Resolving the age controversy of Pleistocene shoreline deposits in the Lower Coastal Plain in northeastern South Carolina

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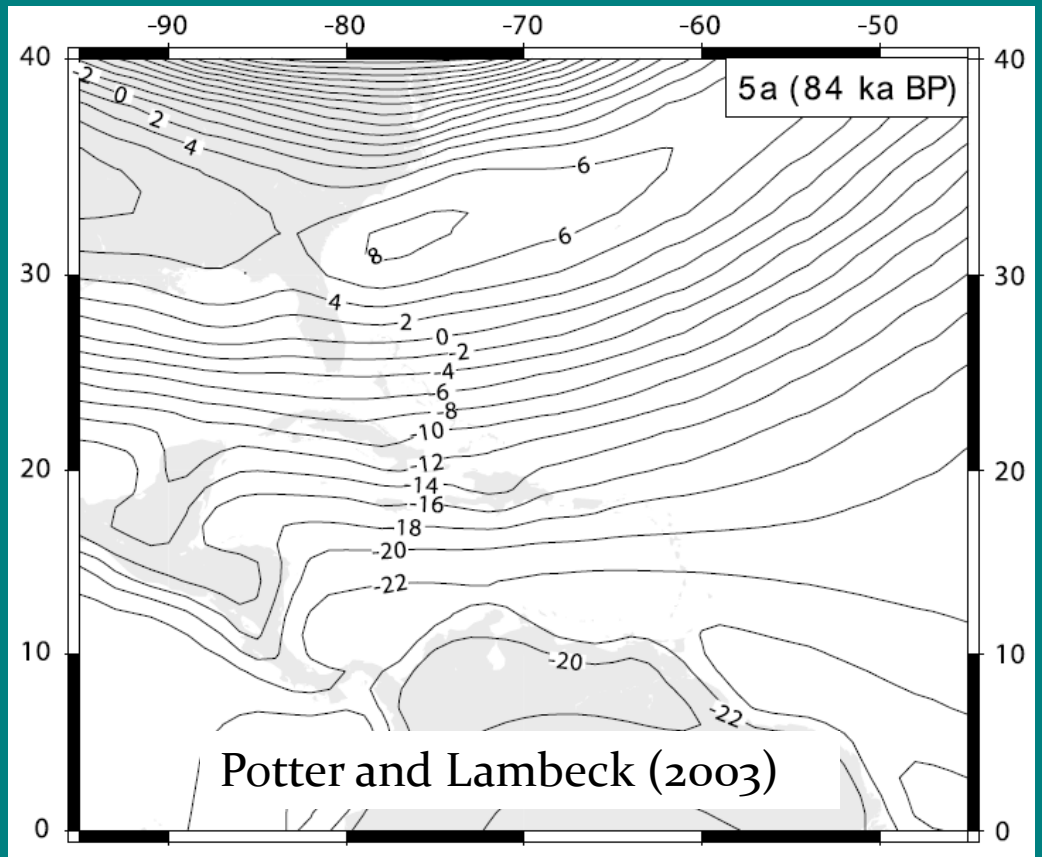
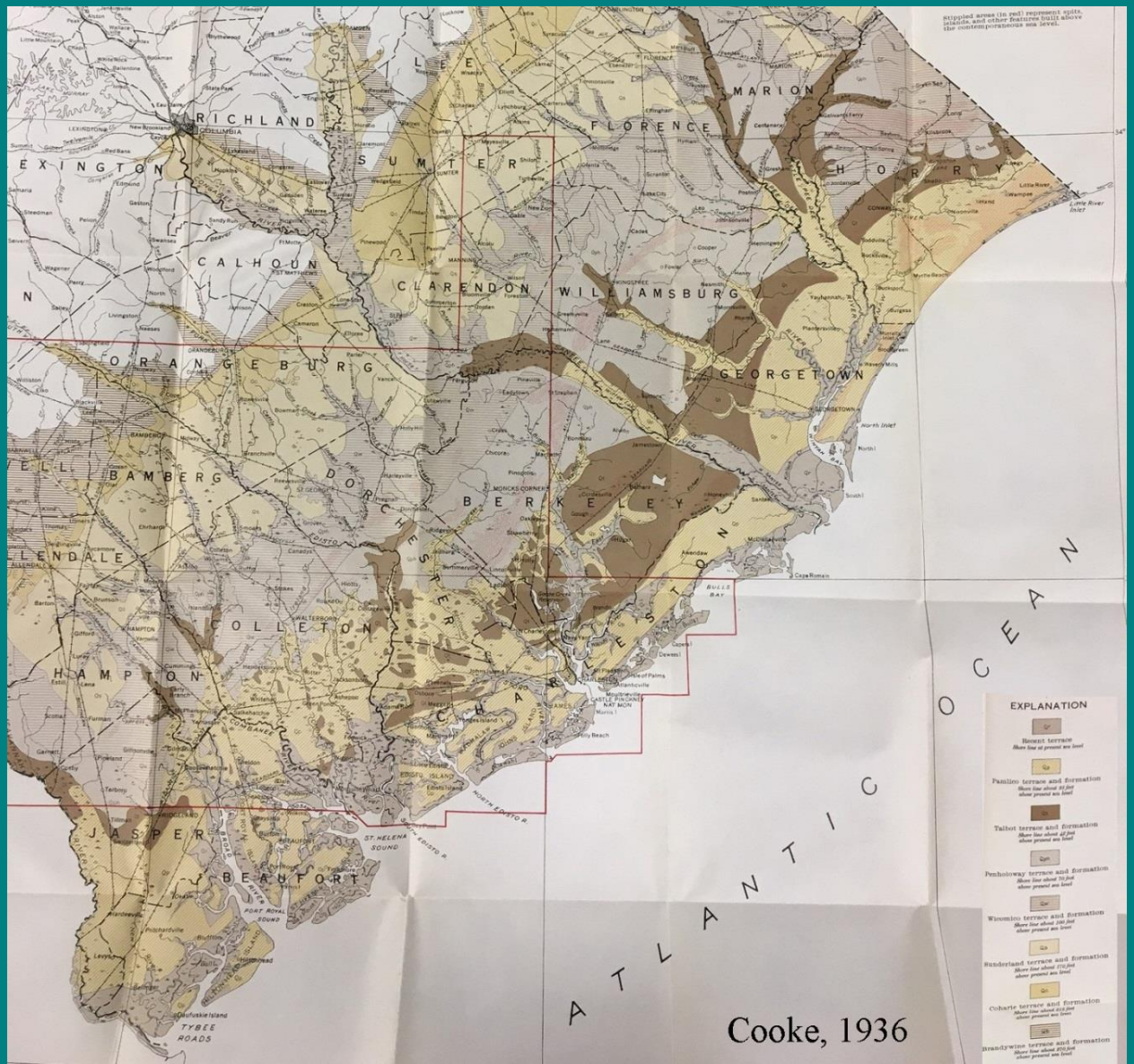
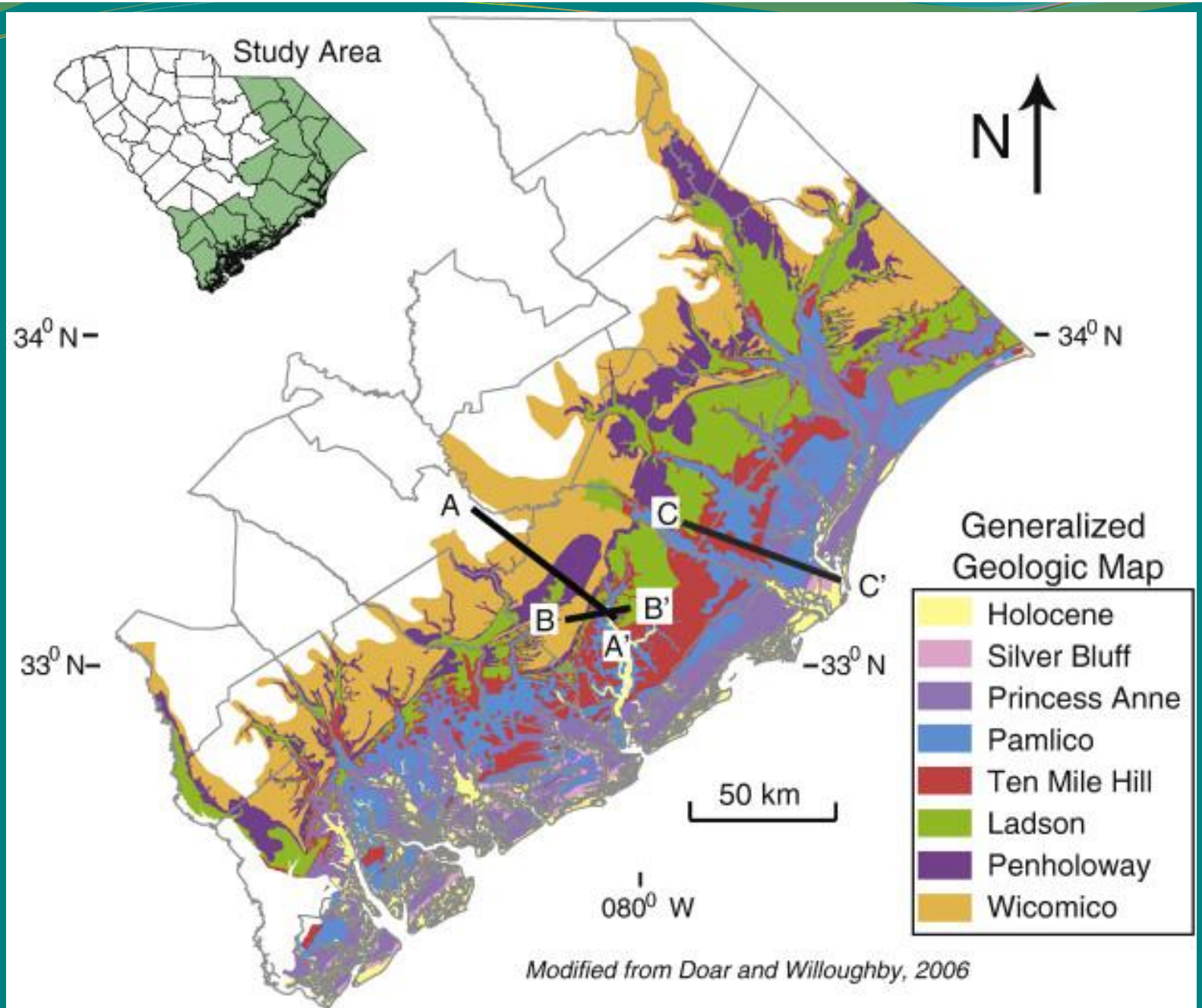
Lower US Atlantic Coastal Plain

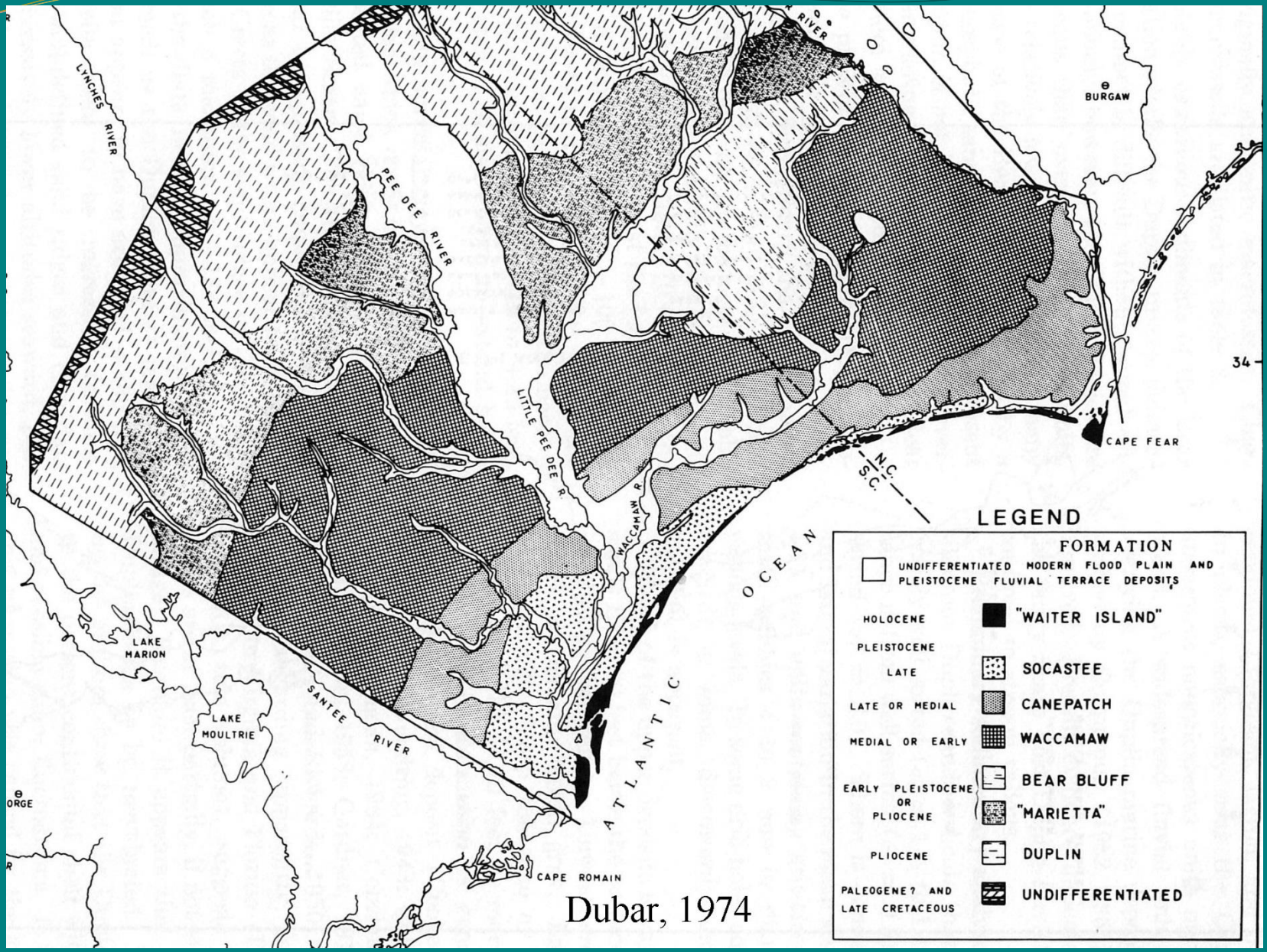
- Pleistocene interglacial deposits driven by sea level change
- Key for studying interglacial sea level and climate changes
- Constraining ice sheet dynamics of glacial



Geological Mapping

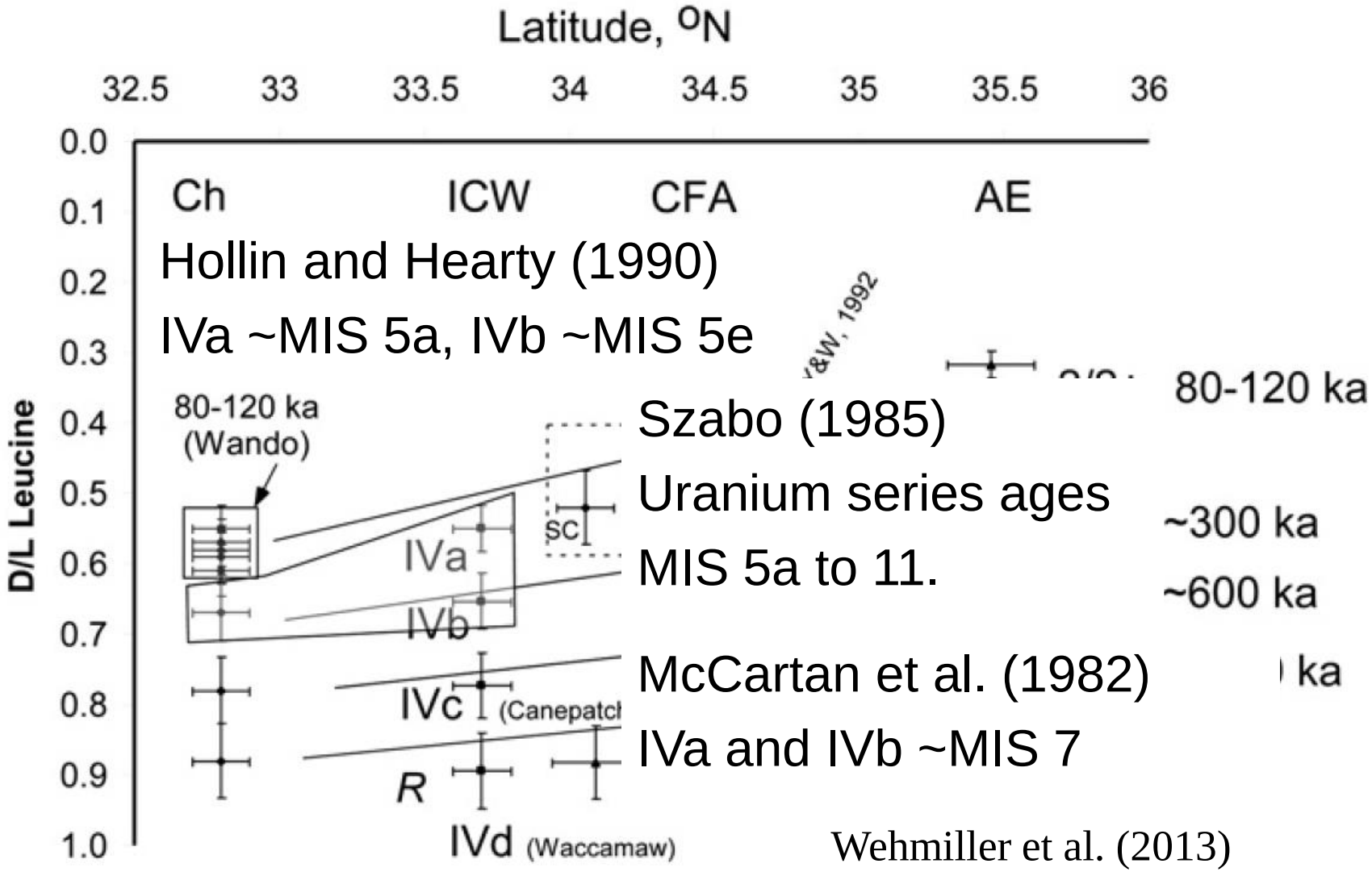



Study Area
N
34⁰ N
34⁰ N
A
A'
B
B'
C
C'
33⁰ N
33⁰ N
50 km
080⁰ W
Generalized Geologic Map
Holocene
Silver Bluff
Princess Anne
Pamlico
Ten Mile Hill
Ladson
Penholoway
Wicomico
Modified from Doar and Willoughby, 2006


LYNCHES RIVER
PEE DEE RIVER
LITTLE PEE DEE R.
WACCAMAW R.
BURGAW
CAPE FEAR
N.C.
S.C.
OCEAN
ATLANTIC
LAKE MARION
LAKE MOULTRIE
SANTEE RIVER
CAPE ROMAIN
34
LEGEND
FORMATION
UNDIFFERENTIATED MODERN FLOOD PLAIN AND PLEISTOCENE FLUVIAL TERRACE DEPOSITS
HOLOCENE
"WAITER ISLAND"
PLEISTOCENE
LATE
SOCASTEE
LATE OR MEDIAL
CANEPATCH
MEDIAL OR EARLY
WACCAMAW
EARLY PLEISTOCENE OR PLIOCENE
BEAR BLUFF
"MARIETTA"
PLIOCENE
DUPLIN
PALEOGENE? AND LATE CRETACEOUS
UNDIFFERENTIATED

Dubar, 1974

Chronology Controversy



Hollin and Hearty (1990)

IVa ~MIS 5a, IVb ~MIS 5e

Szabo (1985)

Uranium series ages

MIS 5a to 11.

McCartan et al. (1982)

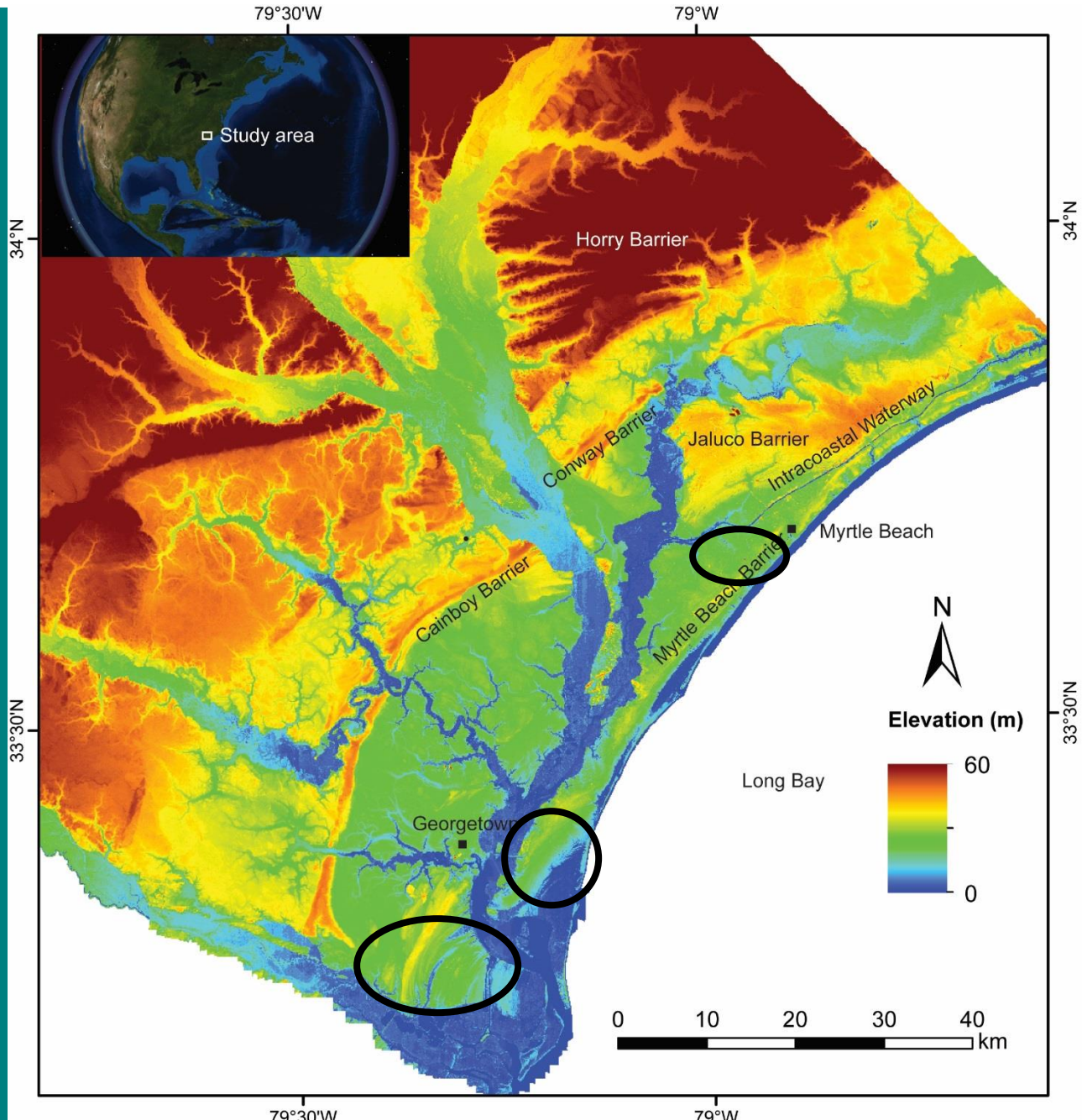
IVa and IVb ~MIS 7

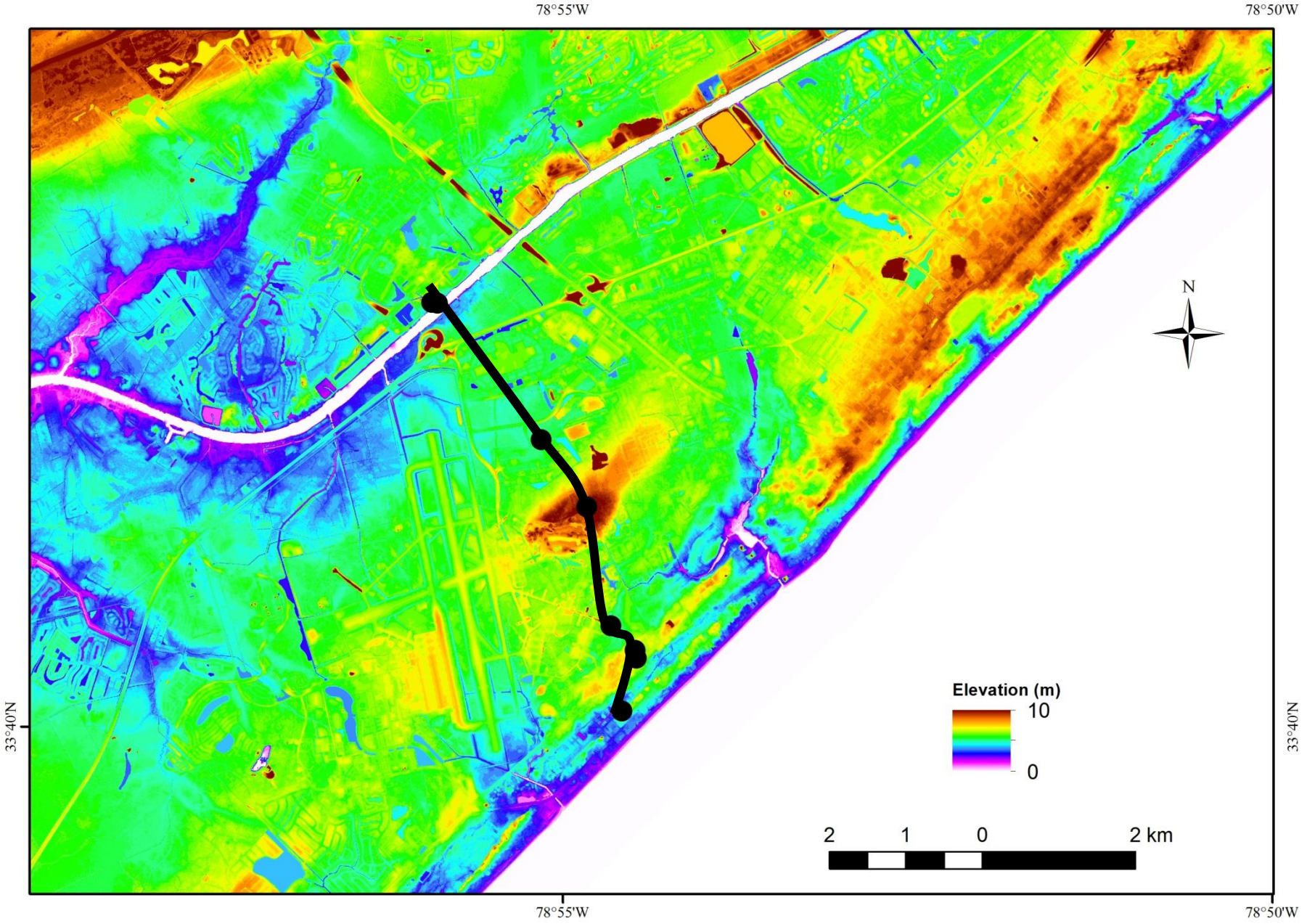
Wehmiller et al. (2013)

Methods

- Vibracore, Powerprobe core, and auger cores
- GPR
- OSL dating

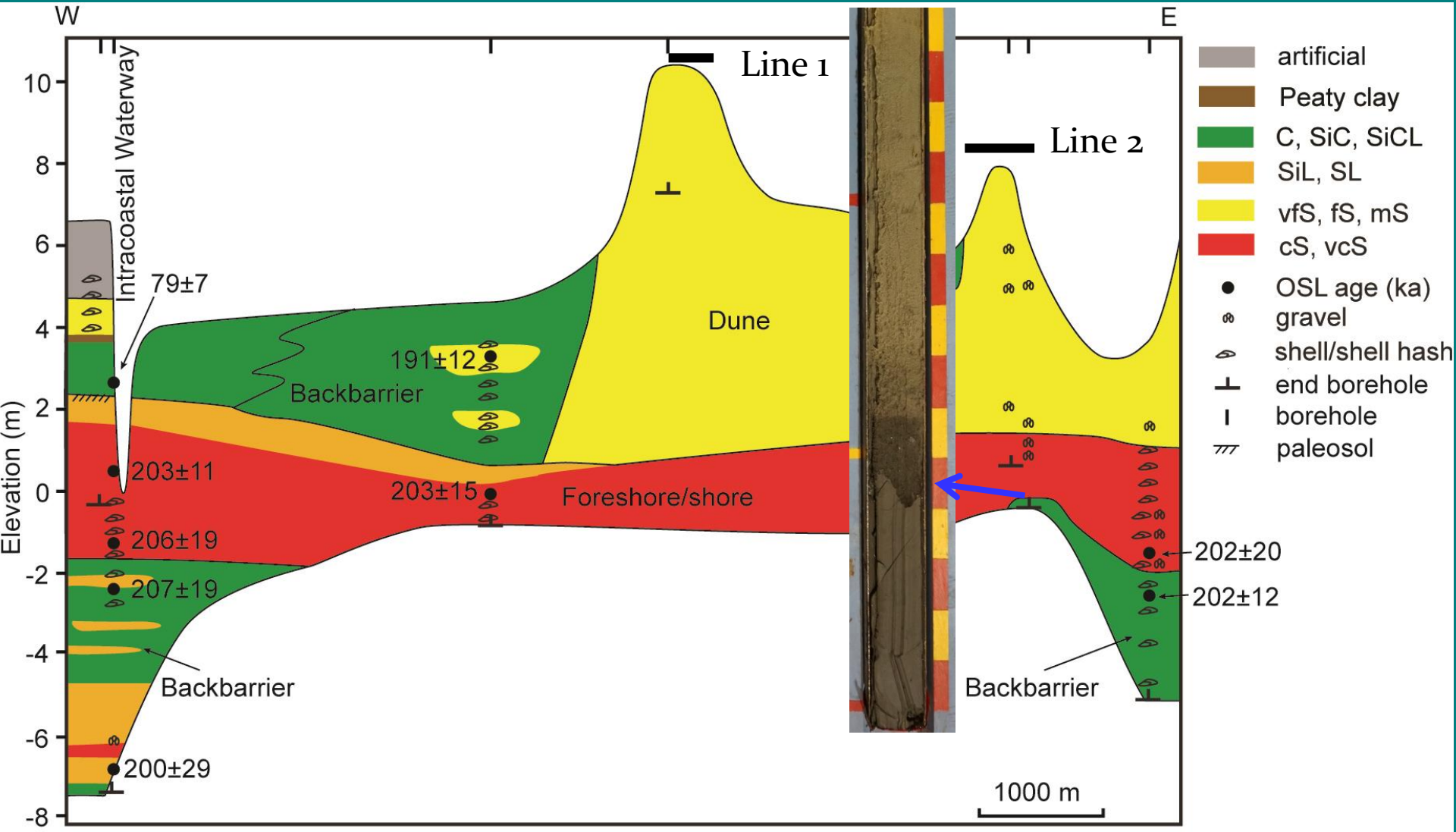
- Myrtle Beach Airport
- Hobcaw Barony
- North Santee



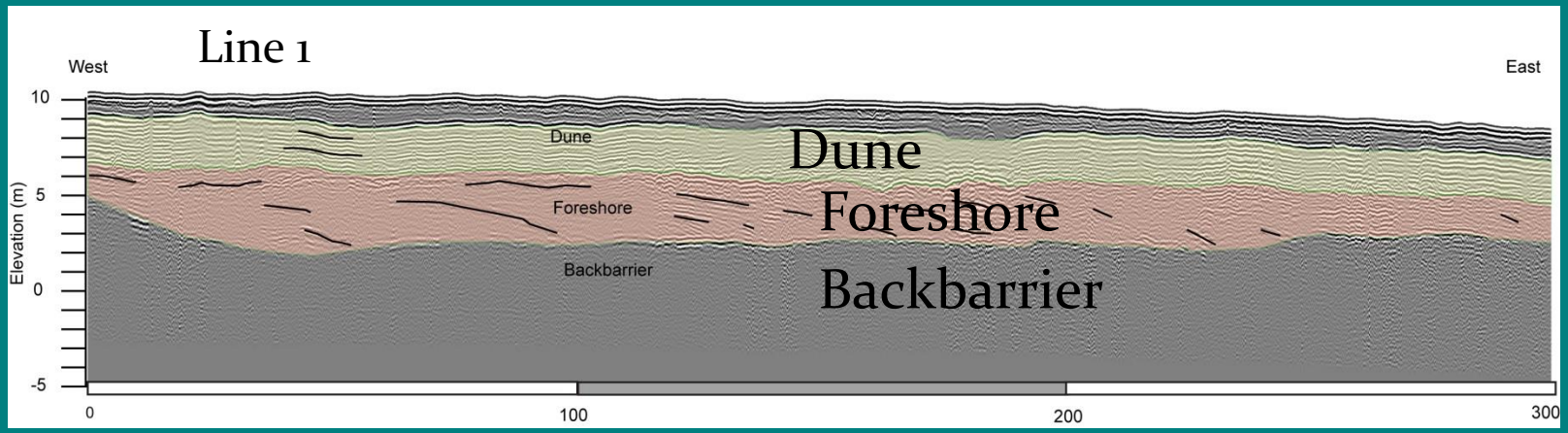

78°55'W
78°50'W
33°40'N
N
Elevation (m)
10
0
2 1 0 2 km

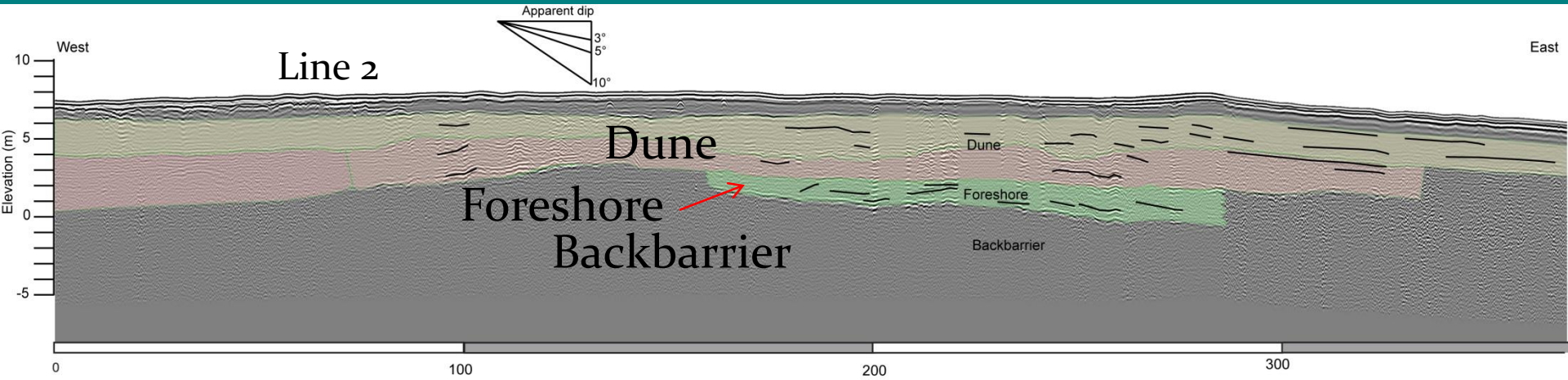
ICW at 1.3 km South of 501 Bridge

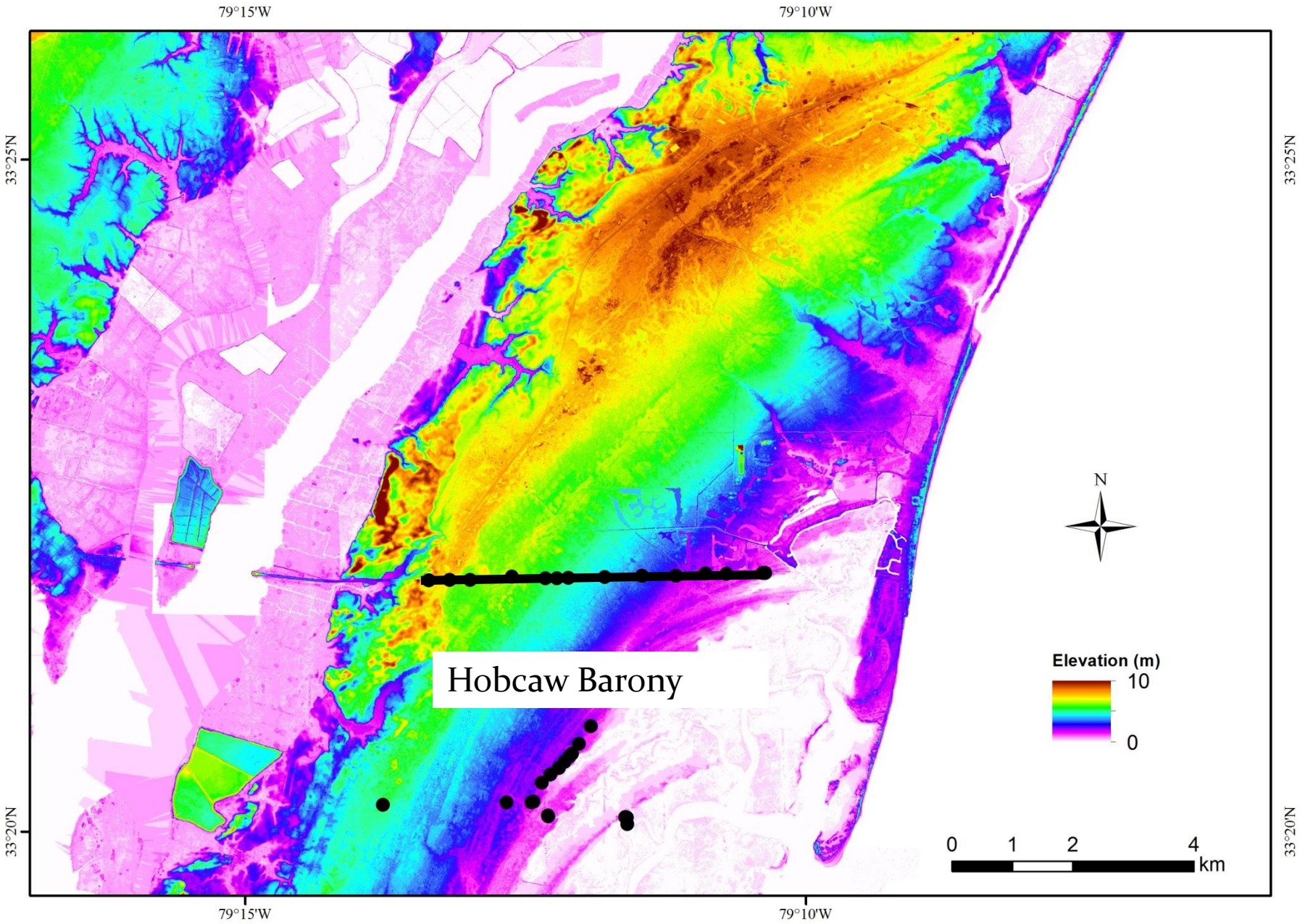
Myrtle Beach Airport Cross Section



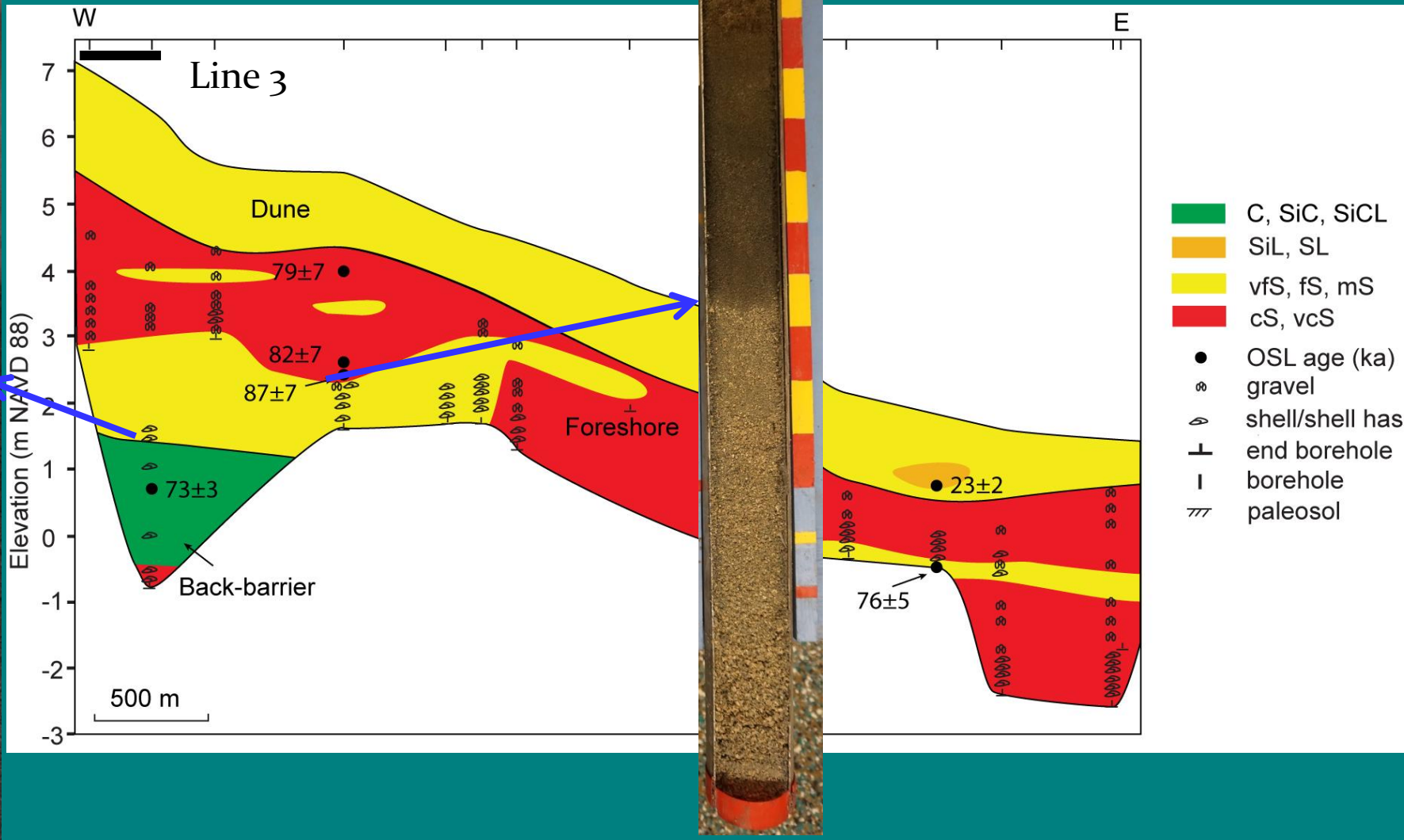
Myrtle Beach Airport GPR



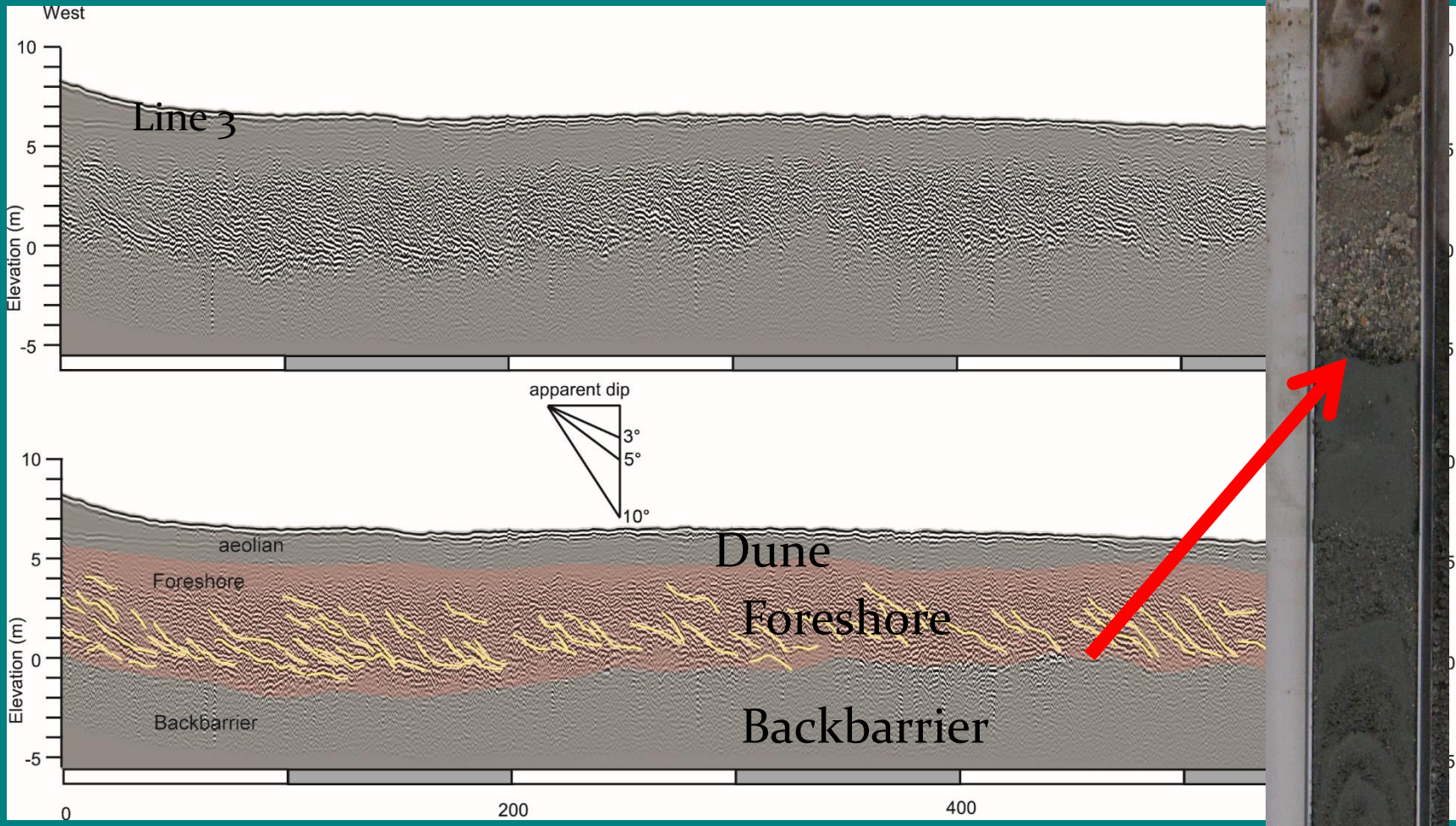


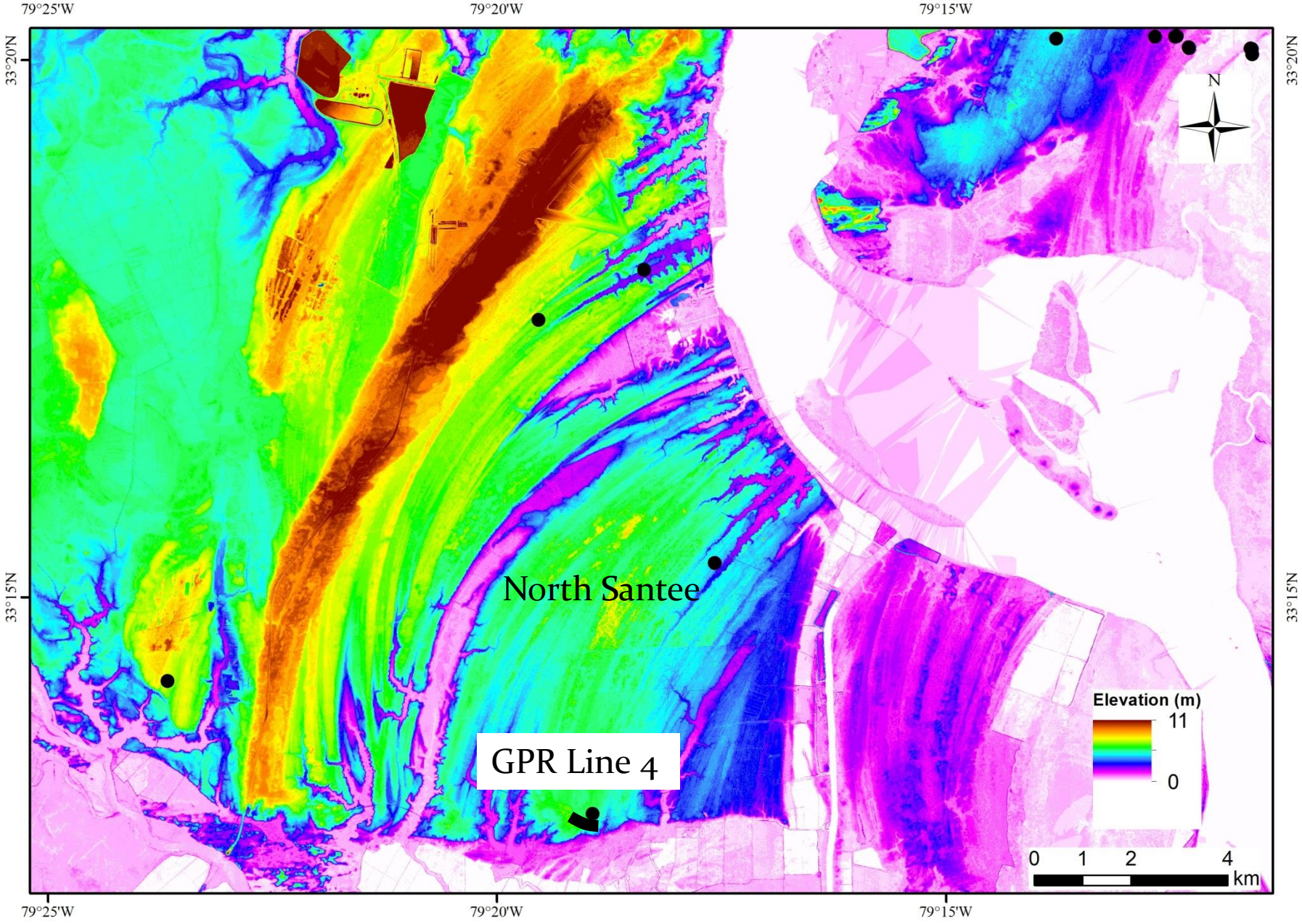

79°15'W
79°10'W
33°25'N
33°20'N
Hobcaw Barony
N
Elevation (m)
10
0
0 1 2 4
km

Hobcaw Barony Cross Section

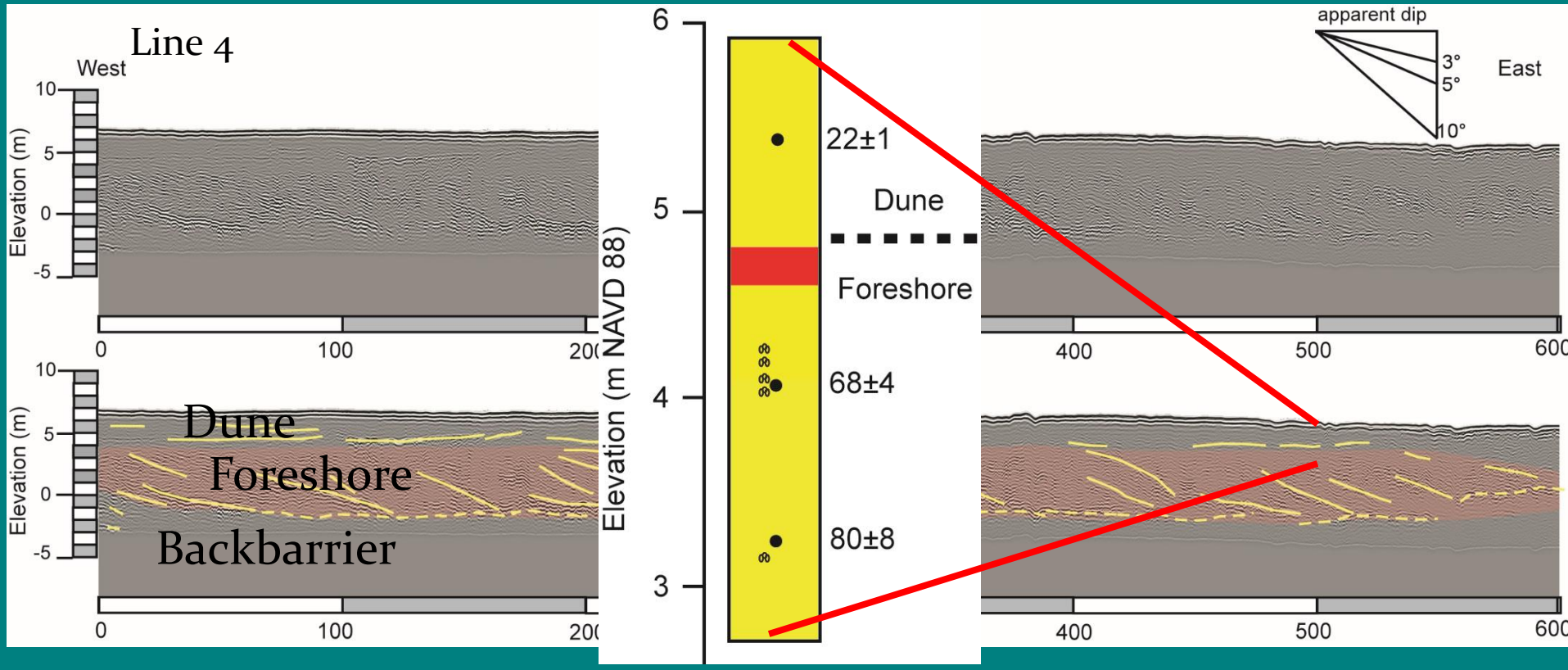


Hobcaw Barony GPR




79°25'W
79°20'W
79°15'W
33°20'N
33°15'N
N
North Santee
GPR Line 4
Elevation (m)
11
0
0 1 2 4
km

North Santee GPR and Stratigraphy



Summary and Conclusion

Myrtle Beach Barrier:

- Formation of the barrier corresponds to MIS 7
- The backbarrier consists of both MIS 7 and MIS 5a deposites
- The Socastee Formation and the Canepatch Formation at the ICW (cf. Dubar, 1974) is of MIS 5a and MIS 7 in age, respectively
- MIS 7 RSL is about -2 to 4 m at NE South Carolina

Continue…

North Santee and Hobcaw Barony

- Formed during MIS 5a as progradational barrier, in agreement with previous studies further south (see Poster by Harris et al. at Booth #9), but covered by MIS 2 aeolian deposits.
- MSI 5a RSL reached 1 to 6 m at SE South Carolina
- Youngest Pleistocene coastal deposits are not contemporary along the northeastern South Carolina coast, despite their stratigraphic and geomorphic similarity.

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