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Abstracts

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OSL and radiocarbon-based chronology of sand-drift events on Beniguet island (W France)

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Sand dunes are an essential component of coastal landscapes. The understanding of their long-term mobility is crucial to design appropriate management methods, especially in a context of global sea level rise and associated coastal erosion. Along the coasts of Western Europe, the morphological evolution of coastal dunes has been characterized by several periods of stability and remobilization of aeolian sands during the last millennia of the Holocene. Well-constrained chronologies of dune mobility periods have been reconstructed in Ireland, UK, Portugal based on radiocarbon dating of palaeosols interbedded in aeolian sand deposits¹. In western France, the absence of palaeosols has limited such approaches. Recently, archaeological and historical remains have been used but such an approach has many methodological limitations².

The objective of this study is to provide robust chronological evidence for the Holocene mobility of coastal dunes in western France. It focuses on the chrono-stratigraphic analysis of the sandy cover of Béniguet Island, located at the western tip of the Brittany peninsula (W France). The geometry of the coastal sedimentary deposits was reconstructed about 40 vibro-cores taken from aeolian sands covering the central part of Béniguet Island over a thickness between 2 and 4 m, near an archaeological site currently being excavated.

Four archaeological levels were identified and dated to the Bell Beaker, Early Bronze Age, High Middle Ages and Late Middle Ages periods. The chronology of the Holocene deposits is based on a dozen radiocarbon dates obtained on the anthropogenic levels and on 8 Optically Stimulated Luminescence (OSL³) ages obtained on the aeolian sand layers.

Equivalent doses were measured from multi-grain aliquots and the dose rate was obtained from high resolution gamma spectrometry. The chronology of the sequence was modeled by combining OSL ages and radiocarbon dates in a Bayesian framework using the R package BayLum⁴.

The anthropogenic levels are overlain by a series of aeolian sand layers dated by OSL to ca. 4000 BP, 2700 BP, 1000 BP. These results are consistent with the regional chronology established for western France and clarify the timing of coastal sand-drift events².

Keywords (max. 5): coastal dunes, Holocene, OSL, archaeology, France

References

1. Hesp, P. A., DaSilva, M., Miot da Silva, G., Bruce, D., & Keane, R. (2022). Review and direct evidence of transgressive aeolian sand sheet and dunefield initiation. *Earth Surface Processes and Landforms*, 47(11), 2660-2675.
2. Gorczyńska, A., Stéphan, P., Pailler, Y., Nicolas, C., Penaud, A., David, O., ... & Le Gall, B. (2023). Holocene evolution of coastal dunes in western France: regional reconstruction from archaeological and historical data. *Aeolian Research*, 60, 100851.
3. Murray, A., Arnold, L. J., Buylaert, J. P., Guérin, G., Qin, J., Singhvi, A. K., ... & Thomsen, K. J. (2021). Optically stimulated luminescence dating using quartz. *Nature Reviews Methods Primers*, 1(1), 1-31.
4. Philippe, A., Guérin, G., & Kreutzer, S. (2019). BayLum-An R package for Bayesian analysis of OSL ages: An introduction. *Quaternary Geochronology*, 49, 16-24.