DATA REPOSITORY MATERIAL:
PALEOCHANNEL GROUP MAPPING DESCRIPTIONS

Groups 1 (North Myrtle Beach) and 2 (Atlantic Beach)

Channel Groups 1 (North Myrtle Beach) and 2 (Atlantic Beach) are located approximately 12 - 15 km southwest of the present Little River Inlet (Figs. 1A and 4). Onshore, the two channels are incised to depths of approximately - 18 and - 15 m, respectively, and are separated by a narrow (< 1 km) and discontinuous interfluve that has a subsurface elevation of ≤ 3 m. Offshore, seismic data indicate several significant incisions (< - 18 m) just east of where Group 1 passes beneath the modern coastline. This group may have had an eastern orientation across the inner shelf, but younger channels associated with Hog Inlet make correlation of the onshore and offshore datasets difficult. Seaward of Group 2, folded Late Cretaceous strata are truncated at the sea floor, and only patchy and discontinuous vestiges of channels remain. Thus, Group 2 has either been mostly eroded within the inner shelf or was never as continuous as indicated by interpretation of the borehole data.

Group 3 (Cane North)

An interfluve approximately 3 to 5 km wide separates Group 2 from Group 3 (Cane North, Fig. DR1). Group 3 is well defined offshore as two channels up to 4 km wide. The main, northern channel is 1 - 2 km wide and incised to depths > - 20 m. A smaller (> 1 km wide) splay lies to the south and parallels it for a distance of approximately 5 km from the shoreline until it is no longer discernable (Fig. 4)**.** Borehole data indicate that Group 3 is much wider (~ 9 km) and shallower (< - 15 m) onshore than offshore. An offset in thalweg positions onshore to offshore is attributed to a lack of borehole control and truncation of the channels by erosion on the inner shelf.

Group 4 (Cane South)

A large (~ 7 km wide) interfluve separates Group 3 from Group 4 (Cane South, Fig. DR2 and 4). Group 4, which is between 6 and 9 km wide, consists of two main channels that cross beneath the modern coastline. The northern channel is approximately 2 - 3 km wide, and it has been incised to depths > - 21 m nearshore (Figs. DR2 and 4). Borehole data presented in Figure 4 indicate that this channel is incised to < - 18 m; however, a recently drilled Rotasonic core (Fig. DR2) penetrated this channel to - 21 m without intersecting pre-Quaternary deposits (Putney and others, 2004). Rotasonic Core 006 (Fig. DR2) also indicates that the lower portion of the fill material in the northern channel is composed of fluvial sands and gravels. The upper portion of the channel fill is characterized by backbarrier and lag deposits. These sediments correlate well with the geometries images by the seismic data, where opaque reflections dominate the lower portion of the channel and the upper portion is dominated by complex cut and fill (Fig. DR2). The shallower southern channel is approximately 2 to 2.5 km wide and < - 15 m deep onshore. The two channels intersect approximately 8 km offshore, but seismic-resolution limitations prevent the use of cross-cutting relations to determine relative ages of the features. Borehole data indicate that Group 4 is coincident with the sub-surface Cretaceous/Tertiary boundary (Fig.

4), suggesting that this boundary was likely an important factor controlling the position and orientation of this group.

Group 5 (Murrells Inlet)

A narrow (~ 3 km), discontinuous interfluve separates Group 4 from Group 5 (Murrells Inlet, Fig. 3). Group 5 is between 10 and 12 km wide (Fig. 4). Multiple main channels cross beneath the modern coastline, indicating that Group 5 likely represents occupation by several generations of the Pee Dee River over a long period and may be more accurately referred to as a compound incised valley (Zaitlin and others, 1994). Map patterns indicate as many as five main channels within the overall valley with widths ranging from 1 to 3 km and depths of incision between -10 and < - 20 m. Though multiple thalwegs are evident within individual seismic-reflection profiles, the highly complex nature of this system and limitations in the resolution of the seismic data prevent the use of cross-cutting relations to identify courses of individual channels or their relative ages (Fig. 4). Geoprobe Core Geo-5 (Fig. 3) is located approximately 2.5 km north of the end of seismic section C – C', but lies along the axis of the nearly north south paleochannels that trend through the Murrells Inlet area. Similar to the borehole intersecting the northern Cane South channel (Fig. DR2), Geo-5 indicates that the sediments filling the lower portion of the Murrells Inlet system are composed of fluvial sands and gravels. The upper portion of the fill consists of laminated muds and sands, representing backbarrier sediments, which are capped by a coarse lag deposit. The distribution of these sediments within the fill correlates well with the geometries images by the seismic data (Fig. 3). The lower portion of the section is characterized by opaque reflection, while the upper portions contain complex cut and fill geometries.

Group 6 (Pawleys Island)

An interfluve approximately 6 km wide separates Group 5 from Group 6 (Pawleys Island, Fig. DR3). Where it trends offshore, this interfluve is dissected by scour on the margins of the bounding channel systems. Overall, Group 6 is between 4 and 7 km wide (Fig. 4), with a channel thalweg approximately 2 to 3 km wide incised to depths between - 10 and > - 20 m. The morphology of this group is remarkably similar to that of the modern Pee Dee River system where it approaches the coast through Winyah Bay (Figs. 1 and 4). Group 6 probably represents a similar estuarine environment during a recent period of lower sea level.

Group 7 (North Island)

Borehole data are sparse southwest of Group 6, thus limiting the contour of the base of Quaternary sediments beyond this point (Fig. 4). Onshore data indicate that the pre-Quaternary surface (Paleocene sediments) dips steeply beneath North Inlet and Winyah Bay. The adjacent inner shelf south of Group 6, surrounding Group 7 (North Island), is thoroughly incised and probably represents the retreat path of the Winyah Bay estuary as it migrated landward during the most recent marine transgression (Figs. 1 and 4). Though Group 7 is only identified offshore, its trend toward the modern shoreline aligns well with the modern channel of the Pee Dee River system within Winyah Bay. The main channel of Group 7 is approximately 2 to 3 km wide and between - 10 and > - 20 m deep (Figs. DR3 and 4).

REFERENCES

Putney, T.R., Katuna, M.P., and Harris, M.S., 2004, Subsurface stratigraphy and geomorphology of the Grand Strand, Georgetown and Horry Counties, South Carolina: Southeastern Geology, v. 42, no. 4, p. 217-236.

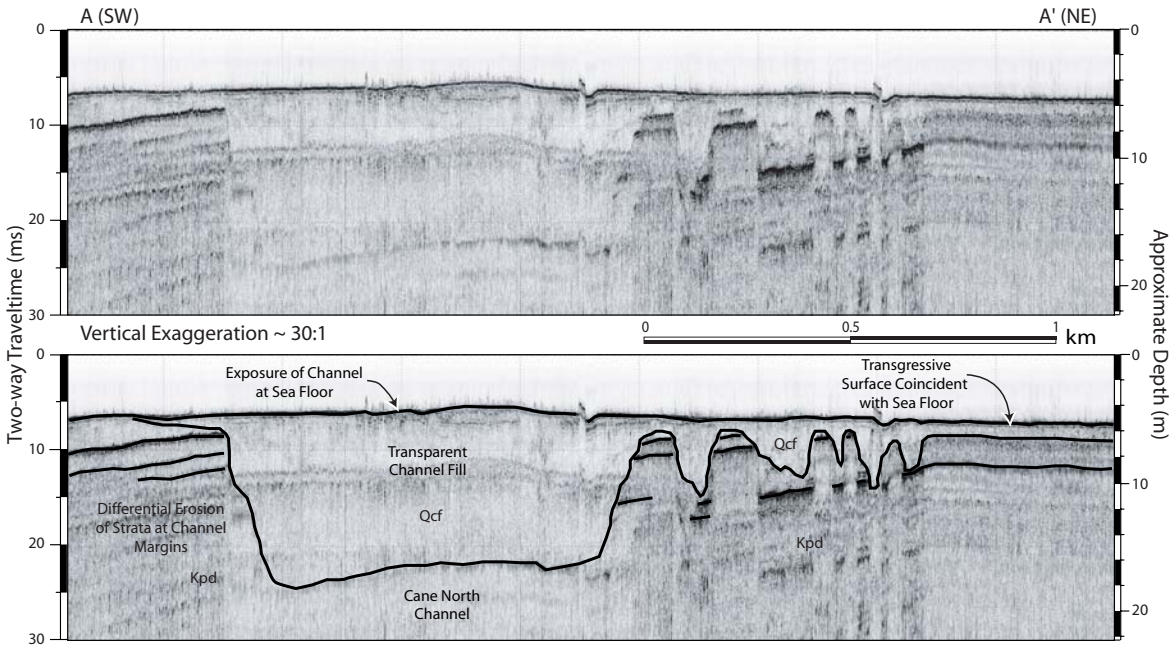
Zaitlin, B.A., Dalrymple, R.W., and Boyd, R., 1994, The stratigraphic organization of incised-valley systems associated with relative sea-level change, *in* Dalrymple, R.W., Boyd, R., and Zaitlin, B.A., eds., Incised-Valley Systems: Origin and Sedimentary Sequences: SEPM Special Publication No. 51, p. 45-60.

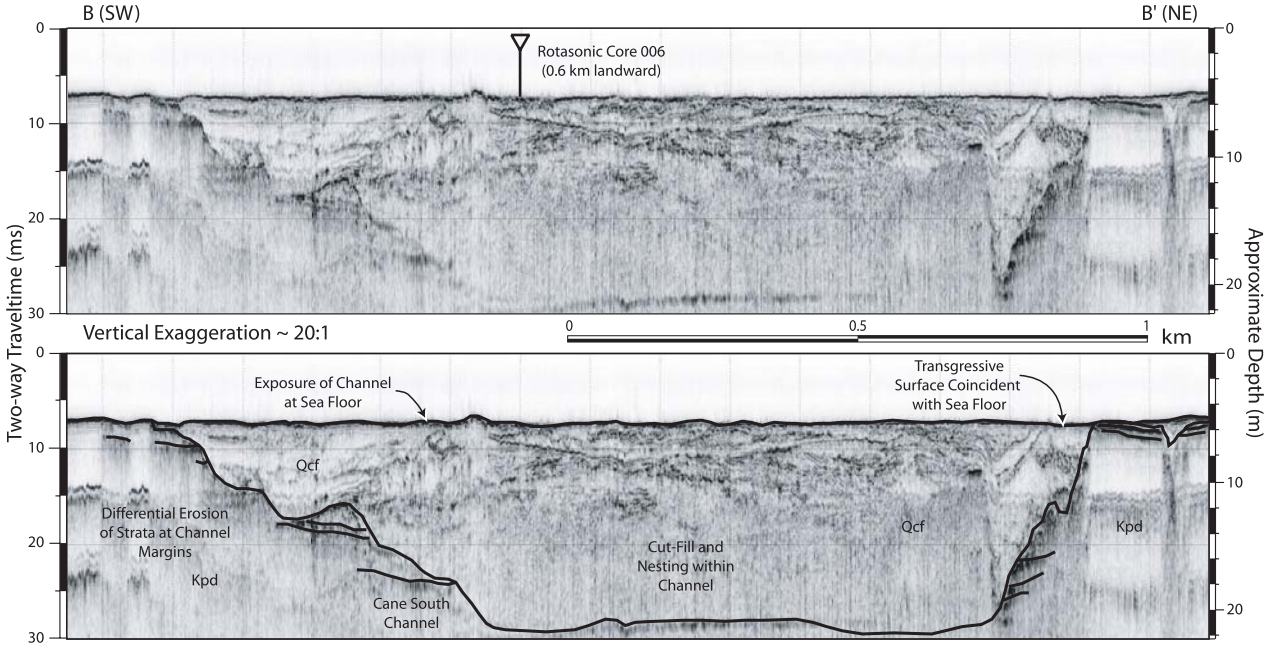
Figure Captions

Figure DR1. Chirp subbottom profile and interpretive cross section of the Cane North paleochannel. Location shown in Figure 1B. This profile illustrates how differential erosion of the tilted units within the underlying Cretaceous strata has influenced the location and trend of this channel system. Kpd - rocks of the Cretaceous Pee Dee Formation; Qcf - undifferentiated channel fill.

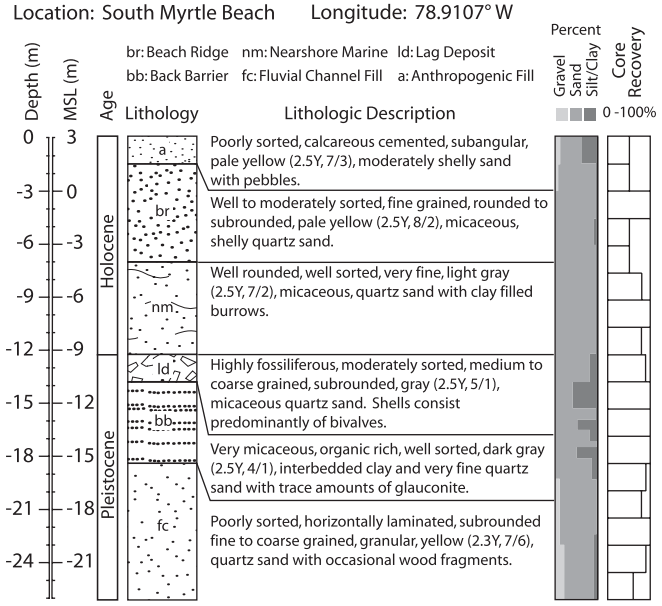
Figure DR2. Chirp subbottom profile and interpretive cross section of the northern Cane South paleochannel and borehole log information for Rotasonic Core 006 (BH 1). Locations are shown in Figure 1B. Kpd - rocks of the Cretaceous Pee Dee Formation; Qcf - undifferentiated channel fill.

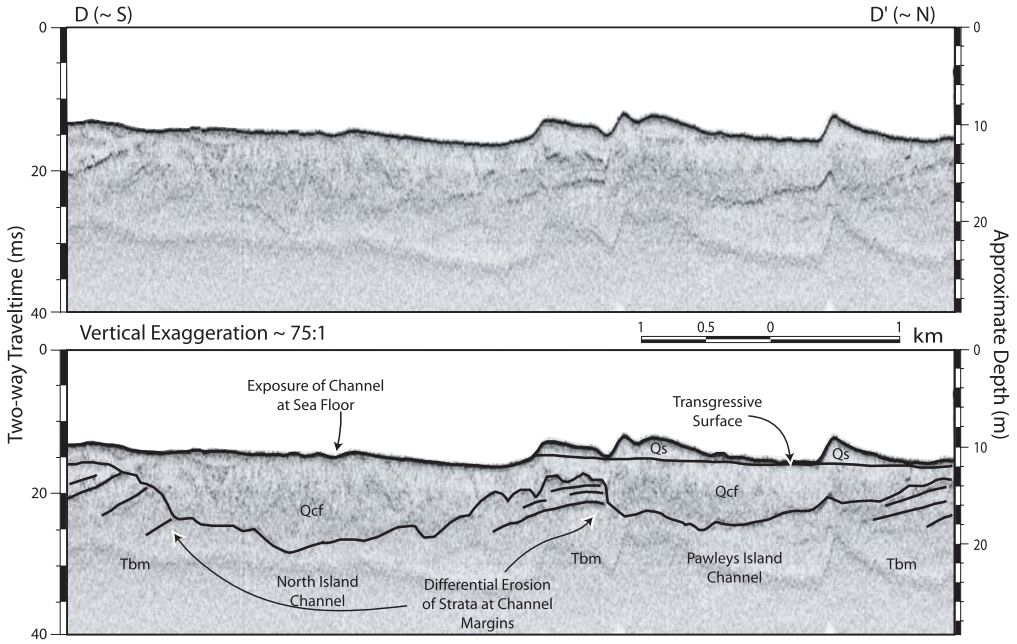
Figure DR3. Chirp subbottom profile and interpretive cross section of the Pawleys Island and North Island paleochannels shoreward of their intersection. Location shown in Figure 1B. Differential erosion of the tilted units within the underlying Paleocene strata has likely influenced the location and trend of these systems. Tbm - rocks of the Paleocene Black Mingo formation; Qcf - undifferentiated channel fill; Qs - undifferentiated surficial sediments.


A (SW)
A' (NE)
Two-way Traveltime (ms)
Approximate Depth (m)
Vertical Exaggeration ~ 30:1
0
0.5
1
km
Exposure of Channel at Sea Floor
Transgressive Surface Coincident with Sea Floor
Transparent Channel Fill
Qcf
Differential Erosion of Strata at Channel Margins
Kpd
Cane North Channel



Rotasonic Core 006 (0 - 26 m) Latitude: 33.6654° N
Location: South Myrtle Beach Longitude: 78.9107° W




D (~ S)
D' (~ N)
Two-way Traveltime (ms)
Approximate Depth (m)
Vertical Exaggeration ~ 75:1
1 0.5 0 1 km
Exposure of Channel at Sea Floor
Transgressive Surface
Qs
Qs
Qcf
Qcf
Tbm
Tbm
Tbm
North Island Channel
Differential Erosion of Strata at Channel Margins
Pawleys Island Channel