

Origin of the Sable Island sand body

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The Quaternary Sable Island sand body lies on the outer Scotian Shelf, 225 km offshore from Halifax. It is up to 55 m thick, covers an area of over 12000 km² and contains 238 km³ of sediment. Of this, 117 km³ is Pleistocene in age and was deposited in ice marginal and proglacial environments. The remaining 121 km³ is Holocene in age and was deposited in marine shelf and coastal environments. Holocene sands were derived from transgressive reworking of the underlying Pleistocene glacial sediments. The maximum Late Wisconsinan (Stage 2) ice margin lay NE-SW across Sable Island Bank. Subglacial tunnels incised older glacial and Tertiary sediments on the Bank and debouched at the ice margin, depositing a fine- to coarse-grained, silty sand in ice-contact and proglacial facies. The locus of ice-contact deposition occupied a NE-SW linear belt including Sable Island, Northern Spur and possibly extending NE across Banquereau and SW across Western Bank to Georges Bank and Cape

Cod. The age of the latest Wisconsinan glacial sequence is poorly constrained on Sable Island Bank, but appears to occupy the interval between 30 and 11 kybp. Following glaciation, relative sea level rose at 55 cm/100 yrs from below 49 mbsl at 11 kybp to 13.5 mbsl at 4.5 kybp. From 4.5 kybp to present, relative sea level rise slowed to 29 cm/100 yrs. This Holocene transgression converged from the bank margins towards the present position of Sable Island. Ahead of the transgression eolian environments predominated, combined with freshwater peat deposition in restricted lowland swamps. At the shoreline coastal barriers developed and separated extensive lagoons from the newly created continental shelf. Reworking on this shelf generated shoreface ridge fields oriented obliquely to the shoreline. Sediment generated by shoreline and ridge erosion and by shoreface retreat was primarily transported NE to accumulate in marine sand bodies at East Bar, West Bar and Northern Spur.