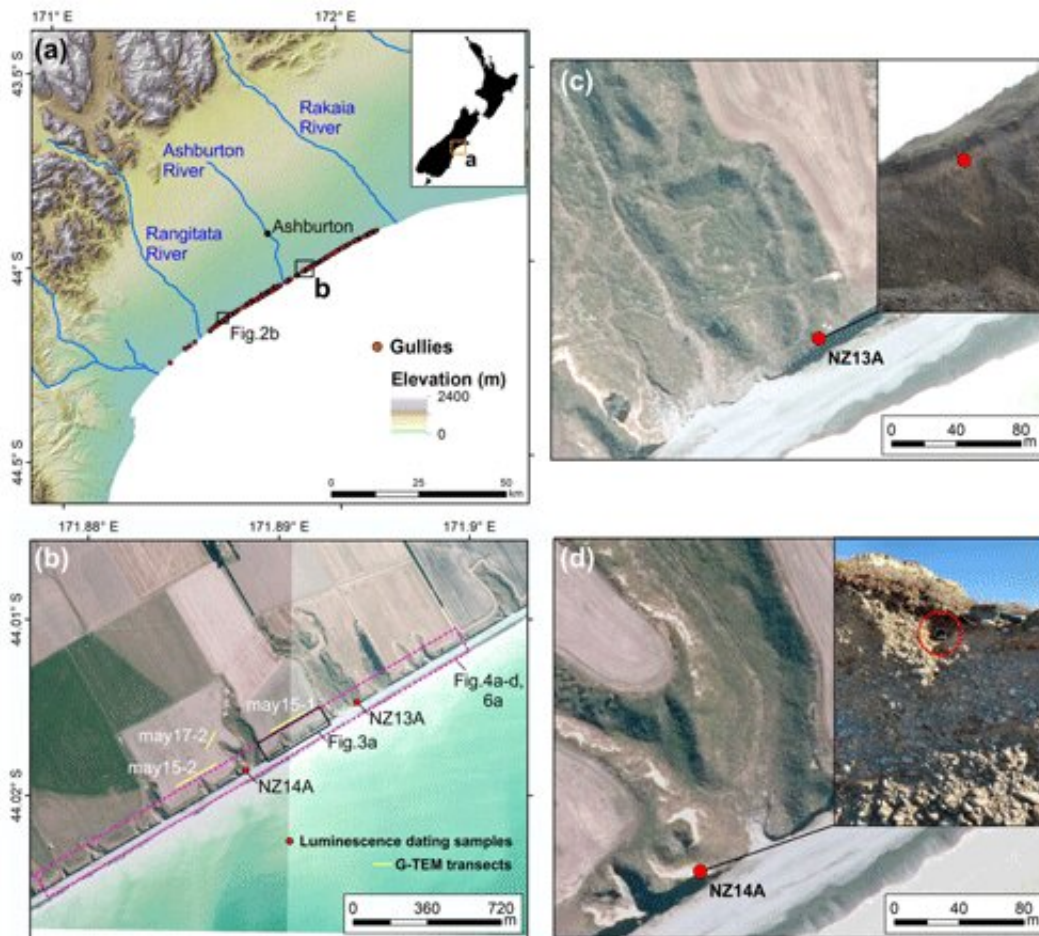


Groundwater drives rapid erosion of the Canterbury coastline, New Zealand

January 12 2021



(a) Digital elevation model of the Canterbury Plains (source—Environment Canterbury), located along the eastern coast of the South Island of New Zealand, showing the location of mapped gullies. The location of figure is shown in the inset. (b) Mosaic of aerial photographs of the study area (see a for location; source—Environment Canterbury). The location of luminescence dating (optically stimulated luminescence—OSL) samples, G-TEM transects and other

figures is shown. (c–d) Enlarged sections of the aerial and site photographs of the luminescence-dating sampling sites of NZ13A and NZ14A. Credit: University of Malta

Groundwater flow and seepage can form large gullies along coastal cliffs in the matter of days, it has been discovered, as per a recently-published paper.

An international team of scientists from Malta, Germany, Romania, New Zealand and USA has used drones and [satellite imagery](#) to monitor a stretch of coastline near Ashburton (South Island, New Zealand). They found that gullies up to 30m in length can develop in less than a week.

Field observations and [numerical models](#) have shown that groundwater plays a key role in forming these gullies, by either eroding tunnels or triggering landslides.

Gullies are an important coastal hazard. There is an average of one gully every 250m along the Canterbury coastline, and their formation leads to the loss of precious agricultural land.

Similar coastal gullies have been documented in South Taranaki (North Island, New Zealand), as well as other countries such as the USA, Japan and Brazil.

When and where coastal gullies form can be partly predicted. The study has shown that gullies form when more than 40mm of rain fall per day, and that they are preferentially located above buried, old river channels.

More information: Aaron Micallef et al, Groundwater erosion of coastal gullies along the Canterbury coast (New Zealand): a rapid and

episodic process controlled by rainfall intensity and substrate variability, *Earth Surface Dynamics* (2021). [DOI: 10.5194/esurf-9-1-2021](https://doi.org/10.5194/esurf-9-1-2021)

Provided by University of Malta

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