

Godfrey et al. Supplementary Table 2. Inferred changes in habitat and biota with proposed climate or human triggers in the wetter vegetation zones of Madagascar during the Holocene (see Figure 1 for locality details). Time of megafaunal collapse at multiple sites within the wetter part of Madagascar is indicated by gray shading.

Dates ¹	Site	Nature of Change	Trigger proposed by original authors ²	Source
Between 9,800 and 7,800 years ago	Anjohibe	Relatively wet period.	Climate	Voarintsoa et al. 2017
~9200 years ago	Anjohibe	Dry interval interrupts an otherwise prolonged wet period.	Climate	Dawson et al. 2024
Between 9,000 and 8,000 years ago	Anjohibe	Two relatively wet periods (~8,300 and 8,200 years ago) attributed to meltwater pulse in North Atlantic and the global “8.2 ka” event	Climate	Voarintsoa et al. 2019
Between 8,500 and 7,500 years ago	Anjohibe	Agreement with previously reported relatively wet 8.2 ka event but with 2-stage structure observed at ~8,200 and ~8,100 years ago	Climate	Duan et al., 2021
Between 7,800 and 1,600 years ago	Anjohibe	Lack of stalagmite growth suggests dry mid-Holocene climate.	Climate	Voarintsoa et al. 2017
Between ~6,000 and 4,000 years ago	Anjohibe	Shift from early Holocene wet conditions to drier conditions with transition between ~6000 and 4000 years ago.	Climate	Dawson et al. 2024
~5500 years ago	Lake Maudit	Shift from wetter to drier conditions.	Climate	Teixeira et al. 2021
4800—4600 yr BP	Anjohibe	Dry period.	Climate	Wang et al. 2019
Between 4310 and 3930 yr BP	Anjohibe/ Anjohikely	Two pronounced dry intervals.	Climate	Scroxton et al. 2023
Between 4300 and 4000 yr BP	Anjohibe	Dry interval.	Climate	Wang et al. 2019
~3200 to 3000 yr BP	Anjohibe	Dry interval.	Climate	Williams et al. 2024

Between ~2500 and 1500 years ago	Anjohibe	Minor landscape change believed by authors to have been human-induced.	Humans*	Wang et al. 2019
Between ~2500 and 2000 years ago	Anjohibe	Megaherbivores (hippopotamuses and elephant birds) disappear locally.	Unclear*	Hansford et al. 2021
Common Era (2000 BP to present)	Anjohibe	Comparison of Common Era (CE) rainfall to Last Glacial Maximum reveals rainfall on average lower during the CE.	Climate	Tiger et al. 2023
Starting ~2000 cal yr BP	Lake Alaotra	Habitat transformation with decrease in trees and increase in upland herbs and grasses	Humans*	Broothaerts et al. 2023
1607.5 ± 137.5 cal yr BP	Lake Komango	Spike in charcoal microparticles suggests an increase in fire.	Humans*	Burney et al. 2004
Starting ~1600 years ago	Anjohibe	Return of relatively wet conditions.	Climate	Voarintsoa et al. 2017
Starting ~1600 years ago	Anjohibe	Return of relatively wet conditions.	Climate	Scroxton et al. 2017
~1300 cal yr BP	Lake Amparihibe	Abrupt environmental change from rain forest to C ₄ grass-dominated, fire-disturbed landscape	Humans	Reinhardt et al. 2022
1237.5 ± 167.5 cal yr BP	Lake Kavitaha	Spike in charcoal microparticles suggests an increase in fire.	Humans	Burney et al. 2003
Beginning ~1200 years ago	Anjohibe	Vegetation increasingly dominated by savanna, despite no significant change in rainfall.	Humans	Railsback et al. 2020
1125 ± 170 cal yr BP	Lake Tritrivakely	Spike in charcoal microparticles suggests an increase in fire.	Humans	Burney et al. 2003
1100—1000 yr BP	Anjohibe	Abrupt shift from C ₃ plant-dominated to C ₄ plant-dominated landscape, despite no significant change in rainfall.	Humans	Burns et al. 2016
1100 —1000 yr BP	Anjohibe	Intensive sampling of stalagmite proxies for rainfall ($\delta^{18}\text{O}$) and ground vegetation ($\delta^{13}\text{C}$) confirms anthropogenic habitat transformation.	Humans	Scroxton et al. 2017
~1000 years ago	Multiple sites	Odds-ratio analysis reveals dramatic megafaunal population loss. The odds of finding bones of extinct (vs. extant) species drop significantly at this time.	Humans	Faina et al. 2021
1000 ± 95 cal yr BP	Lake Amparihibe	Spike in microscopic charcoal particles, lake eutrophication and spike in spores of <i>Sporormiella</i> suggest fire, pastoralism.	Humans	Burney, 1999 Burney et al. 2003

After ~1000 cal yr BP	Lake Amparihibe	Forest/grassland mosaic remains impacted by frequent fires.	Humans	Reinhardt et al. 2022
1000 – 700 cal yr BP	Lake Tritrivakely	Shift from wooded savanna to grass-dominated savanna.	Humans	Gasse & Van Campo 1998
~900 cal yr BP	Lake Maudit	Precipitous decline in pollen of evergreen forest plant taxa and simultaneous sharp rise in charcoal microparticles.	Humans	Teixeira et al. 2021
Starting ~1000 years ago	Anjohibe	Wholesale change in carbon isotopes of large-bodied vertebrates reveals consumption of C ₄ plants by introduced species.	Humans	Crowley & Samonds 2013
815 ± 145 cal yr BP	Lake Kavitaha	Increase in spores of <i>Sporormiella</i> , likely reflecting the introduction of cattle.	Humans	Burney et al. 2003
~790 cal yr BP	Lake Mitsinjo	Shift from wooded savanna to grass-dominated savanna.	Humans	Matsumoto & Burney, 1994
645 ± 150 cal yr BP	Benavony	Spike in microscopic charcoal particles, indicating fire.	Humans	Burney et al. 2003
~500 cal yr BP	Lake Mitsinjo	Increase in ruderal pollen.	Humans	Matsumoto & Burney, 1994

¹Conventional ¹⁴C dates, reported in calendar years BP (cal yr BP), were calibrated or recalibrated using Calib 8.2 (Stuiver and Reimer 1993) and the Southern Hemisphere calibration curve (SHCal20; Hogg et al. 2020). Th/U dates (from stalagmites) do not require calibration and are presented in “yr BP”. Approximate dates from indirect evidence or from multiple data points combined are provided as “years ago.”

²Asterisk signals that our interpretation of the trigger differs at least somewhat from that of the original authors (see main text).

Sources

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