Island fragmentation by sea level rise and global warming drive prehistoric extinctions in Mediterranean island reptiles

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Abstract

We assess how reptile population extinctions on Mediterranean islands has been influenced since the Last Glacial Maximum (LGM) by the interacting effects of island area, timing of fragmentation, changing climate, and topography. By using geophysical models of sea-level rise we produce island-fragmentation cladograms which depict the sequence and timing by which 80 islands and 52 paleo-islands in the Aegean and Ionian seas progressively became separated from paleo-landmasses. These cladograms are used to reconstruct the progressive sequence of local reptile population extinctions. We found that population extinctions rise linearly with increased duration of isolation and that extinctions correlate negatively with (paleo-) island area. In addition, extinctions are positively associated with higher summer temperatures implicating heat stress, as well as with higher island topographic roughness, which may be an indication of diminished resource availability. These conclusions point forward to understanding, predicting, and eventually preventing future species extinctions due to climatic change.

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