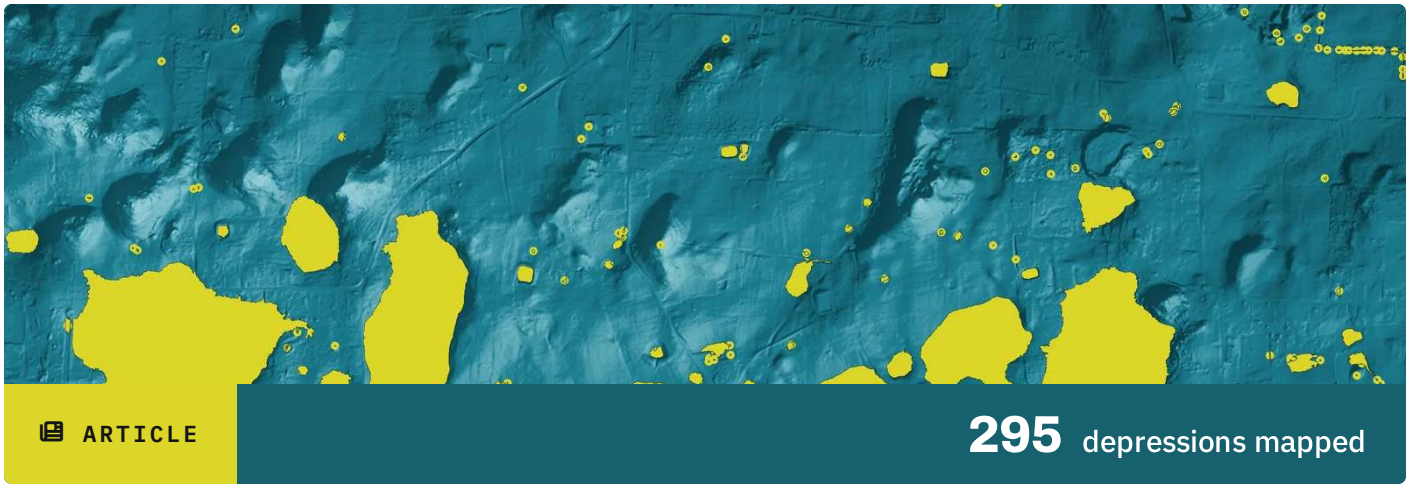
Reading karst from the air: sinkholes in a 1-meter LiDAR model

In Puerto Rico's northern karst, sinkholes hide under forest and pasture. A terrain model built from LiDAR sees through the vegetation — the contour lines on this website come from those models.

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The picture: Shaded relief from the 1-meter LiDAR model around the site. Yellow marks the closed depressions the analysis mapped.

Why karst matters to a review

The limestone of Puerto Rico's northern karst — mogotes, sinkholes, caves — drains straight into the aquifers. A closed depression on a site affects where you can build, how stormwater should move and what a spill could reach. Many are invisible from the road and blurred in aerial photos by vegetation.

From point cloud to sinkholes

We start from public USGS 3DEP LiDAR point clouds and build a **1-meter digital terrain model** of the ground surface. A standard morphological technique fills every closed depression; the difference between the filled and the real surface outlines each sinkhole, which we then measure — depth, area, shape — and flag as likely natural or likely man-made.

295	35	80 s
closed depressions on a 241-acre site	inside the site — the deepest of them 5.9 m	of processing for the whole analysis

A finding no map had

The same analysis tested the mapped ponds against the terrain: only **14 of 48** mapped ponds actually sit in a LiDAR sinkhole. For the review that distinction matters — a pond in a sinkhole connects to the aquifer differently from one on an impervious surface.

Deterministic, explainable, repeatable

There is no AI in this analysis — just terrain data and well-understood geometry, which is exactly why it is easy to defend. The outputs (terrain model, hillshade, sinkhole maps, KMZ for Google Earth and a summary) go straight into the review's exhibits.

> **About our artwork:** the contour lines throughout this website are drawn from these same 1-meter LiDAR terrain models of Puerto Rico's karst.

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