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# Collapsing cliff coasts – near real time seismic warning and trigger-screening on Germany's largest island

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Cliff coasts are highly dynamic interfaces delimiting land and sea. Collapse events are hard to constrain due to their infrequent and emergent occurrence, but bear a hazard potential and impose severe disturbances of slope stress fields, sediment fluxes, local wave fields, marine ecology and land management. Germany's largest island, Rügen, has a 100 m high chalk cliff section about 8 km long, which experiences numerous collapse events per year that add up to about 40,000 $m^3$/a displaced volume.

Combining data from a distributed broadband seismometer network, a telemetric small aperture array and weather station, an infra sound array and periodic done-based surface models of cliff volume changes we can provide near real time warning messages for the National Park authorities, containing precise timing, location and volume estimates. By fusing these data with information about meteorological and sea wave conditions we resolve the impact of the relevant trigger mechanisms: rainwater infiltration, groundwater flows, wind-driven tree swaying, freeze-thaw transitions, wave action at different water levels, and beach gravel mining of the cliff base.