prove that any initial velocity distribution whose spatial profile has an inflection point with negative slope will develop a vertical slope in finite time. Consequently, one expects the time-asymptotic solutions of stochastic Camassa-Holm equation to consist of emergent wave trains of peakons moving along stochastic space-time paths.