ABSTRACT: Rodrigues Island is located in the western Indian Ocean approximately 600 km east of Mauritius, at 19°42'S and 63°24'E. It is a volcanic island with a small overlay of Quaternary eolian limestones, 108 km2 of area, elongated ENE to WEW, 18 km long and 6.5 km wide, with a maximum elevation of 396 m. The last volcanic activity was 1.3 ma, and only one lava tube is known. The eolian calcarenites are restricted to a narrow segmented band on the east coast, and two larger patches, Plaine Caverne and Plaine Corail, on the south and southwest coast. No subtidal carbonate facies are known, and no flank margin caves are known, indicating that platform subsidence has been in excess of 5 m/100 ka to bring such features from the MIS 5e +6m sea-level highstand below modern sea level. The eastern eolianite outcrops contain rectangular incisions similar to the bokas found in the Netherland Antilles, consistent with a large watershed on volcanic rocks traversing a thin coastal limestone outcrop. Plaine Caverne and Plaine Corail each contain large epigene cave passages developed by surface catchment from volcanic rocks being transported under high (up to 62 m) eolianites to the sea. The Plaine Corail caves are abandoned by streams today, are much segmented and modified by collapse such that dissolutional surfaces are absent, and contain massive calcite speleothems, all evidence of an age for the eolianite of perhaps 1 ma or more. Plaine Caverne contains two long, linear stream caves, mostly intact, with a 1 km dry and abandoned cave having lost its recharge to a lower 🔤 but parallel active stream cave. Mauritius has flank margin caves, subtidal facies above modern sea level, and abundant lave tubes (volcanic activity as recent as 26 ka), contrasting with thermal inflation now long ended on subsiding Rodrigues.

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Figure 1: Location of the three main Mascarene Islands, and their tectonic setting.

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Rodrigues Island: Carbonate deposition and karst processes as indicators of platform stability



Figure 3: Mauritius, with a fringing reef and Rodrigues, with a barrier reef at the same scale, indicating greater subsidence for Rodrigues.

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Figure 6: Canyon Tiyel is a large cave collapse feature now turned into a tortoise reserve (red star in Figure 2).







Figure 4: Limestone pinnacles can be over 2 m high (left), and some display a paleosol pit infill (right), indicating significant



Figure 7: Clockwise from upper left – map, Grande Caverne; speleothems; Solitaire bone; tortoise carapace (red circle); Grande Caverne entrance.



Figure 8: Caverne Patate, an intact fossil stream cave showing epigenic stream cave morphologies.



Figure 10: The eolian calcarenites of Rodrigues rest directly on underling basalts without any intervening subtidal facies. No subtidal carbonate facies were observed on Rodrigues.

Background Image: The eastern coast of Rodrigues has four rectilinear carbonate coastal re-entrants similar to bokas seen on Aruba, Bonaire, and Curacao in the Caribbean.



Figure 9: Active raft cone formation







Figure 12: Small dissolution tubes and arches found on the inland, upper boka walls, hypothesized to be relict from the stream incision phase that produced the bokas.



Figure 13: The only known lava tube on Rodrigues, compared to numerous such tubes on Mauritius. This observation is consistent with extinct volcanism on Rodrigues and denudational loss of shallow lava tubes.





Figure 11: No flank margin caves were found anywhere on Rodrigues, only sea (littoral) caves were present.