



Inferring pterosaur diets through quantitative 3D textural analysis of tooth microwear in extant analogues

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Pterosaurs (Pterosauria) were a successful group of Mesozoic flying reptiles. For 150 million years they were integral components of terrestrial and coastal ecosystems, yet their feeding ecology remains poorly constrained. Postulated pterosaur diets include insectivory, piscivory and/or carnivory, but many dietary hypotheses are speculative and/or based on little evidence, highlighting the need for alternative approaches to provide robust data. One method involves quantitative analysis of the micron-scale 3D textures of worn pterosaur tooth surfaces – dental microwear texture analysis. Microwear is produced as scratches and chips generated by food items create characteristic tooth surface textures. Microwear analysis has never been applied to pterosaurs, but we might expect microwear textures to differ between pterosaurs with different diets. An important step in investigating pterosaur microwear is to examine microwear from extant organisms with known diets to provide a comparative data set. This has been achieved through analysis of non-occlusal microwear textures in extant bats, crocodylians and monitor lizards, clades within which species exhibit insectivorous, piscivorous and carnivorous diets. The results - the first test of the hypothesis that non-occlusal microwear textures in these extant clades vary with diet - provide the context for the first robust quantitative tests of pterosaur diets.