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The influence of coastal and marine geology on archaeological occupation in Pondoland: the South African Wild Coast

Cawthra, H.C.^{1,2}, Fisher, E.C.^{3,4}, Jacobs, Z.⁵

¹ Geophysics Competency, Council for Geoscience, Bellville, South Africa, hcawthra@geoscience.org.za

² Centre for Coastal Palaeosciences, Nelson Mandela Metropolitan University, Port Elizabeth, South Africa

³ Institute of Human Origins, School of Human Evolution and Social Change, Arizona State University

⁴ Evolutionary Studies Institute, University of the Witwatersrand, Johannesburg, South Africa

⁵ School of Earth and Environmental Sciences, University of Wollongong, Australia

Glacial periods in human prehistory have long been viewed as stressful times for humans, and archaeological records have shown that these periods influenced the behavioural adaptations, proliferation, and survival of our African ancestors. Across Africa, numerous paleoenvironmental and paleoclimatic records have shown that during glacial periods throughout the Pleistocene large tracts of land were exposed on shallow continental margins as sea levels fell. How did coastal hunter-gatherers adapt to glacial conditions? What role did coastal resources play in modern human survival and evolution during the Pleistocene? Answering these questions hinges largely on finding and studying new records of coastal foraging prehistory in areas where a narrow continental margin has created a stable coastal environment that would facilitate the formation of long-term coastal foraging records, spanning both glacial and interglacial periods. This interest in hunter-gatherer adaptations to coastal zones has recently inspired a study in one of the few places across southern Africa where long-term and continuous records of coastal foraging may be found: Pondoland, on South Africa's 'Wild Coast'. The Pondoland continental shelf is extremely narrow (~8 km) compared to the global average of 78 km. Despite substantial fluctuations in Pleistocene glacio-eustatic sea level changes, it is anticipated that the narrow shelf would have induced a compact history of glacio-eustatic sea level change preserved in the Quaternary rock record. The palaeo-shorelines associated with lowered sea levels would not have extended far from the modern-day coast, remaining relatively accessible to hunter-gatherers abiding in this region. Understanding the sense, magnitude and timing of palaeo sea levels and the response of sedimentation to these fluctuations is critical in piecing together coastal evolution. The results of this work is feeding into holistic models for changing ecosystems through time and will help to interpret how this may have affected early human use of the area. The geological investigations for the P5 project (Pondoland Paleoenvironment, Paleoclimate, Paleoecology, and Paleoanthropology) consist of two closely-linked, parallel objectives. On a fine scale, the stratigraphy of sediments which have accumulated in Pondoland archaeological sites are being analysed through techniques applied in micromorphology and geochemistry. On the broader landscape scale, we aim to critically scrutinise depositional processes along the coastal zone through glacial-interglacial periods, with respect to sediment sources and geomorphological trends, addressing the following broad questions:

1. Was there climate variability through glacials, or was the east coast quite stable throughout?
2. What was the response of the shifting sediments through time on this narrow coastal plain?

3. What is the direct link to the continental shelf?

4. A Strontium isoscape will be constructed, linking palaeobotany to fauna

A study of cemented palaeobeach and palaeodune deposits so far has focussed on rubified palaeosols associated with an ancient dune environment. The lower palaeosol was dated to $300,000 \pm 24,000$ years ago whereas the upper palaeosol was dated to $133,000 \pm 11,000$ years ago. A lengthy sea-level record is coupled with a paralleled coastal occupation in this region.

