**Geomorphology and evolution of the Entrance Point beach ridge plain, Victoria, Australia.**

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# ABSTRACT

Beach ridges and prograded coastal barriers are globally significant features that provide a record of coastal processes and evolution. Ridges and their subsurface deposits indicate former shoreline positions and record processes occurring over storm to millennial time scales. Variability in ridge morphology and progradation rates reflect changes in sediment supply, storm frequency-magnitude, climate, wave height and direction, and sea level. Thus, beach ridge plains act as a repository of geological information, providing insights into past environmental conditions.

In this talk, I will present some initial findings from a recent field campaign at the Entrance Point beach ridge plain in Victoria, Australia. This research aims to determine the evolutionary history of the beach ridge plain and from this identify variability in past environmental conditions. Entrance Point comprises a 3.8 km wide coastal plain with a sequence of >80 beach and foredune ridges of varying heights, spacing, and orientations. This site is a Scientific Reference Area and provides offers an undisturbed and previously undated ‘geo-archive’ of historic coastal processes. Ridge and dune morphology was mapped, ground truthed, and morphological characteristics were analysed from Lidar. Stratigraphically paired Optically Stimulated Luminescence (OSL) samples were collected from 10 ridges spanning the whole coastal plain and chronostratigraphic analysis undertaken. Preliminary data indicates a relatively rapid progradation of the entire ridge plain during the Holocene, but with older, pre-Holocene, dunes landward of these ridges. There are distinct groups of ridges sharing similar directions and heights. We attribute this to variations in wave climate, with deposition modulated by changes in accommodation space within the former embayment. Progradation rates are closely tied to changes in sediment flux in and out of Corner Inlet to the north. Sediment from Corner Inlet is reworked via waves and likely deposited as longshore bars which weld to the shoreline to form ridges. Analysis of recent (1970’s - today) aerial imagery indicates ongoing progradation. Using the modern coast as an analogue it seems that vegetation (Atriplex cinerea, salt bush) may aid in stabilizing embryonic ridges.

Understanding how the Entrance Point beach ridge plain evolved under different conditions in the past allows us to predict (a) how it will respond to future changes in climate and oceanographic conditions, and (b) at what rates these changes may occur. Work is ongoing to connect our observations at Entrance Point with evolutionary studies of the Ninety Mile Beach barrier system along the east coast of Victoria (e.g. Kennedy et al., 2020). This will improve our understanding of changes in Holocene climate, sea level, and wave conditions in the region.

# REFERENCES

Kennedy, D.M., Oliver, T.S., Tamura, T., Murray-Wallace, C.V., Thom, B.G., Rosengren, N.J., Ierodiaconou, D., Augustinus, P., Leach, C., Gao, J. and McSweeney, S.L., 2020. Holocene evolution of the Ninety Mile Beach sand barrier, Victoria, Australia: The role of sea level, sediment supply and climate. Marine Geology, 430, p.106366.