A Pleistocene Example of a Forced Regression: Wave-Dominated Shoreface and Back/Barrier Sediments from Forster, Southeast Australia

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Shorefaces deposited under falling sea level conditions are distinguished by their sharp bases and abrupt vertical transition from underlying shelf mudstones. As exploration targets they have been well documented in ancient rocks, but there are few modern analogues. The shelf region offshore of Forster, NSW provides an ideal opportunity to reconstruct facies architecture and sequence stratigraphy of a Late Quaternary suite of forced-regressive shorefaces deposited in a low accommodation setting, based on an exceptional dataset of seismic, vibracore, and radiocarbon dates. The Pleistocene interstadial sandstone is 5-16 m thick and extends seaward 20-25 km.

It consists of five shingled packages, each comprising a regressive shoreface/barrier wedge with an associated backbarrier estuary/lagoon that is partially eroded. Each shoreface has a clearly visible landward termination, in the form of a strong, concave reflector dipping seaward at 1o to 1.5o. More subdued internal reflectors within the rest of the shoreface indicate progradation. The basal surfaces of the five individual shorefaces coincide to form a bundle of strong, parallel, seaward-dipping reflectors (0.2o). The two most seaward shorefaces contain an internal reflector which is irregular, and slightly erosional. Chronostratigraphic analysis indicates that deposition occurred during oxygen isoptope Stage 3, a period marked by multiple sea level fluctuations with an overall falling trend. Each of the five packages is associated with a small-scale (10-20 m) eustatic cycle.

The landward termination of individual shorefaces marks the limit of transgressive incision, which caused partial erosion of the back-barrier lagoons. During subsequent sea level fall the shoreface prograded over a regressive surface of erosion, producing the strong basal reflectors. A secondary regressive surface of erosion, within the shoreface unit itself, is an unusual feature and appears to have formed in the nearshore zone.