



## **Mechanics of boulder creation on stepped platforms during storms**

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Overtopping waves can cause cliff erosion in the form of very large boulders. Impacts may induce microcracks in rock and hydraulic compression may detach a boulder along pre-existing bedrock joints. The coastal geological structure (rock type, fault orientation, joint alignment, etc.) is important in determining weaknesses in the rock that may lead to erosion. On the Aran Islands (Ireland), the cliff-tops are stepped platforms. Between winter storm periods, it is observed that boulders are created from the faces of the steps. This suggests that not only are the waves powerful enough to overtop the cliff, but the overtopping flow is still energetic enough to erode and transport large boulders.

In this talk, we consider the wave-induced stress in a crack that extends into the cliff. The bending stress on the undersurface of the rock above the crack may induce microcracks. During high-pressure wave events, these microcracks can grow to complete fracture, creating new boulders. In this sense, the stepped platforms are "peeled" back over time. We model and analyze structural and wave conditions that affect this process.