

Change along and across the barrier islands is usually a function of one or more of these factors: the amount of sediment within a coastal segment, the magnitude of natural processes (storms), and the stability of sea level. These factors are also directly related to the geological origin of the barrier islands.

Sea level has oscillated several times during the past half-million years. During the interglacial periods, continental ice melted, and the shorelines advanced inland across the continental shelves. During the glacial periods, as water was withdrawn from the seas and stored in the form of glacial ice, the shorelines moved seaward across the continental shelves. This process involved great quantities of seawater, enough to move the ocean shoreline across roughly 150 km of the coastal plain and continental shelf. When the last period of glaciation, the Wisconsin, came to an end about 20,000 years ago, sea level was approximately 120 m lower than it is today (Figure 5), and the shorelines of the Atlantic and Gulf coasts were 60 to 150 km seaward of their present positions. With the change from glacial to interglacial, the sea started to rise and continued to rise for about 14,000 years, reaching within a few meters of the present about 6,000 to 7,000 years ago.

As the sea rose and the shoreline moved across the continental shelf, large masses of sand were moved with the migrating shore zone in the form of beach deposits. Sediment that had been deposited as deltas and floodplains within the coastal river systems was also reworked by wave action and moved along the shore. Once sea level became fairly stable, waves, currents, and winds worked together on the sand to form the beaches and barrier islands that rim the coast of the S.E. Region. As long as the inshore system contained surplus sediment, the beaches continued to build seaward until equilibrium was reached--in this case the balance among storm and wave energy, sea level, and the amount of sediment in the transport system.

All the evidence suggests that this equilibrium was reached about 4,000 to 5,000 years ago. At that time the barrier islands were wider--some by as much as 2 km or more. As time passed, the complex landscape of the barrier islands evolved. In the narrow areas, inlets breached the islands and filled in to reform them. Long spits connected the more stable sections, such as the land area near Cape Hatteras, where sequences of beach ridges developed, building long