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INTERACTIONS BETWEEN FINE AND COARSE-GRAINED SEDIMENTARY MATERIALS IN THE FORMATION AND DEVELOPMENT OF BARRIER SPITS AT ESTUARY MOUTHS: A CASE STUDY OF YNYSLAS SPIT, WALES

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The study focuses on Ynyslas Spit, a 6 km-long barrier spit of sand and gravel located at the mouth of the Dovey Estuary in Wales. It aims to enhance understanding of the role that sand integration plays within coarse-grained barrier systems. Barrier spits at the mouth of estuaries are influenced by complex hydro-sedimentary interactions, where sedimentary materials are transported and deposited within a mixed-energy environment governed by fluctuating hydrodynamic and meteorological forcings, including river discharge, tide, waves and wind. The research combines the re-interpretation of existing data, including geophysical surveys, sediment cores, and sample dating, with new stratigraphic data collected through ground-penetrating radar and sediment coring. Additionally, detailed morphological analysis is conducted to examine the physical characteristics of the barrier. This integrated approach allows for a more comprehensive understanding of the barrier's formation, sedimentary processes, and environmental changes.

Previous studies suggest that the original barrier of Ynyslas Spit was formed approximately 1 km offshore around 6500 BP. The rate of landward migration since about 4000 BP has been estimated at around 0.25 m/yr, though there is considerable uncertainty regarding the consistency of this rate over time. Given the variability and juxtaposition of different depositional settings behind the active barrier, including gravel hooks, dunes, and marshes, along with the fact that coarse-grained barriers are primarily mobilised during storm events, it is likely that the development of Ynyslas Spit occurred in distinct episodic phases. Here, we propose potential intermediate phases of gravel spit development from evidence on the morphology and internal architecture.