

The 2020-2021 Alaska Peninsula Earthquake Sequence and Megathrust Earthquake Cycle



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**Conference Room, 3/F,
Mong Man Wai Building**



[Zoom Link](#) (Mixed-mode)

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The 2020-2021 Alaska Peninsula earthquake sequence provides a great opportunity to study the megathrust slip budget and earthquake cycle in a region with well-known along-strike changes in the pattern of interseismic slip deficit. The July 2020 M7.8 Simeonof earthquake ruptured across part of the Shumagin Gap, a region with significant interseismic creep, and was followed by the July 2021 M8.2 Chignik earthquake to the NE. In between the enigmatic October 2020 M7.6 Sand Point earthquake occurred within the downgoing plate. In modeling the coseismic and postseismic deformation from these events, we find that the spatial pattern of postseismic deformation contains key new information about the coseismic slip. We use stress-driven afterslip models to infer where the largest coseismic stress changes must have occurred, and these observations require the coseismic slip to terminate relatively abruptly in the downdip direction. The data are better fit by a convex-downward profile of slip as a function of depth, rather than the convex-upward profile that typically results from applying Laplacian smoothing in coseismic slip inversions. The exponential temperature dependence in many rock deformation flow laws also supports a convex-downward profile.



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