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Authors current email address for correspondence is simon.e.engelhart@durham.ac.uk

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Holocene relative sea-level changes and glacial isostatic adjustment of the U.S. Atlantic coast

Engelhart, S.E.[1], Peltier, W.R.[2], and Horton, B.P.[1]*

[1]Sea-Level Research, Department of Earth and Environmental Science, University of Pennsylvania, Hayden Hall, 240 South 33rd St., Philadelphia, Pennsylvania, 19104, USA

[2]Department of Physics, University of Toronto, 60 St. George St, Toronto, Ontario, M5S 1A7, Canada

*E-mail: bphorton@sas.upenn.edu.

ABSTRACT

The first quality controlled Holocene sea-level database for the U.S. Atlantic coast has been constructed from 686 sea-level indicators. The database documents a decreasing rate of relative sea-level (RSL) rise through time with no evidence of sea level being above present in the middle to late Holocene. The highest rates of RSL rise are found in the mid-Atlantic region. We employ the database to constrain an ensemble of glacial isostatic adjustment models using two ice (ICE-5G/6G) and two mantle viscosity (VM5a/b) variations to assess whether the spherically symmetric viscoelastic models are able to survive intercomparison with a more refined database of post glacial RSL history. We identify significant misfits between observations and predictions using ICE-5G with the VM5a viscosity profile. ICE-6G provides some improvement for the northern Atlantic region but misfits remain elsewhere. Decreasing the upper mantle and transition zone viscosity by a factor of two to $0.25 * 10^{21}$Pa s (VM5b) removes significant discrepancies between observations and predictions along the mid-Atlantic coastline

although misfits remain in the southern Atlantic region. These may be an indication of the importance of laterally heterogeneous viscosity in the upper mantle.

INTRODUCTION

Relative sea-level (RSL) change is related to the redistribution of mass from ice sheet growth and decay, inducing isostatic compensation of the underlying solid Earth (PALSEA, 2009). Our understanding of current rates of sea-level rise from tide gauge (e.g., Church and White, 2006) and satellite (e.g., Cazenave et al., 2009) data and of the ongoing mass loss from the major ice-sheets by GRACE (e.g., Velicogna and Wahr, 2006) requires correction for glacial isostatic adjustment (GIA) effects that are both calibrated to, and independently tested by, observations of former sea levels. Holocene RSL data are vital to inference of mantle viscosity (e.g., Mitrovica and Peltier, 1995) and lithospheric thickness (e.g., Tushingham and Peltier, 1992). The U.S. Atlantic coast is a key region for the comparison of model predictions and sea level observations because it provides an independent constraint for GIA models such as ICE-5G VM5a, that are tuned to data sets from Canada, Fennoscandia and Barbados (Peltier and Fairbanks, 2006). Significantly, the GIA of the U.S. Atlantic coast is dominated by the collapse of the large amplitude proglacial forebulge of the massive Laurentide ice-sheet.

The earliest GIA models (Clark et al., 1978) did not fit the observational data from the U.S. Atlantic coast when the viscosity of the mantle was assumed to be independent of depth (Cathles, 1975). While the VM1 model improved the fit between observations and model predictions (Tushingham and Peltier, 1992), a better agreement was achieved with the combination of ICE-4G and the more complex ‘VM2’ viscosity profile (Peltier, 1996). Since this publication, however, advances in the reconstruction of RSL (e.g., Horton et al., 2009), and the development of improved ice models, including ICE-5G (Peltier, 2007) and ICE-6G (Peltier,

2010) have occurred. The incorporation of rotational feedback in GIA models (e.g., Milne and Mitrovica, 1996) is an especially important recent advance. Here, we focus on whether a new sea-level database is able to confirm the good quality of fit between observations and predictions previously obtained using simpler models. As we will show, significant systematic deviations are revealed.

CONSTRUCTION OF A SEA-LEVEL DATABASE

The sea-level database is created from published and unpublished samples of organic sediment (salt and fresh water marshes) and shells of marine gastropods and foraminifera. The samples were converted into sea-level index points (see Supplementary Methods) when they meet three criteria; (1) the location of the sample is established to within 1km; (2) the age of the sample is calibrated to sidereal years using the latest ^{14}C calibration curve and (3) a relationship between the sample and a known tidal level (i.e., indicative meaning; van de Plassche, 1986) is identified. For samples that cannot be directly related to former sea level, we produce marine (e.g., marine shells) and terrestrial (e.g., freshwater peat) limiting data that must have been deposited below and above mean sea level, respectively. Every sample has an error calculated from a variety of factors that are inherent to sea-level research (van de Plassche, 1986). We minimized the influence of compaction of sediment by excluding intercalated index points (organic sediments that were under and overlain between different sedimentary units) and sub-divide the remaining into: ‘base of basal’ and ‘basal’ (e.g., Horton and Shennan, 2009). To account for spatial variations, the database was sub-divided into 16 geographical regions (Fig. 1; #1-16) based on a combination of the availability of data, the distance from the former center of the Laurentide Ice Sheet and GIA reconstructions. The addition of new RSL data may allow further subdivision. All observational data (radiocarbon dates, calibrated age ranges, RSL reconstructions with associated errors and references to the original publications) are provided in the Supplementary Methods.

PREDICTIONS OF RELATIVE SEA LEVEL

The model analyses are based on the full gravitationally self-consistent form of the GIA theory and include the effects of rotational feedback (e.g., Milne and Mitrovica, 1996). The RSL predictions are based on the ICE-5G and ICE-6G ice models. The ice models are coupled to the VM5a viscosity model (Peltier and Drummond, 2008) that reduces the misfit between predicted and observed horizontal motions of the North American plate (Argus and Peltier, 2010). VM5a includes a 100 km thick lithosphere, consisting of a 60km thick elastic upper layer, beneath which there exists a 40km thick layer with a viscosity of 10^{22}Pa s. Here we apply a new Earth model by reducing the viscosity of the upper mantle and transition zone above the 660km phase transformation from $0.5*10^{21}$Pa s (VM5a) to $0.25*10^{21}$Pa s (VM5b) (Figure DR2). This is similar to the value calculated by Wolf et al. (2006) of $0.32*10^{21}$Pa s but represents a 50% reduction compared to the viscosity of $0.53*10^{21}$Pa s provided by Paulson et al. (2007). However, Paulson et al. (2007) noted that a lower upper mantle viscosity could be supported if associated with a stronger lower mantle viscosity. Tushingham and Peltier (1992) showed that reducing the viscosity of the upper mantle and transition zone substantially increases the width of the proglacial forebulge and, therefore, raises the predicted RSLs along the U.S. Atlantic coast without increasing the number of free parameters. VM5b continues to fit RSL data from northern Canada because they are insensitive to upper mantle and transition zone visco-elastic structure (Peltier, 1998).

HOLOCENE SEA-LEVEL OBSERVATIONS

The new Holocene RSL database for the U.S. Atlantic coast consists of 342 sea-level index points, 189 marine limiting dates and 155 terrestrial limiting dates (Fig. 2a). The RSL database previously used to constrain GIA models (Peltier, 1996) contained fewer index points (n = 175) and marine limiting data (n = 85) but a greater number of terrestrial limiting data (n = 395). The increase in the number of index points in the new database is due to both the addition of new data (e.g., Horton et al., 2009; Miller et al., 2009) and the reinterpretation of terrestrial limiting dates as index points on the basis of the macro- and microfossil sea-level indicators. The elevation errors are index point specific, in contrast to the standard vertical error term employed in the previous database. The new database has good temporal coverage from 6ka to present, however only 7% of the index points are older. The early Holocene record is primarily defined by limiting data. Spatially, RSL is well constrained by index points between Maine and South Carolina, although there is an absence of index points in Georgia and the Atlantic coast of Florida. The validation of observations strongly affects the interpretation of a GIA model. For example, the New Jersey predictions must now plot through index points, rather than lying below a host of samples previously interpreted as limiting data (Fig. 2b). The North Carolina site demonstrates the importance of the addition of new data (Horton et al., 2009) to constrain models of GIA (Fig. 2c).

Analysis of the full database from eastern Maine (#1) to southern South Carolina (#16) (Fig. 3) demonstrates that RSL has not risen above present during the middle and late Holocene. In Maine and northern Massachusetts, limiting data suggests RSL may have dropped from above present prior to a “slow stand” between 11.5 and 7.5ka (e.g., Kelley et al., 2010). Rates of RSL change were highest during the early Holocene and have been decreasing over time, due to the exponential form of the GIA process following deglaciation and the reduction of ice equivalent meltwater input from 7ka onwards. The maximum rate of Holocene RSL rise (e.g., ~15m since 6ka) occurred in New Jersey and Delaware (#8-#10); coincident with the area of greatest ongoing GIA related subsidence. The RSL histories of the northeastern Atlantic region (#1-#5) are constrained by sea-level index points from 7ka to present; all five areas reveal a rise in sea level of less than 10m since 6ka. Index points from southern North Carolina to southern South Carolina (#14-#16) similarly support a rise in RSL of less than 10m during the last 6ka.

IMPLICATIONS FOR GLACIAL ISOSTATIC ADJUSTMENT MODELS

The ICE-5G VM5a (Peltier and Drummond, 2008) model is in good agreement with the Holocene RSL observations in eastern (#1) and southern Maine (#2) for the last 6ka. The model lies above marine limiting dates from southern Maine between 8 and 11ka. For the remaining study areas (#3-#16), the model fits the observations in the late Holocene (0-3ka) but with increasing age there is a systematic disagreement between the model and the data. The misfit is most pronounced along the mid and southern Atlantic coastlines (New York #6 to southern South Carolina #16) with observations of RSL ~10m higher than model predictions at 6ka. The predictions are invalidated by marine limiting dates at southern Massachusetts (#4), New Jersey (#8), Chesapeake Bay (#11) and northern North Carolina (#13). ICE-6G VM5a (Peltier, 2010) is an improvement over ICE-5G VM5a for northern Massachusetts to New York (#3-#6). However, the model now under-predicts RSL in eastern Maine (#1) and over-predicts in southern Maine (#2). There is little difference between ICE-5G/6G from Long Island (#7) to southern South Carolina (#16), because both ice models have similar mass and cover exactly the same surface area of the North American continent.

For both ice models, decreasing the upper mantle viscosity in VM5a to produce VM5b results in a considerable improvement (Figure DR3) in the quality of fit along the U.S. Atlantic coast in the area of greatest GIA-related subsidence (#4-#12). Earlier model iterations that also increased the upper mantle/lower mantle contrast ratio from 1:1–1:4 resulted in a similar decrease in variance (Tushingham and Peltier, 1992). However, by reducing the value of both the upper mantle and the transition zone viscosity, we may have significantly violated the model fit to the McConnell spectrum (McConnell, 1968) of Fennoscandian rebound. This would suggest that we have directly detected a requirement for lateral viscosity variation in the upper mantle from two independent data sets associated with different former ice masses (near-field Fennoscandia and intermediate-field U.S. Atlantic coast) (e.g., Kaufmann and Lambeck, 2002). Indeed, it has previously been noted that 1D viscosity structure derived from global post glacial rebound observations is heavily weighted toward the viscosity structure beneath the loaded region and not the global average (Paulson et al., 2005).

While the VM5b viscosity profile results in a significant improvement, there remain two outstanding issues. Firstly, the incorporation of the VM5b viscosity profile with ICE-5G predicts late Holocene highstands of RSL in the northeastern U.S. (#1-#3), because the softening of the upper mantle and transition zone produces a time dependent shift of the boundary between uplift and subsidence. The highstand is removed at eastern Maine (#1) by using ICE-6G because of a change in the thickness of the proximal ice load. Therefore, the remaining highstands in southern Maine (#2) and northern Massachusetts (#3) may also be eliminated through further thickening of the ice load in proximity to these two locations. Alternatively, a slight increase in the thickness of the elastic lithosphere would accomplish the same improvement of fit (Tushingham and Peltier, 1992).

Secondly, and more importantly, are the continuing misfits between the VM5a/VM5b RSL predictions and observations in the southern Atlantic region (#13-#16). We must consider that changes to other aspects of the Earth model may be necessary to fit the data, including lithospheric thickness (e.g., Tushingham and Peltier, 1992) and/or the incorporation of lateral heterogeneity in the mantle (e.g., Wu, 2006) and lithosphere (e.g., Wang and Wu, 2006). Tushingham and Peltier (1992) demonstrated that changes in lithospheric thickness from 71 to 245km have little effect on the variance between model predictions and sea-level observations during the Holocene along the U.S. Atlantic coast. 3D mantle viscosity may be required to incorporate the effects of the subduction of the Farallon Plate 80 million years ago, which has now penetrated the top half of the lower mantle beneath the Atlantic (e.g., Bunge and Grand, 2000). Changes to the viscosity of the upper part of the lower mantle in the 1D model (e.g. Davis and Mitrovica, 1996) are usually ruled out by the strong constraints of the RSL data from Canada. However, Wang and Wu (2006) produced a model supported by seismic velocity anomalies from global tomography models that showed lateral variations at all depths of the mantle performed better than a model with no lateral variations.

RSL observations may also be subject to changes from processes such as compaction, tidal range variations and tectonics (e.g., Shennan and Horton, 2002). The database shows no discernable difference between basal and base of basal samples; indeed compaction would only lower the elevation of index points, artificially improving the fit to the model. If the tidal range has not remained constant through time, sea-level chronologies based upon tide-level indicators will differ from ‘true’ sea level. Modern tidal range along much of the southeastern Atlantic coast is less than 2.5 m. Therefore, an unrealistic 10 fold increase in tidal range is needed to lower the elevation of sea-level observations and remove the misfit at 7ka. The rate of tectonic uplift necessary to achieve a fit between model and data (> 1mm a^{-1}) disagrees with GPS (Sella et al., 2007) and tide-gauge (e.g., Douglas, 1991) observations. Indeed, uplift rates of this magnitude are more typically associated with seismic coastlines such as Cascadia (e.g., Burgette et al., 2009). There is evidence for tectonic activity in North and South Carolina. But the calculated long-term uplift rate along the Orangeburg Scarp, SC, of ~0.02 – 0.05mm a^{-1} (Dowsett and Cronin, 1990) is not sufficient. The rate of uplift along the Cape Fear Arch, NC is poorly constrained (0.14 – 1.8mm a^{-1}) and may be highly localized (Marple and Talwani, 2004). Rates of change due to mantle upwelling and downwelling show no spatial pattern along the U.S. Atlantic coast and are likely to be less than 0.1mm a^{-1} (Conrad and Husson, 2009). It is unfortunate that there is currently no RSL data available from the Atlantic coast of Florida or Georgia to allow us to ascertain whether the misfit between observations and predictions is a regional phenomenon. This limitation currently prevents us from confirming that the internal visco-elastic structure must be laterally heterogeneous on a scale that influences ongoing GIA.

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FIGURE CAPTIONS

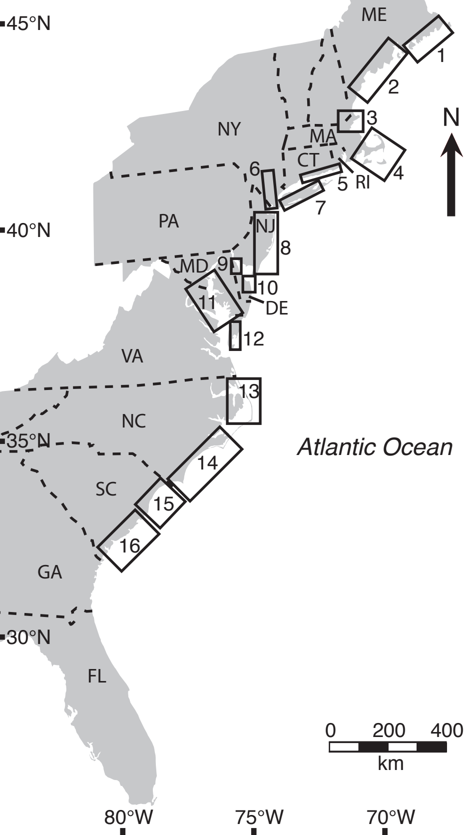
Figure 1. Location map of the U.S. Atlantic coast showing the 16 study areas from Maine to South Carolina. The numbers correspond to the reconstructions in Figure 3.

Figure 2. Age-altitude plots of relative sea-level (RSL) observations for the Peltier (1996) and new database. A. highlights all the index points with an inset of a histogram showing the temporal distribution. B and C demonstrate the differences in New Jersey and northern North Carolina. Index points in the new database are plotted as boxes with the 2σ vertical and calibrated age errors, whereas in the previous database only age errors are 2σ.

Figure 3. Age-altitude plots of relative sea-level (RSL) observations and model predictions for 16 different areas from Maine to South Carolina. Index points are plotted as boxes with the 2σ vertical and calibrated age errors. Predictions shown are from the ICE-5G (black line) and ICE-

6G (red line) ice models, coupled to either the original VM5a (solid lines) or the modified VM5b (dashed lines) viscosity profiles.

[1] GSA Data Repository item 2011xxx, xxxxxxxx, is available online at www.geosociety.org/pubs/ft2011.htm, or on request from editing@geosociety.org or Documents Secretary, GSA, P.O. Box 9140, Boulder, CO 80301, USA.


45°N
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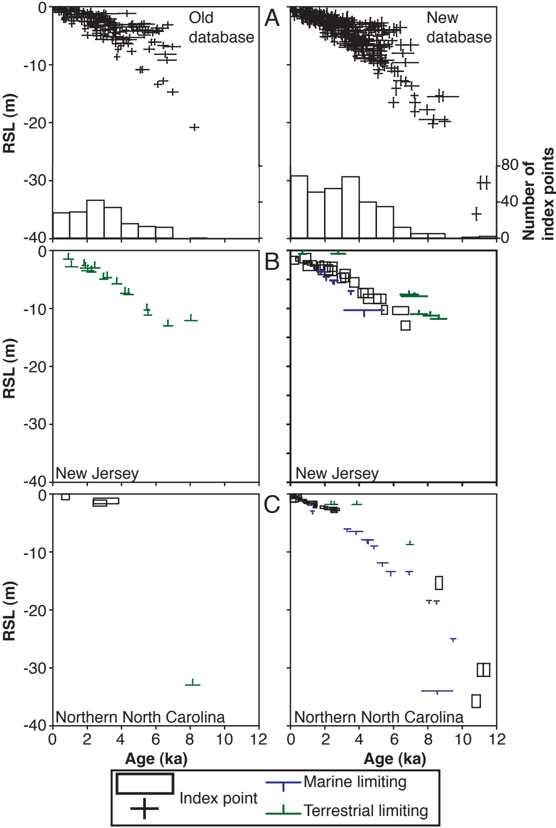
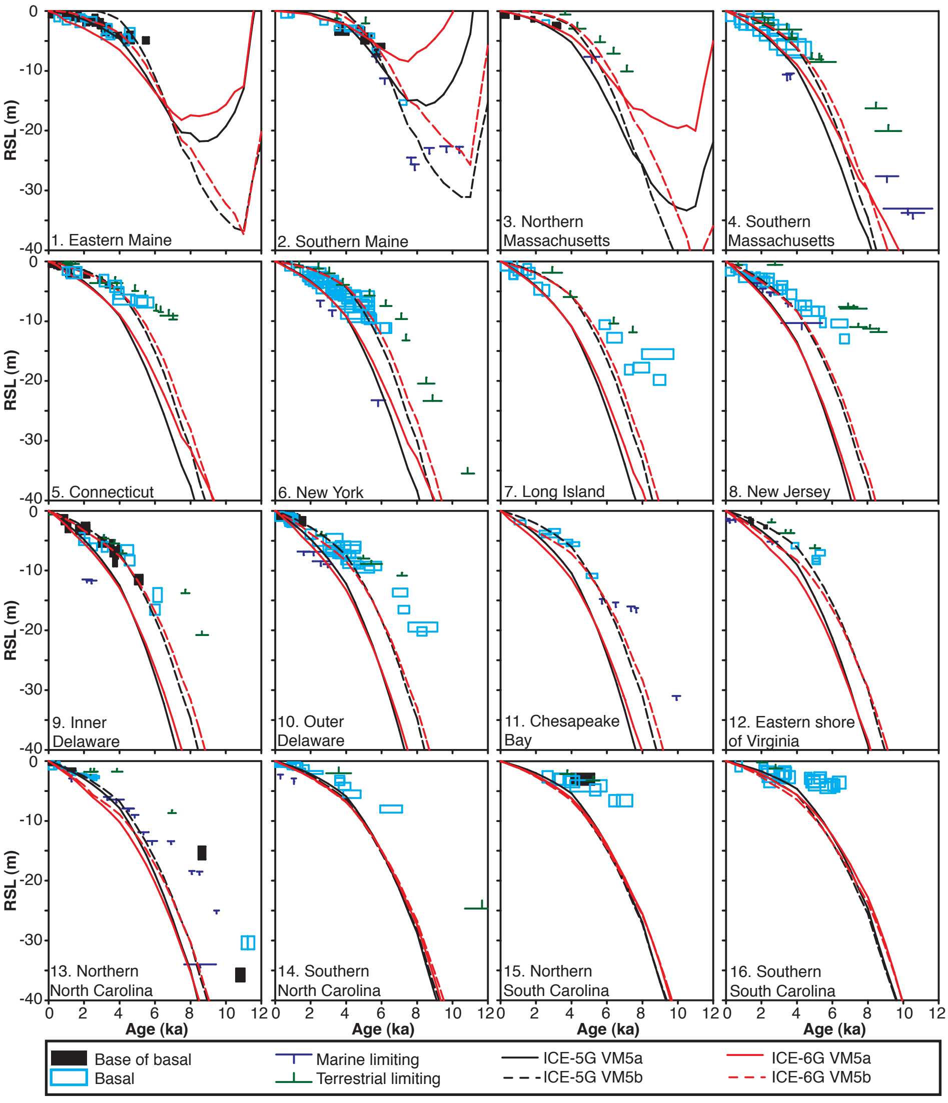


Old database
New database
A
B
C
RSL (m)
0
-10
-20
-30
-40
Number of index points
80
40
0
New Jersey
Northern North Carolina
Age (ka)
0
2
4
6
8
10
12
Index point
Marine limiting
Terrestrial limiting


RSL (m)
Age (ka)
0
-10
-20
-30
-40
0
2
4
6
8
10
12
1. Eastern Maine
2. Southern Maine
3. Northern Massachusetts
4. Southern Massachusetts
5. Connecticut
6. New York
7. Long Island
8. New Jersey
9. Inner Delaware
10. Outer Delaware
11. Chesapeake Bay
12. Eastern shore of Virginia
13. Northern North Carolina
14. Southern North Carolina
15. Northern South Carolina
16. Southern South Carolina
Base of basal
Basal
Marine limiting
Terrestrial limiting
ICE-5G VM5a
ICE-5G VM5b
ICE-6G VM5a
ICE-6G VM5b

Supplementary Methods

1. GEOLOGICAL DATA

A sea-level index point is a datum that can be employed to show vertical movement of sea level (Shennan, 1986). The sample location is identified from GPS co-ordinates and expressed in decimal degrees to three decimal places. To calculate the position of former RSL, both the elevation of the sample (m NAVD88) and its relationship to a water level (known as the indicative meaning) must be known (Shennan, 1986; van de Plassche, 1986). We constrain the indicative meaning using the modern distribution of microfossils (e.g.,Gehrels, 1994) and/or identifiable plant macrofossils of salt marsh vegetation (e.g.,Niering and Warren, 1980), which may be supported by $\delta^{13}C$ values from the radiocarbon-dated sediments (e.g.,Gonzalez and Tornqvist, 2009; Kemp et al., 2010). For example, a sample that has a floral and/or faunal indication of forming within a salt marsh environment is assigned an indicative meaning between highest astronomical tide and mean tide level. The indicative range is reduced for samples where plant macrofossils are identified to the species level (e.g. *Spartina patens*).

The relative sea level of an index point is calculated using the equation:

$$\text{Relative Sea-Level} = \text{Elevation}_{\text{sample}} - \text{Reference Water Level}_{\text{sample}}$$

where the elevation and reference water level are expressed in meters relative to the national datum, NAVD88.

For each sample, we calculated the vertical error of the index point from a variety of factors that are inherent to sea level research (Shennan, 1986), with additional errors incorporated including the type of coring equipment used, techniques of depth measurement and the compaction of the sediment during penetration. An error is also included to account for the leveling of the sample to NAVD88. This varies between ± 0.05 m for high precision modern techniques but maybe greater than ± 0.5 m for less precise methods. We do not include an error for the change in tidal range through time. The total error (E_h) for each sample may then be calculated from the expression:

$$E_h = (e^2{}_1 + e^2{}_2 \ldots + e^2{}_n)^{1/2}$$

Where $e_1 \ldots e_n$ are the individual sources of error.

A further source of error in sea-level reconstruction is sediment consolidation, the influence of which was recognized in early studies of sea level from European (e.g., Jelgersma, 1961) and North American (e.g., Bloom, 1964) salt marshes. If consolidation is not corrected for, then index points will be lowered from their original elevation and may lead to erroneous conclusions concerning the fit of the GIA models. As correcting for compaction is a complex process involving many variables (Pizzuto and Schwendt, 1997), we have instead only employed index points with a reduced likelihood of influence by compaction (e.g., Törnqvist et al., 2008); base of basal (salt-marsh peat that directly overlies uncompressible substrate) and basal (salt-marsh peat that directly overlies uncompressible substrate but not sampled directly above the contact) peat samples (Horton and Shennan, 2009). Where samples cannot be directly related to former sea level, we produce marine (e.g. marine shells) and terrestrial (e.g. freshwater peat) limiting data. These are important constraints for models of GIA, as the predictions of RSL must lie above or below the data, respectively (Shennan and Horton, 2002).

All the samples within the database were radiocarbon dated and calibrated to sidereal years using CALIB 5.0.1 (Stuiver et al., 2005). A laboratory multiplier of 1 was used, and all radiocarbon assays are presented with 2 sigma age errors. Samples with a terrestrial source were calibrated using the IntCal04 data set (Reimer et al., 2004). Marine samples were calibrated with the Marine04 data set (Hughen et al., 2004) with an appropriate marine reservoir correction (Reimer and Reimer, 2001). The database contains samples that were dated by Accelerator Mass Spectrometry (AMS) as well as conventional methods (Gas Proportional Counting (GPC) and Liquid Scintillation Counting (LSC)). The database includes dates based on bulk peat to dates on identifiable salt marsh plant rhizomes.

1.1 Example of a late Holocene basal sea-level index point from New Jersey

Core EF/07/10 (39.49 °N, 74.42 °W) was extruded from a modern salt marsh at the Edwin B. Forsythe National Wildlife Refuge in New Jersey in the mid-Atlantic region of the U.S. Atlantic coast (Figure DR1a). The modern marsh was dominated by stunted *Spartina alterniflora* with a patchy presence of the high marsh species *Distichlis spicata* and *Spartina patens*. Two transects of cores across the marsh (Figure DR1c) revealed a spatially consistent stratigraphy. The peat was less than 0.3 m thick at the salt marsh/terrestrial boundary and increased to over 5 m thick at the most seaward core.

Core EF/07/10 was surveyed using a total station (±0.05 m leveling error) to a NGS benchmark with first order vertical precision (±0.10 m benchmark error). The core has a surface elevation of 0.48 m NAVD88 and extended to a depth of -4.02 m NAVD88. The core terminated in a sand unit including some pebble-sized grains, which we interpret as a former Pleistocene surface (Psuty, 1986). The lower 1.40 m (-4.02 to -2.62 m NAVD88) was composed of highest marsh, black peat, which has limited numbers of plant macrofossils and agglutinated foraminiferal counts less than 50 per cm^3. In contrast, the peat in the upper 3.1 m of the core (-2.62 to 0.48 m NAVD88) contained large numbers of identifiable high salt marsh plant rhizomes and rootlets, and abundant agglutinated foraminifera. The top 0.50 m of the core (-0.02 to 0.48 m NAVD88) had an increasing minerogenic content that is probably the consequence of ditching during the early 20th century e.g. (Headlee and Carroll, 1920; Teal and Peterson, 2009). A sample of sub-surface high marsh *Spartina patens* rhizome (0.01 m thick) was selected for dating 2.78 m below the surface (±0.03 m borehole error) at -2.30 m NAVD88 (±0.01 m sampling error), which yielded a date of 1.521-1.383 ka (1550 ± 25 14C a). The δ^{13}C of the sample of -14.4 $^{0}/_{00}$ is within the expected range associated with C4 plants such as *Spartina patens* (Chmura and Aharon, 1995; Lamb et al., 2006; Johnson et al., 2007). Samples were analyzed for their foraminiferal content to further assess the depositional environment (Figure DR1d). The bottom three samples from -2.40 to -2.34 m NAVD88 suggest a low marsh with the assemblage dominated by the agglutinated foraminifera *Miliammina fusca* e.g. (Gehrels, 1994; Edwards et al., 2004; Kemp et al., 2009). The foraminifera indicate that between -2.34 and -2.30 m, there was a change to a middle to high marsh environment as illustrated by high abundances of *Tiphotrocha comprimata* and *Trochammina inflata* e.g. (Gehrels, 1994; De Rijk and Troelstra, 1997; Edwards et al., 2004). The combination of plant macrofossils, foraminifera and geochemical data suggest that the radiocarbon dated sample formed in a high marsh environment. The dated sample was, therefore, assigned a reference water level of the midpoint between mean high water (MHW) and highest astronomical tide (HAT) (0.73 m NAVD88) and an indicative range of [MHW to HAT]/2 (±0.25 m). The sample lies within a peat unit overlying the Pleistocene substrate, but it was not sampled within 0.05 m of the boundary, thus it is considered a basal peat index point. The calculation of RSL and the error term for this index point is:

$$\text{RSL} = -2.30\ \text{m}_{\text{elevation}} - 0.73\ \text{m}_{\text{Reference Water Level}}$$

$$= -3.03\ \text{m}$$

$$\text{Error} = \Sigma(0.25\ \text{m}^2_{\text{indicative range}} + 0.005\ \text{m}^2_{\text{thickness}} + 0.05\ \text{m}^2_{\text{levelling}} + 0.01\ \text{m}^2_{\text{sampling}} + 0.1\ \text{m}^2_{\text{benchmark}} + 0.03\ \text{m}^2_{\text{borehole}})^{1/2}$$

$$= \pm 0.28\ \text{m}$$

Age = 1550 ± 25 14C a

= 1.521-1.383 ka

2. GLACIAL ISOSTATIC ADJUSTMENT MODELS

The RSL predictions are based on both the ICE-5G ice model v1.3e (Peltier, 2007) and ICE-6G (Peltier, 2010) coupled to the VM5a viscosity model (Peltier and Drummond, 2008) that reduces the misfit between predicted and observed horizontal motions of the North American plate (Argus and Peltier, 2010). VM5a was modified from VM2 (described as M2 in Peltier, 1996), which was inferred from a Bayesian inversion of all the available GIA data that could constrain the radial profile of mantle viscosity (Peltier, 1996; Peltier and Drummond, 2008). Importantly, VM2 has a perfectly elastic 90 km thick lithosphere, whereas VM5a includes a 60 km thick perfectly elastic upper layer, beneath which exists a 40 km thick layer with a viscosity of 10^{22} Pa s. We have developed a new Earth model (VM5b), by reducing the viscosity of the upper mantle above the 660 km phase transformation by 50% from $0.5 * 10^{21}$ Pa s to $0.25 * 10^{21}$ Pa s (Figure DR2).

The ICE-5G model has been constrained by multiple lines of evidence including postglacial sea-level index points from near field sites, ice margin chronologies, and the observations of two anomalies in the Earth's rotational state. ICE-5G has been tested against RSL observations from intermediate- and far-field sites that were not employed in its construction. Further refinements to this model beyond ICE-5G version 1.3e (Peltier, 2007) have resulted in the development of ICE-6G. This refinement process started with the analysis of Argus and Peltier (2010) which utilized space geodetic measurements to test the ICE-5G (VM2) model. This analysis revealed systematic misfits between the model and the space geodetic data in several regions over the North American continent.

ICE-5G (Peltier, 2007) and ICE-6G (Peltier, 2010) contain a similar mass for the Laurentide Ice Sheet and cover exactly the same surface area of the North American continent. They differ in the relative thickness of the ice sheet, which in the case of ICE-6G has been adjusted to rectify the misfits with the space geodetic measurements. Changes include the thinning of LGM ice over Yellowknife and a thickening in Quebec. Neither ice model has been constrained to fit the sea-level observations provided by this analysis.

3. GLACIAL ISOSTATIC ADJUSTMENT MODEL AND RELATIVE SEA-LEVEL DATA COMPARISONS

Figure DR3 presents the residuals between the four combinations of GIA model predictions (ICE-5G VM5a, ICE-5G VM5b, ICE-6G VM5a and ICE-6G VM5b) and the relative sea-level observations. At Eastern Maine (#1), both the choice of earth and ice model strongly affect the residuals. ICE-6G VM5b provides the best agreement between the model and the data. The best agreement between the models and the data is only weakly affected by ice model choice at New Jersey (#8); changing from VM5a to VM5b has a more dramatic effect, reducing the residuals from 15 m to less than 5 m at 6 ka. As observed at Eastern Maine, ICE-6G VM5b also provides the best model-data agreement. In Southern North Carolina (#14) both ice model and earth model choice make little difference to the disagreement between the predictions and the data; the misfit is greater than 10 m at 6 ka.

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FIGURE CAPTIONS

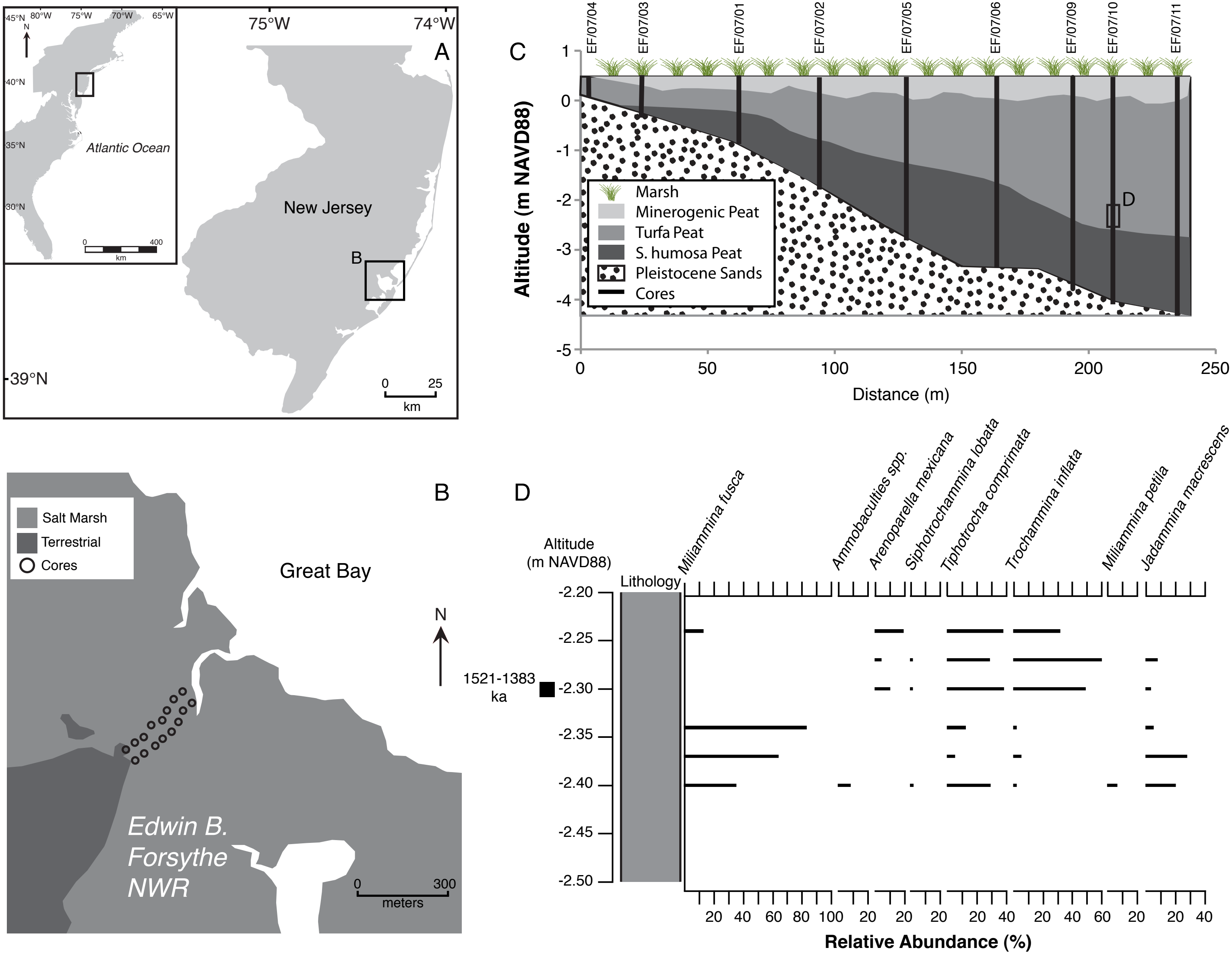
Figure DR1. A) Location of the New Jersey study site within the United States of America. B) Local study area map of the Edwin B. Forsythe National Wildlife Refuge on Great Bay, New Jersey. The locations of cores used to ascertain the stratigraphy are shown. C) Stratigraphy for a transect of eight cores across the marsh. D) Foraminiferal assemblages of six samples surrounding a dated rhizome of Spartina patens at -2.3 m NAVD88 in core EF/07/10. The sample age is calibrated to sidereal years.

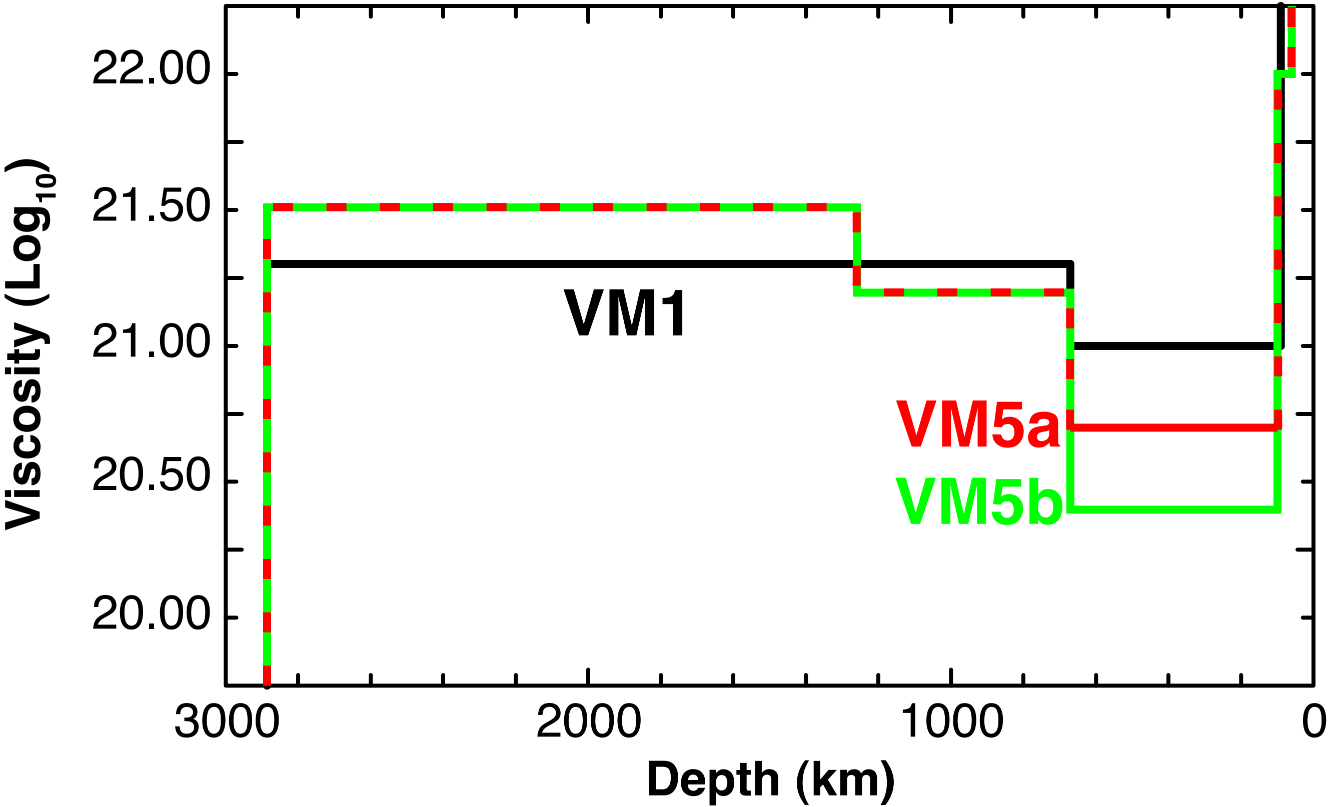
Figure DR2. Variation in viscosity with depth for three earth models, VM1 (Tushingham and Peltier (1991), VM5a (Peltier and Drummond, 2008) and the new model VM5b. The VM1 model is that employed as a first guess in the inversion procedure. VM5a is a best fit 5 layer model to the VM2 (Peltier, 1996) structure, one that differs significantly from this original structure only by the insertion of an additional 40 km thick layer of viscosity equal to 10^{22} Pas below the 60 km thick elastic lithosphere. This lower lithospheric layer defines the transition between the elastic lithosphere and the upper mantle and transition zone within which the viscosity is taken to be equal to 5 * 10^{21} Pas. VM5b differs from VM5a by a factor of 2 reduction in the viscosity above the 660 km phase transformation from 0.5 * 10^{21} Pa s to 0.25 * 10^{21} Pa s.

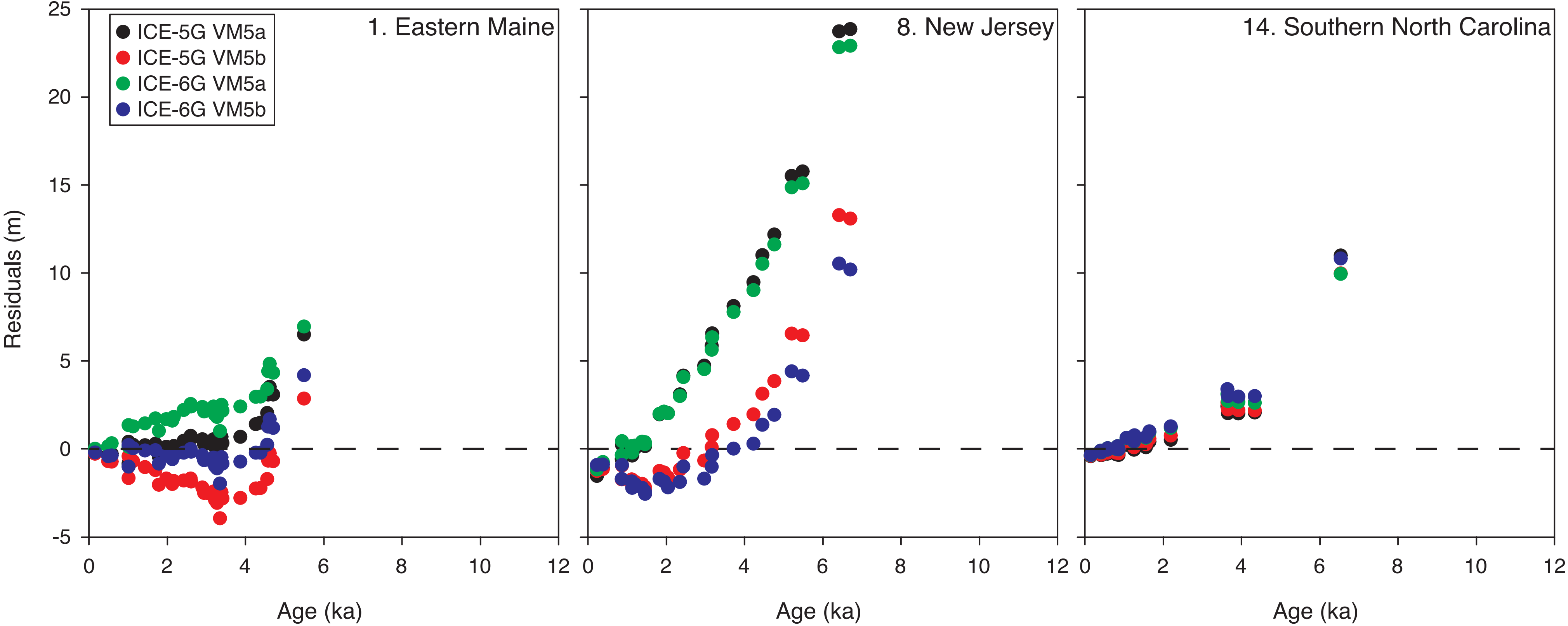
Figure DR3. Age-residual plots of relative sea-level observations versus model predictions at three sites in the northern Atlantic (#1 Eastern Maine), mid-Atlantic (#8 New Jersey) and southern Atlantic (#14 Southern North Carolina) regions. If the models and data were in total agreement, the residuals should plot along the black dashed line. Positive and negative residual indicates the model predicts relative sea level (RSL) lower and higher than the observations, respectively. At Eastern Maine and New Jersey, ICE-6G VM5b best fits the data. For Southern North Carolina, model choice does not affect the residuals.

APPENDIX 1.

A Holocene relative sea-level database for the U.S. Atlantic coast including the sample location, type of dated material, associated reference for the original material and a code indicating the main line of evidence that led to the classification of the sample as an index point (1=microfossils, 2=plant macrofossils, 3=author listing, 4=identified estuarine/marine shells or foraminifera). All index points, marine and terrestrial limiting dates are included and sub-divided by location. Age ranges are calibrated to 2-sigma using Calib 5.0.1 and are expressed as calibrated years relative to present. Samples with a terrestrial source are calibrated using the IntCal04 dataset. Samples with a marine source are calibrated using the Marine04 dataset either with a sample specific marine reservoir correction where available, or using the standard 400 year correction where not. Relative sea level (RSL) was calculated by subtracting the reference water level from the sample elevation, both expressed as meters relative to NAVD88. The total error term is calculated from a number of errors inherent to sea-level research including the method of estimating altitude, the coring technique employed and the thickness of the sample. The error term for an index point also includes the indicative range; the range over which a sample may occur in the modern environment. The error term due to sample collection is subtracted (Marine) or added (Terrestrial) to limiting dates. Such limiting dates have an unknown one-way error; as such RSL may lie anywhere above or below them, respectively.


A
45°N
80°W
75°W
70°W
65°W
N
40°N
35°N
30°N
Atlantic Ocean
0
400
km
75°W
74°W
New Jersey
B
-39°N
0
25
km
C
EF/07/04
EF/07/03
EF/07/01
EF/07/02
EF/07/05
EF/07/06
EF/07/09
EF/07/10
EF/07/11
Altitude (m NAVD88)
1
0
-1
-2
-3
-4
-5
Marsh
Minerogenic Peat
Turfa Peat
S. humosa Peat
Pleistocene Sands
Cores
D
0
50
100
150
200
250
Distance (m)
B
Salt Marsh
Terrestrial
Cores
Great Bay
N
Edwin B. Forsythe NWR
0
300
meters
D
Altitude (m NAVD88)
Lithology
Miliammina fusca
Ammobaculties spp.
Arenoparella mexicana
Siphotrochammina lobata
Tiphotrocha comprimata
Trochammina inflata
Miliammina petila
Jadammina macrescens
-2.20
-2.25
1521-1383 ka
-2.30
-2.35
-2.40
-2.45
-2.50
20
40
60
80
100
20
20
20
20
40
20
40
60
20
20
40
Relative Abundance (%)


22.00
21.50
21.00
20.50
20.00
Viscosity (Log$_{10}$)
3000
2000
1000
0
Depth (km)
VM1
VM5a
VM5b


Residuals (m)
25
20
15
10
5
0
-5
● ICE-5G VM5a
● ICE-5G VM5b
● ICE-6G VM5a
● ICE-6G VM5b
1. Eastern Maine
8. New Jersey
14. Southern North Carolina
0
2
4
6
8
10
12
Age (ka)
Age (ka)
Age (ka)

Site	Latitude	Longitude	Labcode	Material	^{14}C age ± 1σ	δ^{13}C	Calibrated age range	RSL (m)	Error (± m)	Reference	Evidence
Eastern Maine											
Index Points											
Sanborn Cove	44.683	67.406	AA-8210	HHM Plant	4795 ± 80	-28	5661-5319	-4.90	0.55	Gehrels (1999)	1
Sanborn Cove	44.683	67.406	AA-8211	S. alt	4075 ± 75		4822-4422	-3.97	0.54	Gehrels (1999)	1
Sanborn Cove	44.683	67.406	AA-8941	S. alt	3010 ± 70	-15.7	3370-2996	-2.88	0.54	Gehrels (1999)	1
Sanborn Cove	44.683	67.406	AA-8942	Plant frag	2540 ± 110	-28.7	2845-2349	-1.68	0.54	Gehrels (1999)	1
Sanborn Cove	44.683	67.406	AA-27620	Twig	1070 ± 90	-30	1230-786	-0.49	0.55	Gehrels (1999)	1
Sanborn Cove	44.683	67.406	AA-27621	Twig	195 ± 45	-28.4	308-0	-0.53	0.55	Gehrels (1999)	1
Sanborn Cove	44.683	67.406	AA-27622	Plant frag	1210 ± 80	-26.5	1284-972	-0.74	0.55	Gehrels (1999)	1
Sanborn Cove	44.683	67.406	AA-27623	Plant frag	1540 ± 60		1541-1313	-0.99	0.55	Gehrels (1999)	1
Sanborn Cove	44.683	67.406	AA-27624	Plant frag	2170 ± 50	-28.4	2328-2010	-1.74	0.55	Gehrels (1999)	1
Sanborn Cove	44.683	67.406	AA-27625	Plant frag	2120 ± 60		2308-1950	-1.87	0.55	Gehrels (1999)	1
Gouldsboro	44.429	68.011	BETA-63981	HM peat	4030 ± 70	-29.8	4818-4296	-4.99	0.45	Gehrels et al. (1996)	1
Gouldsboro	44.429	68.011	BETA-64579	HM peat	2730 ± 80	-26.3	3063-2729	-1.78	0.45	Gehrels et al. (1996)	1
Gouldsboro	44.429	68.011	SI-6541	HHM peat	3580 ± 75	-24.6	4088-3650	-4.05	0.45	Gehrels et al. (1996)	3
Jasper Beach	44.629	67.382	BETA-52183	HM peat	3150 ± 70	-24	3557-3209	-2.87	0.45	Gehrels and Belknap (1993)	1
Jasper Beach	44.629	67.382	BETA-52184	HM peat	2880 ± 80	-26	3253-2795	-2.49	0.45	Gehrels and Belknap (1993)	1
Sanborn Cove	44.683	67.406	BETA-52185	HM peat	3860 ± 60	-27	4425-4091	-4.50	0.45	Gehrels and Belknap (1993)	1
Sanborn Cove	44.683	67.406	BETA-52187	HM peat	2800 ± 70	-26	3137-2759	-2.42	0.45	Gehrels and Belknap (1993)	1
Gouldsboro	44.430	68.010	SI-6543	HM peat	1775 ± 50	-23.1	1821-1565	-0.80	0.94	Belknap et al. (1989)	3
Gouldsboro	44.430	68.010	SI-6544	HM peat	2550 ± 50	-27.6	2759-2467	-1.55	0.94	Belknap et al. (1989)	3
Gouldsboro	44.430	68.010	SI-6545	HM peat	3045 ± 65	-18.2	3396-3040	-3.11	0.94	Belknap et al. (1989)	3
Sanborn Cove	44.683	67.406	BETA-57808	S. alt	490 ± 70	-19.4	654-324	-1.18	0.54	Gehrels (1999)	1
Sanborn Cove	44.683	67.406	BETA-57809	S. alt + S. rob	1070 ± 90	-16.8	1230-786	-1.72	0.54	Gehrels (1999)	1
Gouldsboro	44.429	68.011	SI-6536	HHM peat	570 ± 50	-25.1	653-519	-0.61	0.45	Gehrels et al. (1996)	3
Gouldsboro	44.429	68.011	SI-6537	HHM peat	2010 ± 60	-25.7	2123-1827	-1.25	0.45	Gehrels et al. (1996)	3
Gouldsboro	44.429	68.011	SI-6538	HM peat	2325 ± 65	16.8	2696-2150	-1.43	0.45	Gehrels et al. (1996)	3
Jasper Beach	44.629	67.382	BETA-52182	HM peat	3170 ± 140	-27	3716-2978	-4.30	0.45	Gehrels and Belknap (1993)	1
Sanborn Cove	44.683	67.406	BETA-52186	HM peat	3090 ± 60	-23	3446-3084	-3.32	0.45	Gehrels and Belknap (1993)	1
Jasper Beach	44.629	67.382	PITT-0964	HM peat	4165 ± 30		4829-4583	-4.44	0.45	Gehrels and Belknap (1993)	1
Addison	44.608	67.753	SI-6199	HM peat	4095 ± 100	-23	4853-4299	-3.94	1.10	Belknap et al. (1989)	3
Addison	44.608	67.753	SI-6204	HM peat	3170 ± 60	-26.6	3557-3255	-3.26	1.10	Belknap et al. (1989)	3
Addison	44.608	67.753	SI-6208	HM peat	1840 ± 110	-26.9	2041-1521	-1.62	1.10	Belknap et al. (1989)	3
Gouldsboro	44.430	68.010	SI-6542	HM peat	3940 ± 50	-16.6	4523-4239	-4.83	0.94	Belknap et al. (1989)	3
Terrestrial Limiting											
Gouldsboro	44.430	68.020	BETA-64580	Fresh peat	9730 ± 60	-29.4	11251-10801	-3.53	0.17	Gehrels et al. (1996)	3
Gouldsboro	44.430	68.020	BETA-64581	Fresh peat	9490 ± 80	-27.6	11121-10561	-2.05	0.17	Gehrels et al. (1996)	3
Gouldsboro	44.430	68.010	SI-5417	Marsh peat	1490 ± 45		1515-1301	0.50	0.85	Belknap et al. (1989)	3
Gouldsboro	44.430	68.010	SI-5425	Wood	1465 ± 50		1512-1290	1.29	0.85	Belknap et al. (1989)	2
Southern Maine											
Index Points											
Phippsburg	43.752	69.822	BETA-50161	LM peat	4980 ± 60	-19.1	5893-5601	-6.90	0.41	Gehrels et al. (1996)	1
Phippsburg	43.752	69.822	AA-8939	HM peat	4270 ± 70	-15.9	5039-4581	-3.09	0.40	Gehrels et al. (1996)	1
Phippsburg	43.752	69.822	PITT-0965	HHM peat	4480 ± 95		5441-4857	-4.13	0.40	Gehrels et al. (1996)	1
Phippsburg	43.752	69.822	PITT-0967	HHM peat	3470 ± 150		4147-3389	-3.57	0.41	Gehrels et al. (1996)	1
Phippsburg	43.752	69.822	PITT-0968	HHM peat	3435 ± 45		3830-3584	-2.33	0.41	Gehrels et al. (1996)	1
Wells	43.292	70.573	SI-6623	HM peat	5135 ± 70		6171-5663	-5.85	0.39	Kelley et al. (1995)	3
Wells	43.292	70.573	SI-6626	HM peat	4380 ± 55		5274-4842	-5.09	0.39	Kelley et al. (1995)	3
Phippsburg	43.742	69.832	AA-8212	LM peat	4945 ± 75	-25.7	5896-5494	-6.49	0.41	Gehrels et al. (1996)	1
Phippsburg	43.752	69.822	AA-8937	HM peat	990 ± 60	-15.4	1053-745	-0.62	0.40	Gehrels et al. (1996)	1
Phippsburg	43.752	69.822	AA-8938	HM peat	2675 ± 70		2960-2544	-1.89	0.40	Gehrels et al. (1996)	1

Phippsburg	43.752	69.822	BETA-52188	HM peat	3760 ± 60	-17.1	4400-3928	-3.03	0.41	Gehrels et al. (1996)	1
Damariscotta	43.964	69.571	SI-6617	HHM peat	6295 ± 55	-27.8	7413-7021	-15.31	0.40	Gehrels et al. (1996)	3
Wells	43.292	70.573	PITT-0907	BM peat	4255 ± 55		4967-4617	-3.60	0.39	Gehrels et al. (1996)	1
Wells	43.292	70.573	AA-8208	BM peat	4235 ± 70	-25.7	4965-4539	-2.95	0.38	Gehrels et al. (1996)	1
Wells	43.292	70.573	PITT-0917	BM peat	3900 ± 145		4815-3927	-2.80	0.40	Gehrels et al. (1996)	1
Wells	43.292	70.573	PITT-0918	BM peat	3265 ± 70		3680-3362	-2.90	0.39	Gehrels et al. (1996)	1
Wells	43.292	70.573	PITT-0920	BM peat	3340 ± 55		3700-3446	-1.75	0.39	Gehrels et al. (1996)	1
Wells	43.292	70.573	AA-8209	BM peat	4735 ± 70		5591-5319	-4.15	0.39	Gehrels et al. (1996)	1
Wells	43.340	70.541	PITT-0902	LM peat	705 ± 165		966-330	-0.36	0.76	Kelley et al. (1995)	1
Marine Limiting											
Kennebec River	43.701	69.824	BETA-63124	M. edu	7490 ± 90		8104-7634	-25.62	3.02	Barnhardt et al. (1995)	4
Kennebec River	43.701	69.824	BETA-63125	M. edu	7310 ± 70		7900-7514	-25.62	3.02	Barnhardt et al. (1995)	4
Kennebec River	43.707	69.794	OS-1862	M. bal	8610 ± 40		9379-8977	-26.62	3.02	Barnhardt et al. (1995)	4
Kennebec River	43.707	69.794	OS-1860	M. bal	8710 ± 35		9456-9068	-26.62	3.02	Barnhardt et al. (1995)	4
Saco Bay	43.533	70.217	PITT-0739	A. isl	785 ± 35		488-146	-54.31	3.02	Kelley et al. (1992)	4
Saco Bay	43.533	70.217	PITT-0741	H. arc	5915 ± 155		6624-5878	-51.51	3.02	Kelley et al. (1992)	4
Cape Small	43.700	69.767	PITT-0744	M. are	9000 ± 100		9998-9310	-22.61	3.02	Kelley et al. (1992)	4
Cape Small	43.700	69.767	PITT-0745	M. are	9630 ± 75		10577-10191	-22.71	3.02	Kelley et al. (1992)	4
Cape Small	43.700	69.767	PITT-0746	M. mod	9700 ± 65		10646-10230	-22.91	3.02	Kelley et al. (1992)	4
Cape Small	43.700	69.767	PITT-0747	M. are	9260 ± 100		10220-9576	-24.71	3.02	Kelley et al. (1992)	4
Cape Small	43.700	69.767	PITT-0748	M. edu	8250 ± 80		8962-8416	-22.86	3.02	Kelley et al. (1992)	4
Cape Small	43.700	69.767	PITT-0749	M. are	9235 ± 60		10171-9623	-23.91	3.02	Kelley et al. (1992)	4
Cape Small	43.700	69.767	PITT-0585	M. are	9090 ± 95		10091-9465	-24.26	3.02	Kelley et al. (1992)	4
Cape Small	43.700	69.767	PITT-0586	M. are	9250 ± 110		10216-9550	-24.36	3.02	Kelley et al. (1992)	4
Cape Small	43.700	69.767	PITT-0587	M. are	7270 ± 105		7904-7438	-24.51	3.02	Kelley et al. (1992)	4
Cape Small	43.683	69.917	PITT-0753	A. isl	1300 ± 35		914-636	-37.91	3.02	Kelley et al. (1992)	4
Cape Small	43.683	69.917	PITT-0754	M. are	2570 ± 50		2326-1924	-39.01	3.02	Kelley et al. (1992)	4
Cape Small	43.683	69.917	PITT-0755	M. are	2950 ± 210		3161-2049	-42.11	3.02	Kelley et al. (1992)	4
Cape Small	43.800	69.850	PITT-0756	A. isl	8270 ± 75		8974-8440	-46.11	3.02	Kelley et al. (1992)	4
Casco Bay	43.717	70.167	PiTT-0737	M. are	9130 ± 70		10089-9519	-24.11	3.02	Kelley et al. (1992)	4
Penobscot Bay	44.414	68.857	BETA-69336	M. are	8730 ± 70		9487-9037	-27.40	3.02	Barnhardt et al. (1995)	4
Penobscot Bay	44.414	68.857	BETA-69337	M. are	8730 ± 60		9484-9058	-27.40	3.02	Barnhardt et al. (1995)	4
Fox Island	44.119	68.869	GX-11004	M. are	5880 ± 105	2	6455-5911	-11.25	0.80	Belknap et al. (1989)	4
Fox Island	44.119	68.869	GX-11005	M. are	5430 ± 100	1.6	5975-5453	-7.60	0.80	Belknap et al. (1989)	4
Terrestrial Limiting											
Penobscot Bay	44.176	68.825	GX-11008	Wood	3700 ± 200	-26.3	4780-3484	-0.52	0.80	Belknap et al. (1989)	2
Wells	43.320	70.580	PITT-0962	stump	4535 ± 35		5313-5051	-1.23	0.26	Kelley et al. (1995)	2
Wells	43.320	70.580	PITT-0963	stump	3260 ± 40		3574-3390	-1.23	0.26	Kelley et al. (1995)	2
Wells	43.320	70.580	W-396	white pine stump	2980 ± 180		3559-2757	2.83	0.73	Bloom (1963)	2
Wells	43.320	70.580	W-508	white pine stump	2810 ± 200		3436-2366	3.90	0.73	Bloom (1963)	2
Wells	43.320	70.580	PITT-0913	wood	4480 ± 60		5309-4887	-2.06	0.16	Kelley et al. (1995)	2
Northern Massacusetts											
Index Points											
Romney Marsh	42.428	70.989	BETA-134753	Jg and Sp	3050 ± 50	-18	3376-3080	-2.52	0.41	Donnelly (2006)	2
Romney Marsh	42.428	70.989	BETA-134755	Ds	2950 ± 60	-15	3328-2948	-2.33	0.41	Donnelly (2006)	2
Romney Marsh	42.428	70.989	BETA-134756	Jg, Sr and Sp	1900 ± 40	-23.8	1927-1727	-1.38	0.40	Donnelly (2006)	2
Romney Marsh	42.428	70.989	OS-24172	Jg and Sp	260 ± 50	-20.8	468-0	-0.73	0.40	Donnelly (2006)	2
Romney Marsh	42.428	70.989	BETA-138707	Sp	1040 ± 40	-15.7	1058-804	-0.95	0.40	Donnelly (2006)	2
Romney Marsh	42.428	70.989	BETA-134754	Sp	2510 ± 50	-14.7	2744-2366	-1.94	0.40	Donnelly (2006)	2
Marine Limiting											
Boston	42.351	71.075	O-1475	Estuarine Silt	4450 ± 130		5567-4727	-7.66	0.27	Kaye and Barghoorn (1964)	3

Jeffreys Ledge	42.640	70.450	WHG-709	Marine shells	4660 ± 65		4960-4540	-58.05	3.18	Oldale et al. (1993)	3
Jeffreys Ledge	42.655	70.415	WHG-706	Marine shells	7500 ± 75		8027-7673	-61.06	3.19	Oldale et al. (1993)	3
Terrestrial Limiting											
Boston	42.346	71.080	O-1124	Sedge peat	3850 ± 130		4784-3878	-2.95	0.26	Kaye and Barghoorn (1964)	3
Boston	42.351	71.075	O-1118	Fresh peat	5600 ± 140		6729-6021	-7.12	0.27	Kaye and Barghoorn (1964)	3
Neponset River	42.270	71.050	I-2215	Undiff peat	1310 ± 95		1387-989	2.04	0.96	Redfield (1967)	3
Neponset River	42.270	71.050	I-2216	Undiff peat	1360 ± 105		1517-1017	1.74	0.96	Redfield (1967)	3
Neponset River	42.270	71.050	I-2217	Undiff peat	1860 ± 100		2034-1542	1.43	0.96	Redfield (1967)	3
Neponset River	42.270	71.050	W-1451	Undiff peat	2100 ± 200		2660-1648	1.31	0.96	Redfield (1967)	3
Neponset River	42.270	71.050	W-1452	Undiff peat	2790 ± 200		3381-2365	0.70	0.96	Redfield (1967)	3
Neponset River	42.270	71.050	W-1453	Undiff peat	3110 ± 200		3823-2793	0.22	0.96	Redfield (1967)	3
Boston	42.400	71.100	C-417	Fresh peat	5717 ± 550		7669-5315	-6.33	0.27	Redfield and Rubin (1962)	3
Gloucester Point	42.750	70.800	H-1376	Undiff peat	2450 ± 110		2763-2185	0.80	0.95	Newman et al. (1980)	3
Gloucester Point	42.750	70.800	H-1367	Undiff peat	3550 ± 130		4226-3482	-0.95	0.95	Newman et al. (1980)	3
Gloucester Point	42.750	70.800	H-1366	Undiff peat	3375 ± 120		3920-3364	-0.60	0.95	Newman et al. (1980)	3
Gloucester Point	42.750	70.800	H-1375	Undiff peat	3625 ± 125		4377-3595	-1.56	0.95	Newman et al. (1980)	3
Gloucester Point	42.750	70.800	H-1372	Undiff peat	4225 ± 135		5277-4419	-2.49	0.95	Newman et al. (1980)	3
Gloucester Point	42.750	70.800	H-1356	Undiff peat	4900 ± 130		5912-5324	-5.20	0.95	Newman et al. (1980)	3
Gloucester Point	42.750	70.800	H-1359	Undiff peat	6280 ± 150		7464-6798	-10.09	0.96	Newman et al. (1980)	3
Southern Massachusetts											
Index Points											
Barnstable	41.710	70.370	W-1092	Spartina peat	3400 ± 300		4496-2284	-6.04	1.34	Redfield and Rubin (1962)	2
Barnstable	41.700	70.360	W-971	Spartina peat	2800 ± 250		3556-2340	-3.61	1.34	Redfield and Rubin (1962)	2
Barnstable	41.700	70.360	W-973	Spartina peat	3660 ± 250		4801-3391	-6.48	1.34	Redfield and Rubin (1962)	2
Barnstable	41.730	70.300	Y-1186	Salt peat	1400 ± 80		1518-1150	-2.06	1.12	Stuiver et al. (1963)	3
Barnstable	41.730	70.300	Y-1189	Salt peat	2200 ± 100		2451-1905	-3.83	1.12	Stuiver et al. (1963)	3
Barnstable	41.710	70.370	W-1094	Spartina peat	1040 ± 300		1568-488	-0.91	1.34	Redfield and Rubin (1962)	2
Barnstable	41.710	70.370	W-1095	Spartina peat	1850 ± 300		2684-1174	-1.83	1.34	Redfield and Rubin (1962)	2
Barnstable	41.710	70.370	W-1096	Spartina peat	2240 ± 300		2951-1539	-2.83	1.34	Redfield and Rubin (1962)	2
Barnstable	41.710	70.370	W-1098	Spartina peat	3060 ± 300		4057-2469	-5.12	1.34	Redfield and Rubin (1962)	2
Barnstable	41.730	70.320	Y-1187	Salt peat	710 ± 80		784-540	-1.63	1.12	Stuiver et al. (1963)	3
Barnstable	41.730	70.300	Y-1188	Salt peat	240 ± 80		480-0	-0.56	1.12	Stuiver et al. (1963)	3
Barnstable	41.730	70.320	Y-1190	Salt peat	1060 ± 100		1231-743	-2.03	1.12	Stuiver et al. (1963)	3
Marine Limiting											
Nantucket Sound	41.550	70.467	BETA-122519	Mercenaria	3790 ± 70	0	3838-3394	-10.43	0.71	Gutierrez et al. (2003)	4
Nantucket Sound	41.550	70.467	BETA-122520	Mercenaria	3640 ± 90	0	3683-3203	-10.63	0.71	Gutierrez et al. (2003)	4
Marthas Vineyard	41.300	71.000	W-2013	C. vir	9300 ± 250		10561-9405	-37.42	3.15	Oldale and O'Hara (1980)	4
Marthas Vineyard	41.408	70.739	W-3786	Mercenaria	7570 ± 250		9726-8452	-27.65	0.75	Oldale and O'Hara (1980)	4
Marthas Vineyard	41.317	70.922	W-3766	shell hash	5150 ± 200		5841-4867	-34.38	0.78	Oldale and O'Hara (1980)	3
Marthas Vineyard	41.368	70.867	W-3787	shell hash	4470 ± 500		5722-3260	-26.75	0.75	Oldale and O'Hara (1980)	3
Marthas Vineyard	41.443	70.722	I-9944	shell hash	3710 ± 80		3758-3318	-15.11	0.71	Oldale and O'Hara (1980)	3
Marthas Vineyard	41.443	70.722	I-9945	shell hash	3560 ± 95		3597-3069	-14.61	0.71	Oldale and O'Hara (1980)	3
Marthas Vineyard	41.243	70.927	W-3782	Mercenaria	1340 ± 200		1222-484	-32.17	0.77	Oldale and O'Hara (1980)	4
Marthas Vineyard	41.302	70.992	W-3763	C. vir	9740 ± 250		11167-9901	-33.77	0.77	Oldale and O'Hara (1980)	4
Marthas Vineyard	41.317	70.992	W-3769	C. vir	9710 ± 300		11201-9681	-35.78	0.78	Oldale and O'Hara (1980)	4
Marthas Vineyard	41.303	70.992	W-3764	C. vir	9470 ± 500		11623-8895	-33.07	0.77	Oldale and O'Hara (1980)	4
Terrestrial Limiting											
Centerville	41.633	70.333	W-586	Fresh peat	5500 ± 300		6955-5607	-3.74	0.53	Emery et al. (1967)	3
Falmouth	41.550	70.633	Y-1663	Fresh peat	3420 ± 120		3975-3401	-4.74	0.53	Emery et al. (1967)	3
Barnstable (Brewster)	41.817	70.085	W-2494	Fresh peat	4700 ± 300		6174-4572	-8.52	3.14	Field et al. (1979)	3
Nantucket Sound	41.583	70.383	OS-18551	plant fragments	4600 ± 50	-27.4	5468-5054	-8.12	0.70	Gutierrez et al. (2003)	3

Nantucket Sound	41.583	70.400	OS-18549	Undiff peat	4280 ± 35	-26.8	4961-4727	-8.02	0.70	Gutierrez et al. (2003)	3
Nauset Bay	41.840	69.970	I-1967	Undiff peat	2300 ± 105		2705-2059	-2.39	0.57	Redfield (1967)	3
Nauset Bay	41.840	69.970	I-1968	Undiff peat	3460 ± 100		3975-3475	-4.46	0.57	Redfield (1967)	3
Barnstable	41.730	70.380	W-1093	Oak wood	4860 ± 350		6395-4629	-4.85	0.54	Redfield and Rubin (1962)	2
Barnstable	41.700	70.317	W-639	Fresh peat	500 ± 150		736-0	1.46	0.53	Redfield and Rubin (1962)	3
Barnstable	41.730	70.380	W-1099	Fresh peat	3170 ± 300		4230-2622	-3.11	0.22	Redfield and Rubin (1962)	3
Centerville	41.633	70.333	W-570	chaemocypris log	2130 ± 200		2707-1633	-2.00	0.26	Redfield and Rubin (1962)	2
Centerville	41.633	70.333	W-584	Fresh peat	2040 ± 240		2703-1421	-1.10	0.53	Redfield and Rubin (1962)	3
Marthas Vineyard	41.450	70.937	W-3386	Fresh peat	8230 ± 300		9895-8417	-20.07	0.73	Oldale and O'Hara (1980)	3
Marthas Vineyard	41.482	70.860	W-3394	Fresh peat	7600 ± 250		9028-7880	-16.28	0.72	Oldale and O'Hara (1980)	3
Connecticut											
Index Points											
Guildford	41.278	72.650	Not Stated	Sp	1070 ± 80	-10	1175-795	-1.61	0.63	Nydick et al. (1995)	2
Hammock River	41.266	72.515	GrN-14518	Sp/Ds	1710 ± 60		1812-1422	-1.86	0.51	van de Plassche (1991)	2
Barn Island	41.332	71.864	OS-26454	Sp/Jg	265 ± 30		434-0	-0.52	0.31	Donnelly et al. (2004a)	2
Barn Island	41.332	71.864	OS-29654	Sp/Jg	15 ± 40		256-0	-0.57	0.31	Donnelly et al. (2004a)	2
Barn Island	41.332	71.864	OS-27765	Sp/Jg	240 ± 35		428-0	-0.63	0.31	Donnelly et al. (2004a)	2
Barn Island	41.332	71.864	OS-26452	Sp/Jg	305 ± 40		476-292	-0.73	0.31	Donnelly et al. (2004a)	2
Barn Island	41.332	71.864	OS-29653	Sp	330 ± 35		479-307	-0.82	0.31	Donnelly et al. (2004a)	2
Barn Island	41.332	71.864	OS-27764	Sp	540 ± 40		643-509	-0.91	0.31	Donnelly et al. (2004a)	2
Barn Island	41.332	71.864	OS-33644	Sp	475 ± 40		622-466	-0.94	0.31	Donnelly et al. (2004a)	2
Barn Island	41.332	71.864	OS-29652	Sp	570 ± 35		650-524	-1.03	0.31	Donnelly et al. (2004a)	2
Branford	41.261	72.849	UtC-9139	Ds	3092 ± 31	-18.1	3381-3221	-3.92	0.45	van de Plassche et al. (2002)	2
Branford	41.250	72.860	UtC-9140	Ds	2814 ± 34	-14.2	3018-2796	-3.08	0.45	van de Plassche et al. (2002)	2
Branford	41.256	72.839	UtC-9262	Ds	2124 ± 37	-15.8	2301-1995	-2.25	0.45	van de Plassche et al. (2002)	2
Gulf Pond	41.200	73.000	QC-1016	Salt peat	1515 ± 185		1863-1019	-1.87	0.97	Cinquemani et al. (1982)	3
Indian River	41.200	73.000	QC-1010	Salt peat	3645 ± 95		4236-3702	-5.27	0.97	Cinquemani et al. (1982)	3
Indian River	41.200	73.000	QC-1012	Salt peat	3500 ± 120		4089-3473	-4.17	0.97	Cinquemani et al. (1982)	3
Indian River	41.200	73.000	QC-1017	Salt peat	2970 ± 100		3372-2876	-3.20	0.97	Cinquemani et al. (1982)	3
Guildford	41.277	72.641	Not Stated	Plant frags	1220 ± 80	-14.3	1288-978	-1.79	0.78	Nydick et al. (1995)	1
Oyster Creek	41.260	72.350	QC-1013	Salt peat	4780 ± 175		5909-4983	-6.87	0.84	Cinquemani et al. (1982)	3
Oyster Creek	41.260	72.350	QC101413BC	Salt peat	3850 ± 235		4856-3638	-6.37	0.84	Cinquemani et al. (1982)	3
Oyster Creek	41.260	72.350	QC-1014A	Salt peat	4460 ± 155		5580-4648	-6.57	0.84	Cinquemani et al. (1982)	3
Terrestrial											
Mystic	41.370	71.950	W-1082	Undiff peat	2850 ± 260		3608-2348	-3.60	0.40	Redfield and Rubin (1962)	3
Kittam's Point	41.250	72.810	Y-840	Wood	910 ± 120		1066-574	0.36	0.48	Bloom (1963)	2
New Haven	41.300	72.750	W-945	Undiff peat	5900 ± 200		7242-6304	-9.08	0.51	Redfield and Rubin (1962)	3
Stiles Brickyard	41.340	72.880	Y-843	Wood	6810 ± 170		7982-7338	-4.37	0.56	Bloom (1963)	2
Guildford	41.269	72.681	Not Stated	Wood	720 ± 90		899-533	-0.08	0.48	Nydick et al. (1995)	2
Guildford	41.270	72.660	Y-855	Wood	1180 ± 80		1276-956	0.03	0.48	Bloom (1963)	2
Hammock River	41.265	72.508	GrN-14515	Sedge peat	3950 ± 60		4569-4161	-3.80	0.22	van de Plassche et al. (1989)	3
Hammock River	41.265	72.508	GrN-14514	Sedge peat	4295 ± 45		5031-4713	-4.93	0.22	van de Plassche et al. (1989)	3
Hammock River	41.265	72.508	GrN-14513	Sedge peat	4700 ± 40		5581-5319	-5.97	0.22	van de Plassche et al. (1989)	3
Hammock River	41.265	72.508	GrN-14512	Sedge peat	5300 ± 60		6267-5933	-7.28	0.23	van de Plassche et al. (1989)	3
Hammock River	41.265	72.508	GrN-14511	Sedge peat	5880 ± 70		6881-6503	-7.35	0.23	van de Plassche et al. (1989)	3
Hammock River	41.265	72.508	GrN-14510	Sedge peat	5520 ± 60		6436-6206	-8.48	0.23	van de Plassche et al. (1989)	3
Hammock River	41.265	72.508	Y-1056	sedge peat	4780 ± 130		5888-5062	-7.11	0.48	Bloom (1963)	3
Hammock River	41.265	72.508	Y-1057	sedge peat	3540 ± 130		4220-3478	-4.50	0.49	Bloom (1963)	3
Hammock River	41.265	72.508	Y-1058	sedge peat	3450 ± 160		4149-3363	-3.60	0.49	Bloom (1963)	3
Hammock River	41.265	72.508	Y-1074	sedge peat	6130 ± 90		7248-6794	-9.69	0.50	Bloom (1963)	3
Hammock River	41.265	72.508	Y-1175	sedge peat	3020 ± 90		3437-2955	-1.56	0.51	Bloom (1963)	3
Hammock River	41.265	72.508	Y-1176	sedge peat	3220 ± 90		3685-3245	-2.27	0.50	Bloom (1963)	3
Hammock River	41.265	72.508	Y-1177	Wood	4880 ± 120		5899-5325	-4.77	0.50	Bloom (1963)	2

Hammock River	41.160	72.310	Y-1055	Undiff peat	7060 ± 100		8151-7673	-8.94	0.50	Bloom (1963)	3
Hammock River	41.265	72.508	2177-13	Sr	210 ± 30	-26	306-0	0.43	0.17	van de Plassche et al. (1998)	2
Hammock River	41.265	72.508	2792-13	Sr	370 ± 40	-25	505-315	0.01	0.17	van de Plassche et al. (1998)	2
Hammock River	41.265	72.508	2786-13	Sr	1020 ± 40	-22	1052-798	-0.26	0.17	van de Plassche et al. (1998)	2
Hammock River	41.265	72.508	2182-13	Sr	1250 ± 40	-25	1276-1076	-0.57	0.17	van de Plassche et al. (1998)	2
Hammock River	41.265	72.508	2001-F	Sr	1410 ± 40	-9	1381-1279	-0.42	0.16	van de Plassche et al. (1998)	2
Hammock River	41.265	72.508	2163-1	Sr	1170 ± 50	-28	1240-964	-0.26	0.17	van de Plassche et al. (1998)	2
Hammock River	41.265	72.508	2165-1	Sr	1100 ± 30	-27	1063-937	-0.48	0.17	van de Plassche et al. (1998)	2
Hammock River	41.265	72.508	2168-6.5	Sr	230 ± 40	-27	428-0	0.36	0.17	van de Plassche et al. (1998)	2
Hammock River	41.265	72.508	2169-6.5	Sr	240 ± 50	-26	462-0	0.30	0.17	van de Plassche et al. (1998)	2
Hammock River	41.265	72.508	2170-6.5	Sr	220 ± 40	-27	426-0	0.22	0.17	van de Plassche et al. (1998)	2
Hammock River	41.265	72.508	2171-6.5	Sr	430 ± 50	-27	540-318	0.14	0.17	van de Plassche et al. (1998)	2
Hammock River	41.265	72.508	2172-6.5	Sr	420 ± 50	-13	535-317	0.09	0.17	van de Plassche et al. (1998)	2
Hammock River	41.265	72.508	2174-6.5	Sr	440 ± 40	-26	541-331	0.00	0.17	van de Plassche et al. (1998)	2
Hammock River	41.265	72.508	2175-6.5	Sr	520 ± 30	-27	627-507	-0.08	0.17	van de Plassche et al. (1998)	2
Hammock River	41.265	72.508	2176-6.5	Sr	520 ± 30	-26	627-507	-0.14	0.17	van de Plassche et al. (1998)	2
Hammock River	41.265	72.508	2790-6.5	Sr	350 ± 50	-26	500-308	0.20	0.17	van de Plassche et al. (1998)	2
Hammock River	41.265	72.508	2794-6.5	Sr	480 ± 50	-26	634-334	-0.14	0.17	van de Plassche et al. (1998)	2
Menunketesuck River	41.280	72.480	GrN-15007	Sedge peat	5280 ± 40		6184-5940	-8.22	0.24	van de Plassche et al. (1989)	3
Hammock River	41.266	72.515	GrN-15556	Sr	85 ± 45		270-0	0.58	0.32	van de Plassche (1991)	2
Hammock River	41.266	72.515	GrN-15557	Pa	740 ± 40		735-569	0.15	0.32	van de Plassche (1991)	2
Hammock River	41.266	72.515	GrN-15595	Pa	1580 ± 110		1715-1291	-0.40	0.30	van de Plassche (1991)	2
Hammock River	41.266	72.515	GrN-15596	Pa	890 ± 60		924-698	0.20	0.30	van de Plassche (1991)	2
New York											
Index Points											
Cedar Pond Brook Marsh	41.225	73.967	QC-770	Salt peat	800 ± 100		928-560	-0.76	0.81	Pardi et al. (1984)	3
Cedar Pond Brook Marsh	41.225	73.967	QC-711	Salt peat	3630 ± 110		4282-3640	-5.21	0.82	Pardi et al. (1984)	3
Cedar Pond Brook Marsh	41.225	73.967	QC-772	Salt peat	1740 ± 100		1873-1415	-1.76	0.81	Pardi et al. (1984)	3
Cedar Pond Brook Marsh	41.225	73.967	QC-712	Salt peat	1940 ± 110		2285-1607	-2.56	0.81	Pardi et al. (1984)	3
Cedar Pond Brook Marsh	41.225	73.967	QC-773	Salt peat	2650 ± 100		2995-2367	-2.56	0.81	Pardi et al. (1984)	3
Cedar Pond Brook Marsh	41.225	73.967	QC-810	Salt peat	3030 ± 100		3447-2951	-3.31	0.82	Pardi et al. (1984)	3
Cedar Pond Brook Marsh	41.225	73.967	QC-709	Salt peat	2220 ± 120		2688-1898	-3.34	0.82	Pardi et al. (1984)	3
Cedar Pond Brook Marsh	41.225	73.967	QC-774	Salt peat	3090 ± 110		3557-2979	-3.46	0.81	Pardi et al. (1984)	3
Cedar Pond Brook Marsh	41.225	73.967	QC-811	Salt peat	2700 ± 120		3160-2462	-3.61	0.82	Pardi et al. (1984)	3
Constitution Island	41.411	73.948	QC-227	Salt peat	4230 ± 120		5265-4423	-7.51	0.81	Pardi et al. (1984)	3
Constitution Island	41.406	73.942	QC-692	Salt peat	4660 ± 140		5654-4892	-9.46	0.83	Pardi et al. (1984)	3
Constitution Island	41.406	73.948	QC-1039	Salt peat	2160 ± 130		2469-1823	-1.80	0.82	Pardi et al. (1984)	3
Constitution Island	41.406	73.942	QC-695	Salt peat	2440 ± 100		2753-2315	-3.06	0.83	Pardi et al. (1984)	3
Constitution Island	41.411	73.948	QC-226	Salt peat	2320 ± 100		2713-2117	-3.71	0.80	Pardi et al. (1984)	3
Constitution Island	41.406	73.942	QC-693	Salt peat	3210 ± 110		3700-3084	-4.86	0.84	Pardi et al. (1984)	3
Constitution Island	41.411	73.948	QC-276	Salt peat	4110 ± 100		4861-4317	-5.96	0.80	Pardi et al. (1984)	3
Constitution Island	41.406	73.942	QC-694	Salt peat	3760 ± 120		4512-3782	-6.26	0.84	Pardi et al. (1984)	3
Marlboro Marsh	41.611	73.966	QC-341	Salt peat	2330 ± 240		2942-1742	-3.11	0.80	Pardi et al. (1984)	3
Marlboro Marsh	41.611	73.966	QC-340	Salt peat	3010 ± 120		3448-2872	-4.11	0.80	Pardi et al. (1984)	3
Marlboro Marsh	41.611	73.966	QC-343	Salt peat	4390 ± 220		5583-4437	-5.81	0.80	Pardi et al. (1984)	3
Marlboro Marsh	41.611	73.966	QC-705	Salt peat	4260 ± 130		5283-4441	-7.21	0.81	Pardi et al. (1984)	3
Marlboro Marsh	41.611	73.966	QC-686	Salt peat	4570 ± 110		5580-4482	-8.31	0.83	Pardi et al. (1984)	3
Oscawana I Tidal Marsh	41.229	73.931	QC-228	Salt peat	1870 ± 90		1997-1569	-2.51	0.80	Pardi et al. (1984)	3
Oscawana I Tidal Marsh	41.229	73.931	QC-221B	Salt peat	4570 ± 120		5580-4878	-6.61	0.80	Pardi et al. (1984)	3
Oscawana I Tidal Marsh	41.229	73.931	QC-264	Salt peat	4500 ± 100		5448-4860	-6.81	0.80	Pardi et al. (1984)	3
Roa Hook	41.299	73.947	QC-1043	Salt peat	4450 ± 200		5586-4540	-7.64	0.83	Pardi et al. (1984)	3
Roa Hook	41.299	73.947	QC-512	Salt peat	4120 ± 350		5580-3718	-8.81	0.81	Pardi et al. (1984)	3
Roa Hook	41.299	73.947	QC-509	Salt peat	4550 ± 130		5580-4866	-9.31	0.80	Pardi et al. (1984)	3
Roa Hook	41.299	73.947	QC-569	Salt peat	2490 ± 120		2844-2314	-1.95	0.80	Pardi et al. (1984)	3

Roa Hook	41.299	73.947	QC-568	Salt peat	3170 ± 170	3799-2949	-4.02	0.80	Pardi et al. (1984)	3
Roa Hook	41.292	73.947	QC-1041	Salt peat	3190 ± 160	3828-2978	-4.31	0.81	Pardi et al. (1984)	3
Roa Hook	41.299	73.947	QC-510	Salt peat	3140 ± 170	3816-2878	-4.81	0.80	Pardi et al. (1984)	3
Roa Hook	41.299	73.947	QC-721	Salt peat	3320 ± 110	3840-3342	-5.56	0.81	Pardi et al. (1984)	3
Roa Hook	41.299	73.947	QC-723	Salt peat	3910 ± 130	4812-3978	-6.76	0.81	Pardi et al. (1984)	3
Stoney Point	41.244	73.968	QC-505	Salt peat	3100 ± 110	3564-2996	-3.21	0.80	Pardi et al. (1984)	3
Stoney Point	41.244	73.968	QC-506	Salt peat	3740 ± 200	4798-3576	-5.81	0.80	Pardi et al. (1984)	3
Piermont Tidal Marsh	41.025	73.900	QC-737	Salt peat	3730 ± 200	4797-3565	-5.66	0.81	Pardi et al. (1984)	3
Piermont Tidal Marsh	41.025	73.900	QC-739	Salt peat	3790 ± 90	4421-3925	-7.71	0.82	Pardi et al. (1984)	3
Piermont Tidal Marsh	41.025	73.900	QC-261	Salt peat	4610 ± 110	5586-4974	-8.35	0.81	Pardi et al. (1984)	3
Piermont Tidal Marsh	41.025	73.900	QC-740	Salt peat	4300 ± 280	5589-4101	-9.37	0.83	Pardi et al. (1984)	3
Piermont Tidal Marsh	41.025	73.900	QC-741	Salt peat	4720 ± 120	5710-5048	-9.71	0.83	Pardi et al. (1984)	3
Piermont Tidal Marsh	41.025	73.900	QC-742	Salt peat	5320 ± 170	6441-5667	-11.16	0.82	Pardi et al. (1984)	3
Piermont Tidal Marsh	41.025	73.900	QC-808	Salt peat	5480 ± 140	6555-5933	-11.16	0.84	Pardi et al. (1984)	3
Piermont Tidal Marsh	41.025	73.900	QC-734	Salt peat	1420 ± 120	1563-1063	-1.46	0.81	Pardi et al. (1984)	3
Piermont Tidal Marsh	41.025	73.900	QC-735	Salt peat	2000 ± 110	2306-1706	-3.06	0.81	Pardi et al. (1984)	3
Piermont Tidal Marsh	41.025	73.900	QC-211	Salt peat	2300 ± 160	2742-1950	-2.81	0.80	Pardi et al. (1984)	3
Piermont Tidal Marsh	41.025	73.900	QC-736	Salt peat	2550 ± 140	2958-2320	-4.56	0.81	Pardi et al. (1984)	3
Piermont Tidal Marsh	41.025	73.900	QC-732	Salt peat	2990 ± 100	3388-2882	-4.56	0.81	Pardi et al. (1984)	3
Piermont Tidal Marsh	41.025	73.900	QC-730	Salt peat	3050 ± 100	3455-2959	-5.26	0.81	Pardi et al. (1984)	3
Piermont Tidal Marsh	41.025	73.900	QC-738	Salt peat	3320 ± 140	3921-3221	-6.74	0.82	Pardi et al. (1984)	3
Piermont Tidal Marsh	41.025	73.900	QC-262	Salt peat	3460 ± 100	3975-3475	-4.86	0.81	Pardi et al. (1984)	3
Marine Limiting										
Piermont	41.136	73.894	Not Stated	C. vir	3510 ± 35	3412-3048	-11.40	0.12	Slagle et al. (2006)	4
Piermont	41.093	73.886	Not Stated	C. vir	2655 ± 35	2335-2003	-11.97	0.11	Slagle et al. (2006)	4
Piermont	41.056	73.896	Not Stated	C. vir	2955 ± 45	2728-2354	-6.57	0.12	Slagle et al. (2006)	4
Piermont	41.056	73.896	Not Stated	C. vir	3375 ± 35	3262-2864	-8.54	0.12	Slagle et al. (2006)	4
Piermont	41.048	-73.896	Not Stated	C. vir	3500 ± 40	3402-3022	-8.18	0.12	Slagle et al. (2006)	4
Westway	40.726	74.011	QC-1184	Marine shell	5540 ± 160	6189-5435	-23.25	0.59	Pardi et al. (1984)	3
Terrestrial Limiting										
Constitution Island	41.406	73.948	QC-1040	basal peat	6030 ± 290	7477-6287	-6.85	0.56	Pardi et al. (1984)	3
Cedar Pond Brook Marsh	41.225	73.967	QC-771	Wood	2890 ± 130	3348-2768	-2.02	0.54	Pardi et al. (1984)	2
Constitution Island	41.406	73.942	QC-691	Fresh peat	2320 ± 500	3559-1283	0.03	0.54	Pardi et al. (1984)	1
Constitution Island	41.406	73.942	QC-690	Peat	1440 ± 100	1558-1146	-1.02	0.54	Pardi et al. (1984)	3
Piermont Tidal Marsh	41.025	73.900	QC-731	Wood	3530 ± 110	4145-3489	-3.93	0.53	Pardi et al. (1984)	1
Roa Hook	41.299	73.947	QC-566	Wood	4660 ± 100	5593-5049	-5.74	0.54	Pardi et al. (1984)	2
Roa Hook	41.299	73.947	QC-565	Wood	5470 ± 140	6544-5928	-7.47	0.54	Pardi et al. (1984)	2
Roa Hook	41.299	73.947	QC-573	wood	6230 ± 120	7419-6807	-9.67	0.54	Pardi et al. (1984)	2
Roa Hook	41.299	73.947	QC-722	Wood	2360 ± 100	2719-2153	-1.22	0.54	Pardi et al. (1984)	2
Westway	40.726	74.012	QC-1026	Peat	9170 ± 230	11087-9681	-21.87	0.64	Pardi et al. (1984)	3
Westway	40.725	74.011	QC-1029	Peat	8190 ± 130	9477-8729	-18.18	0.63	Pardi et al. (1984)	3
Westway	40.723	74.016	QC-1028	Peat	8750 ± 170	10222-9486	-20.29	0.67	Pardi et al. (1984)	3
Barclay	40.717	74.000	L-562	Wood	6500 ± 100	7581-7183	-13.22	0.25	Olson and Broecker (1961)	2
Westway	40.761	74.013	QC-1183	Organic silt	9540 ± 120	11201-10525	-35.50	0.71	Pardi et al. (1984)	3
Westway	40.741	74.011	QC-1321	Organic silt	7920 ± 200	9395-8371	-23.36	0.65	Pardi et al. (1984)	3
Westway	40.724	74.016	QC-1380	Organic silt	8960 ± 270	11052-9432	-20.27	0.64	Pardi et al. (1984)	3
Westway	40.726	74.016	QC-1389	Organic silt	7650 ± 190	8991-8051	-20.44	0.62	Pardi et al. (1984)	3
Westway	40.725	74.016	QC-1374	Organic silt	8690 ± 190	10231-9309	-23.36	0.65	Pardi et al. (1984)	3
Piermont Tidal Marsh	41.025	73.900	QC-809	Peat	6840 ± 230	8162-7294	-10.47	0.59	Pardi et al. (1984)	3
Long Island										
Index Points										
Caumsett Marsh	40.942	73.481	QC-689	Salt peat	780 ± 120	926-548	-0.84	0.92	Pardi et al. (1984)	3

Caumsett Marsh	40.942	73.481	QC-687	Salt peat	660 ± 120		904-482	-2.04	0.92	Pardi et al. (1984)	3
Caumsett Marsh	40.942	73.481	QC-688	Salt peat	760 ± 140		953-515	-2.05	0.92	Pardi et al. (1984)	3
College Point Marsh	40.796	73.831	QC-267	Salt peat	5650 ± 170		6848-6008	-12.76	0.82	Pardi et al. (1984)	3
College Point Marsh	40.796	73.831	QC-265	Salt peat	6370 ± 100		7469-7017	-18.11	0.82	Pardi et al. (1984)	3
College Point Marsh	40.796	73.831	QC-269	Salt peat	8100 ± 100		9302-8644	-19.81	0.84	Pardi et al. (1984)	3
College Point Marsh	40.796	73.831	QC-266	Salt peat	7120 ± 240		8393-7517	-17.76	0.83	Pardi et al. (1984)	3
Eatons Neck	40.949	73.395	QC-679	Salt peat	1585 ± 110		1720-1292	-1.34	0.91	Cinquemani et al. (1982)	3
Eatons Neck	40.949	73.395	QC-681	Salt peat	370 ± 120		642-0	-0.64	0.92	Cinquemani et al. (1982)	3
Eatons Neck	40.949	73.395	QC-682	Salt peat	2520 ± 85		2752-2360	-4.84	0.92	Cinquemani et al. (1982)	3
Mt. Sinai Harbor	40.949	73.031	QC-190	Salt peat	2180 ± 100		2357-1903	-4.57	1.01	Cinquemani et al. (1982)	3
Pelham Bay Park	40.868	73.793	QC-295	Salt peat	1800 ± 90		1927-1527	-1.99	0.92	Pardi et al. (1984)	3
Roosevelt Ave	40.800	73.800	QC-306	Salt peat	7980 ± 390		9766-7982	-15.51	0.82	Pardi et al. (1984)	3
Cedar Beach Suffolk Co	40.617	73.383	QC-314	Salt peat	5060 ± 120		6177-5585	-10.59	0.74	Pardi and Newman (1980)	3
Wantagh- Nassau Co	40.650	73.517	QC-315	Salt peat	1020 ± 100		1172-732	-1.61	0.74	Pardi and Newman (1980)	3
Wantagh- Nassau Co	40.650	73.517	QC-316	Salt peat	300 ± 90		518-0	-0.76	0.74	Pardi and Newman (1980)	3
Terrestrial Limiting											
Gardiners Bay	41.192	72.192	I-1663	Undiff peat	6575 ± 125		7670-7260	-11.87	0.80	Field et al. (1979)	3
Pelham Bay	40.870	73.790	C-943	Stump	2830 ± 220		3452-2364	-1.88	0.16	Redfield and Rubin (1962)	2
Riverhead	40.900	72.617	I-2077	Fresh peat	8070 ± 130		9398-8596	-2.77	0.42	Redfield (1967)	3
Shelter Island	41.046	72.314	QC1083A&B	Peat	3590 ± 130		4288-3560	-5.96	0.42	Pardi et al. (1984)	3
South Long Island	40.748	72.447	I-7434	Fresh peat	5585 ± 110		6627-6131	-10.39	0.80	Field et al. (1979)	3
NY/NJ Border	40.460	74.180	QC-1399	Organic sediment	2700 ± 150		3207-2363	-0.88	0.16	Pardi et al. (1984)	3
New Jersey											
Index Points											
Brigantine City- NJ	39.426	74.390	Y-1284	Salt peat	5890 ± 100		6951-6453	-12.95	0.77	Stuiver and Daddario (1963)	3
Brigantine NWR	39.483	74.424	Y-1281	Salt peat	3000 ± 90		3387-2929	-4.65	0.77	Stuiver and Daddario (1963)	3
Brigantine NWR	39.479	74.419	Y-1282	Salt peat	3830 ± 100		4517-3929	-7.35	0.77	Stuiver and Daddario (1963)	3
Brigantine NWR	39.454	74.405	Y-1283	Salt peat	4760 ± 80		5643-5315	-10.25	0.78	Stuiver and Daddario (1963)	3
Brigantine NWR	39.485	74.426	Y-1331	Salt peat	1890 ± 40		1922-1720	-2.55	0.77	Stuiver and Daddario (1963)	3
Great Bay	39.561	74.349	Not Stated	Salt peat	3035 ± 120		3475-2879	-4.05	0.77	Psuty et al. (1986)	3
Great Bay	39.522	74.324	Not Stated	Salt peat	4495 ± 125		5565-4843	-8.35	0.78	Psuty et al. (1986)	3
Great Bay	39.522	74.324	Not Stated	Salt peat	4175 ± 145		5264-4256	-8.35	0.78	Psuty et al. (1986)	3
Sea Island City	39.200	74.700	QC-850	Salt peat	920 ± 160		1177-559	-1.31	0.80	Cinquemani et al. (1982)	3
Sea Island City	39.200	74.700	QC-851	Salt peat	2345 ± 100		2715-2149	-2.81	0.80	Cinquemani et al. (1982)	3
Sea Island City	39.200	74.700	QC-853	Salt peat	2760 ± 100		3204-2720	-4.76	0.80	Cinquemani et al. (1982)	3
Sea Island City	39.200	74.700	QC-854	Salt peat	3440 ± 110		3981-3445	-5.51	0.81	Cinquemani et al. (1982)	3
Sea Island City	39.200	74.700	QC-855	Salt peat	3960 ± 110		4816-4092	-7.36	0.81	Cinquemani et al. (1982)	3
Sea Island City	39.180	74.730	QC-852	Salt peat	2260 ± 100		2695-1993	-3.51	0.80	Pardi et al. (1984)	3
Brigantine Marsh	39.420	74.354	Not Stated	Salt peat	240 ± 50	-13.2	462-0	-1.70	0.68	Donnelly et al. (2004b)	2
Edwin B Forsythe NWR	39.495	74.418	OS-70442	Salt peat	1249 ± 13	-10.1	1263-1147	-2.43	0.28	This publication	1
Edwin B Forsythe NWR	39.495	74.418	OS-70443	Salt peat	1502 ± 14	-1.7	1407-1349	-2.70	0.28	This publication	1
Edwin B Forsythe NWR	39.495	74.418	OS-70444	Salt peat	1188 ± 30	-28.7	1228-1004	-2.23	0.28	This publication	1
Edwin B Forsythe NWR	39.495	74.418	OS-70445	Salt peat	1541 ± 14	-14.6	1379-1517	-2.93	0.28	This publication	1
Edwin B Forsythe NWR	39.495	74.418	OS-70446	Salt peat	319 ± 13	-12	452-308	-1.52	0.28	This publication	1
Edwin B Forsythe NWR	39.495	74.418	OS-66514	Salt peat	1550 ± 25	-14.4	1521-1383	-3.03	0.28	This publication	1
Edwin B Forsythe NWR	39.495	74.418	OS-66518	Salt peat	950 ± 30	-13.78	926-794	-2.09	0.28	This publication	1
Cheesequake Marsh	40.400	74.300	QC-842	Salt peat	2080 ± 160		2457-1625	-3.32	0.85	Cinquemani et al. (1982)	3
Cheesequake Marsh	40.400	74.300	QC-844	Salt peat	1210 ± 185		1510-738	-2.62	0.85	Cinquemani et al. (1982)	3
Cheesequake Marsh	40.400	74.300	QC-847	Salt peat	1960 ± 130		2306-1572	-2.85	0.85	Cinquemani et al. (1982)	3
Island Beach	39.803	74.094	GX-19017	Salt peat	5625 ± 200		6883-5947	-10.38	0.67	Miller et al. (2009)	3
Marine Limiting											
Rainbow Island	39.305	74.585	GX-30879	Elphidium spp.	2580 ± 30		2235-1921	-4.54	0.18	Miller et al. (2009)	4

Rainbow Island	39.305	74.585	GX-30880	Elphidium spp.	2880 ± 30		2646-2314	-5.15	0.18	Miller et al. (2009)	4
Rainbow Island	39.305	74.585	GX-30881	Elphidium spp.	3770 ± 40		3658-3376	-6.98	0.19	Miller et al. (2009)	4
Rainbow Island	39.304	74.588	GX-31527	Elphidium spp.	2330 ± 70		1957-1561	-3.60	0.18	Miller et al. (2009)	4
Rainbow Island	39.304	74.588	GX-31526	Elphidium spp.	2960 ± 70		2720-2340	-5.18	0.19	Miller et al. (2009)	4
Cheesequake Marsh	40.439	74.273	Not Stated	Marine shell	4330 ± 460		5446-3122	-10.29	0.59	Psuty et al. (1986)	3
Terrestrial Limiting											
Great Bay	39.549	74.342	Not Stated	Undiff peat	6380 ± 355		7933-6477	-7.89	0.55	Psuty et al. (1986)	3
Great Bay	39.510	74.320	OS-3415	Undiff peat	7340 ± 35		8287-8027	-7.14	0.19	Miller et al. (2009)	3
Island Beach	39.803	74.094	GX-19018	Undiff peat	4532 ± 58		5442-4976	0.40	0.18	Miller et al. (2009)	3
Core 3	39.664	74.099	Not Stated	Undiff peat	8800 ± 170		10242-9502	-3.80	1.09	Miller et al. (2009)	3
Cheesequake Marsh	40.400	74.300	QC-896	Undiff peat	7320 ± 185		8508-7756	-11.24	0.59	Cinquemani et al. (1982)	3
Cheesequake Marsh	40.439	74.273	Not Stated	Cedar peat	6610 ± 215		7930-7020	-10.99	0.59	Psuty et al. (1986)	2
Cheesequake Marsh	40.439	74.273	Not Stated	Undiff peat	7735 ± 195		9087-8163	-11.79	0.59	Psuty et al. (1986)	3
Cheesequake Marsh	40.435	74.281	Not Stated	Cedar peat	6020 ± 215		7413-6403	-7.59	0.59	Psuty et al. (1986)	2
Union Beach	40.446	74.161	Not Stated	Undiff peat	660 ± 110		897-497	-0.59	0.58	Psuty et al. (1986)	3
Union Beach	40.446	74.161	Not Stated	Undiff peat	2695 ± 145		3201-2363	-0.54	0.58	Psuty et al. (1986)	3
Inner Delaware											
Index Points											
Leipsic River	39.253	75.460	Beta-118799	Salt peat	970 ± 80		1055-727	-1.51	0.79	Nikitina et al. (2000)	1
Leipsic River	39.251	75.469	GrN-18995	Salt peat	1160 ± 50		1232-960	-2.81	0.79	Nikitina et al. (2000)	1
Leipsic River	39.429	75.457	Beta-118800	Salt peat	1770 ± 60		1857-1543	-3.13	0.79	Nikitina et al. (2000)	1
Leipsic River	39.251	75.469	GrN-18994	Salt peat	2030 ± 80		2302-1818	-3.14	0.79	Nikitina et al. (2000)	1
Leipsic River	39.249	75.469	Beta-118803	Salt peat	2070 ± 80		2308-1870	-2.79	0.79	Nikitina et al. (2000)	1
Leipsic River	39.235	75.436	Beta-118802	Salt peat	2880 ± 70		3244-2810	-5.25	0.79	Nikitina et al. (2000)	1
Leipsic River	39.248	75.469	GrA-9719	Salt peat	3320 ± 40		3676-3452	-5.66	0.79	Nikitina et al. (2000)	1
Leipsic River	39.243	75.442	Beta-117237	Salt peat	3430 ± 70		3865-3483	-6.86	0.79	Nikitina et al. (2000)	1
Leipsic River	39.246	75.470	GrA-9698	Salt peat	3485 ± 40		3861-3641	-8.54	0.79	Nikitina et al. (2000)	1
Leipsic River	39.247	75.469	GrA-9693	Salt peat	3530 ± 40		3912-3694	-7.23	0.79	Nikitina et al. (2000)	1
Leipsic River	39.247	75.469	GrN-18993	Salt peat	3660 ± 30		4084-3900	-6.61	0.79	Nikitina et al. (2000)	1
Port Mahon	39.125	75.321	I-5955	Salt peat	4090 ± 100		4851-4299	-8.31	0.85	Belknap (1975)	3
Leipsic River	39.246	75.411	Beta-117239	Salt peat	4490 ± 80		5318-4872	-11.52	0.79	Nikitina et al. (2000)	1
Port Mahon	39.125	75.321	TEM-172	Salt peat	2020 ± 110		2307-1721	-5.18	0.58	Marx (1981)	3
Port Mahon	39.180	75.403	TEM-173	Salt peat	2490 ± 80		2739-2361	-6.06	0.60	Marx (1981)	3
Bowers	39.052	75.390	P-1686	Salt peat	1950 ± 55		2036-1736	-4.50	0.80	Belknap (1975)	3
Bowers	39.052	75.390	P-1688	Spartina	2999 ± 59		3348-3004	-6.02	0.85	Belknap (1975)	2
Bowers	39.056	75.394	I-5927	Salt peat	5205 ± 110		6273-5723	-16.54	0.86	Belknap (1975)	3
Sheppards Island	38.922	75.313	I-5930	Salt peat	5345 ± 110		6391-5905	-14.10	1.15	Belknap (1975)	3
St Jones River	39.071	75.431	Beta-176159	Organic sediment	3930 ± 80	-15.6	4781-4095	-6.54	0.80	Leorri et al. (2006)	3
Bowers	39.051	75.394	P-1685	Salt peat	3314 ± 63		3691-3403	-5.85	0.81	Belknap (1975)	3
Marine Limiting											
Offshore Bowers	39.087	75.228	I-6674	Marine shell	2685 ± 90		2428-1906	-11.50	0.52	Belknap (1975)	3
Offshore Bowers	39.087	75.228	I-6675	Marine shell	2855 ± 90		2687-2141	-11.67	0.51	Belknap (1975)	3
Terrestrial Limiting											
Smyrna	39.320	75.483	I-6589	Peat	6835 ± 115		7931-7497	-13.80	0.63	Belknap (1975)	3
Sheppards Island	38.929	75.319	I-9229	Peat	285 ± 75		508-0	1.07	0.61	Kraft (1976)	3
Port Mahon	39.136	75.403	TEM-148	Stump	3450 ± 100		3972-3468	-5.48	0.60	Ramsey and Baxter (1996)	2
Smyrna	39.243	75.584	Not Stated	Fresh peat	3515 ± 85		4072-3574	-1.08	0.54	Rogers and Pizzuto (1994)	3
Port Mahon	39.177	75.408	I-5929	Peat	2945 ± 95		3352-2870	-4.67	0.61	Belknap (1975)	3
Bowers	39.056	75.394	I-5994	Peat	7730 ± 125		8978-8328	-20.79	0.65	Belknap (1975)	3
St Jones River	39.082	75.445	Beta-179205	Peat	230 ± 60	-25	460-0	-0.63	0.52	Leorri et al. (2006)	3
St Jones River	39.090	75.458	Beta-177401	Plant	3790 ± 40	-25.2	4376-3994	-7.13	0.52	Leorri et al. (2006)	2

Outer Delaware										
Index Points										
Horse Island	38.672	75.134	Beta-118808	Salt peat	170 ± 80	426-0	-0.80	0.65	Nikitina et al. (2000)	2
Horse Island	38.672	75.134	Beta-118807	Salt peat	960 ± 50	961-745	-1.52	0.65	Nikitina et al. (2000)	2
Offshore Rehoboth	38.649	75.021	I-5204	Salt peat	7500 ± 135	8545-8023	-20.19	0.72	Belknap (1975)	3
Great Marsh	38.786	75.172	Beta-14681	Salt peat	80 ± 60	274-0	-0.80	0.75	Ramsey and Baxter (1996)	3
Wolf Glade	38.764	75.097	TEM-158	Spartina	280 ± 60	496-0	-0.94	0.76	Ramsey and Baxter (1996)	2
Great Marsh	38.786	75.171	Beta-14683	Salt peat	670 ± 70	725-539	-1.20	0.75	Ramsey and Baxter (1996)	3
Wolf Glade	38.765	75.099	TEM-164	Spartina	690 ± 100	892-512	-1.33	0.76	Ramsey and Baxter (1996)	2
Wolf Glade	38.764	75.098	TEM-163	Spartina	750 ± 70	897-555	-1.73	0.76	Ramsey and Baxter (1996)	2
Wolf Glade	38.768	75.106	TEM-165	Spartina	760 ± 70	900-558	-1.79	0.76	Ramsey and Baxter (1996)	2
Great Marsh	38.785	75.171	Beta-14684	Salt peat	930 ± 80	969-689	-1.38	0.75	Ramsey and Baxter (1996)	3
Wolf Glade	38.764	75.098	TEM-162	Spartina	930 ± 90	1048-680	-1.15	0.76	Ramsey and Baxter (1996)	2
Great Marsh	38.786	75.172	Beta-14682	Salt peat	950 ± 90	1052-690	-1.05	0.75	Ramsey and Baxter (1996)	3
Wolf Glade	38.761	75.096	TEM-157	Spartina	940 ± 120	1166-664	-1.55	0.76	Ramsey and Baxter (1996)	2
Wolf Glade	38.768	75.106	TEM-166	Spartina	980 ± 120	1170-682	-1.27	0.76	Ramsey and Baxter (1996)	2
Wolf Glade	38.764	75.097	TEM-161	Spartina	1100 ± 90	1260-798	-1.48	0.76	Ramsey and Baxter (1996)	2
Wolf Glade	38.764	75.097	TEM-160	Spartina	1150 ± 80	1262-930	-1.94	0.76	Ramsey and Baxter (1996)	2
Great Marsh	38.785	75.171	Beta-14685	Salt peat	1150 ± 80	1262-930	-1.29	0.75	Ramsey and Baxter (1996)	3
Great Marsh	38.785	75.171	Beta-14686	Salt peat	1370 ± 60	1387-1175	-1.47	0.75	Ramsey and Baxter (1996)	3
Great Marsh	38.785	75.171	Beta-14687	Salt peat	1650 ± 70	1712-1390	-1.75	0.75	Ramsey and Baxter (1996)	3
Horse Island	38.670	75.130	I-8118	Spartina	690 ± 85	772-530	-0.96	0.64	Belknap (1975)	2
Rehoboth Bay	38.645	75.072	R-4114	Salt peat	3780 ± 170	4786-3690	-6.40	0.66	Belknap (1975)	3
Rehoboth Bay	38.637	75.069	R-4113	Salt peat	3130 ± 170	3805-2871	-4.58	0.72	Belknap (1975)	3
Rehoboth Bay	38.645	75.072	R-4114_a	Salt peat	3520 ± 160	4241-3405	-5.78	0.71	Belknap (1975)	3
Rehoboth Bay	38.645	75.072	R-4114_b	Salt peat	3890 ± 170	4822-3892	-5.91	0.76	Belknap (1975)	3
Rehoboth Bay	38.669	75.070	R-4100_b	Salt peat	4860 ± 180	5991-5053	-9.23	0.73	Belknap (1975)	3
Rehoboth Bay	38.669	75.068	R-4101_c	Salt peat	6190 ± 190	7459-6639	-13.68	0.67	Belknap (1975)	3
Wolf Glade	38.760	75.100	I-8119	Spartina	920 ± 90	1043-677	-1.90	0.81	Belknap (1975)	2
Wall Island	38.802	75.204	I-4353	Salt peat	1990 ± 100	2300-1706	-3.91	0.81	Belknap (1975)	3
Lewes	38.778	75.174	I-4625	Salt peat	2330 ± 100	2713-2127	-5.07	0.81	Belknap (1975)	3
Wolf Glade	38.753	75.119	GX-16215	Sp	2945 ± 190	3578-2720	-6.38	0.58	Fletcher et al. (1993)	2
Wolf Glade	38.753	75.119	GX-16217	Salt peat	3130 ± 200	3829-2849	-7.01	0.58	Fletcher et al. (1993)	3
Wolf Glade	38.753	75.119	GX-16216	Salt peat	3195 ± 200	3890-2880	-6.68	0.58	Fletcher et al. (1993)	3
Wolf Glade	38.753	75.119	GX-16218	Salt peat	3465 ± 185	4283-3271	-7.31	0.58	Fletcher et al. (1993)	3
Wolf Glade	38.756	75.117	GX-15829	Salt peat	3630 ± 40	4082-3840	-7.68	0.59	Fletcher et al. (1993)	3
Wolf Glade	38.753	75.119	GX-16219	Salt peat	3620 ± 215	4522-3404	-7.38	0.58	Fletcher et al. (1993)	3
Wolf Glade	38.756	75.117	GX-15830	Sp	3870 ± 200	4838-3728	-8.38	0.59	Fletcher et al. (1993)	2
Wolf Glade	38.756	75.117	GX-15831	Salt peat	3860 ± 175	4820-3836	-8.98	0.59	Fletcher et al. (1993)	3
Wolf Glade	38.754	75.116	GX-15837	Jg	4210 ± 85	4961-4453	-9.08	0.59	Fletcher et al. (1993)	2
Wolf Glade	38.756	75.117	GX-15833	Sp/Ds	4420 ± 170	5574-4574	-9.78	0.59	Fletcher et al. (1993)	2
Cape Henlopen	38.783	75.078	Beta-5154	Sa	6360 ± 140	7561-6945	-16.52	0.64	Ramsey and Baxter (1996)	2
Cape Henlopen	38.785	75.094	R-4103	Salt peat	7050 ± 220	9144-7510	-19.46	0.77	Belknap (1975)	3
Marine Limiting										
Rehoboth Bay	38.669	75.070	R-4100	Mercenaria	2180 ± 150	1941-1259	-6.83	0.60	Belknap (1975)	4
Rehoboth Bay	38.669	75.068	R-4101	Cyrtopleura/Tagelus	2630 ± 190	2660-1670	-6.86	0.60	Belknap (1975)	4
Offshore Rehoboth	38.663	75.058	Beta-5157	Unidentified Shells	3310 ± 90	3208-2722	-8.91	0.53	Ramsey and Baxter (1996)	3
Rehoboth Beach	38.756	75.082	R-4104_a	C. vir	1950 ± 200	1801-917	-7.32	0.60	Belknap (1975)	4
Rehoboth Beach	38.756	75.082	R-4104_d	Unidentified Shells	3010 ± 180	3042-2108	-8.43	0.80	Belknap (1975)	3
Terrestrial Limiting										
Offshore Rehoboth	38.663	75.050	BETA-5158	Wood	6220 ± 90	7407-6885	-10.86	0.51	Ramsey and Baxter (1996)	2
Lewes	38.789	75.159	I-5206	Undiff peat	330 ± 90	532-0	-0.18	0.59	Belknap (1975)	3

Lewes	38.781	75.174	I-4799	Undiff peat	2580 ± 95		2849-2363	-4.08	0.59	Belknap 1975	3
Wolf Glade	38.754	75.116	GX-15838	Sc/Sr	4350 ± 85	-26.8	5289-4665	-7.98	0.54	Fletcher et al 1993	2
Wolf Glade	38.755	75.116	GX-16224	Fresh peat	4745 ± 245	-26.6	5995-4833	-8.88	0.54	Fletcher et al 1993	1
Inner Chesapeake											
Index Points											
Blackwater	38.400	76.100	QC-861	Salt peat	2485 ± 125		2846-2208	-3.64	0.34	Cinquemani et al 1982	3
Blackwater	38.400	76.100	QC-862	Salt peat	2650 ± 180		3240-2334	-4.12	0.33	Cinquemani et al 1982	3
Blackwater	38.400	76.100	QC-860	Salt peat	2835 ± 140		3357-2730	-3.34	0.34	Cinquemani et al 1982	3
Blackwater	38.400	76.100	QC-863	Salt peat	3745 ± 120		4436-3729	-5.57	0.35	Cinquemani et al 1982	3
Radcliffe Creek	39.000	76.100	QC-859	Salt peat	1230 ± 155		1411-795	-1.92	0.33	Cinquemani et al 1982	3
Radcliffe Creek	39.000	76.100	QC-857	Salt peat	3365 ± 145		4059-3265	-5.17	0.35	Cinquemani et al 1982	3
Radcliffe Creek	39.000	76.100	QC-856	Salt peat	4505 ± 115		5465-4855	-10.87	0.36	Cinquemani et al 1982	3
Marine Limiting											
Patuxtent River	38.331	76.378	OS-18535	Shell	580 ± 35	-1.37	296-111	-10.27	0.67	Colman et al. (2002)	3
Patuxtent River	38.331	76.378	OS-18661	Shell	905 ± 60	-1.18	627-429	-10.40	0.67	Colman et al. (2002)	3
Patuxtent River	38.331	76.378	OS-20057	Shell	860 ± 40	-0.41	543-418	-11.02	0.67	Colman et al. (2002)	3
Patuxtent River	38.331	76.378	OS-18534	Shell	1210 ± 45	-7.57	871-665	-11.32	0.67	Colman et al. (2002)	3
Patuxtent River	38.331	76.378	OS-18413	Shell	780 ± 40	-5.35	491-315	-9.77	0.67	Colman et al. (2002)	3
Patuxtent River	38.331	76.378	OS-18411	Shell	750 ± 45	-1.25	476-295	-10.06	0.67	Colman et al. (2002)	3
Patuxtent River	38.331	76.378	OS-18410	Shell	675 ± 45	-0.91	436-246	-10.34	0.67	Colman et al. (2002)	3
Town Point	38.544	76.427	OS-15674	Shell	1010 ± 85	-0.14	725-471	-25.63	0.67	Colman et al. (2002)	3
Town Point	38.544	76.427	OS-15676	Shell	605 ± 40	-0.59	355-119	-25.73	0.67	Colman et al. (2002)	3
Town Point	38.544	76.427	OS-15675	Forams	1220 ± 80	-2.14	921-638	-26.33	0.67	Colman et al. (2002)	3
Town Point	38.544	76.427	OS-15684	Forams	1310 ± 80	-2.1	1014-682	-26.83	0.67	Colman et al. (2002)	3
Town Point	38.544	76.427	OS-15683	Forams	1200 ± 75	-2.08	905-633	-26.95	0.67	Colman et al. (2002)	3
Town Point	38.544	76.427	OS-15677	Forams	1190 ± 70	-2.04	894-633	-27.23	0.67	Colman et al. (2002)	3
Town Point	38.544	76.427	OS-19508	Forams E.e.	1050 ± 180		957-299	-27.23	0.67	Colman et al. (2002)	4
Town Point	38.544	76.427	OS-17874	Forams E.s.	1320 ± 195	-2.54	1251-541	-27.23	0.67	Colman et al. (2002)	4
Town Point	38.544	76.427	OS-15682	Shell	2100 ± 80	-0.24	1875-1492	-27.83	0.67	Colman et al. (2002)	3
Town Point	38.544	76.427	OS-17881	Forams E.e	2090 ± 30	-2.18	1771-1562	-28.03	0.67	Colman et al. (2002)	4
Town Point	38.544	76.427	OS-17884	Forams E.s.	2090 ± 55	-2.3	1809-1529	-28.03	0.67	Colman et al. (2002)	4
Town Point	38.544	76.427	OS-15686	Forams	1290 ± 75	-2.07	973-674	-28.13	0.67	Colman et al. (2002)	3
Town Point	38.544	76.427	OS-15687	Shell	1850 ± 80	0.32	1580-1251	-28.13	0.67	Colman et al. (2002)	3
Town Point	38.544	76.427	OS-15685	Forams	2090 ± 70	-1.39	1847-1506	-28.33	0.67	Colman et al. (2002)	3
Town Point	38.544	76.427	OS-15690	Forams	2570 ± 70	-0.97	2418-2049	-28.45	0.67	Colman et al. (2002)	3
Town Point	38.544	76.427	OS-15678	Gastropod	1130 ± 80	-0.07	857-542	-29.03	0.67	Colman et al. (2002)	3
Town Point	38.544	76.427	CAMS-43708	Shell	640 ± 50		413-143	-26.15	0.67	Colman et al. (2002)	3
Town Point	38.544	76.427	CAMS-43709	Shell	1160 ± 40		788-638	-27.54	0.67	Colman et al. (2002)	3
Town Point	38.544	76.427	CAMS-43710	Shell	1980 ± 50		1677-1403	-28.62	0.67	Colman et al. (2002)	3
Town Point	38.538	76.430	OS-18409	Shell	625 ± 35	-0.72	366-142	-23.11	0.67	Colman et al. (2002)	3
Town Point	38.538	76.430	OS-18532	Shell	535 ± 35	-1.04	266-0	-23.88	0.67	Colman et al. (2002)	3
Town Point	38.538	76.430	OS-18660	Shell	815 ± 45	-0.4	516-332	-24.20	0.67	Colman et al. (2002)	3
Town Point	38.538	76.430	OS-18533	Shell	3030 ± 35	0.13	2886-2723	-26.14	0.67	Colman et al. (2002)	3
Town Point	38.538	76.430	OS-21266	Forams	3090 ± 90	-0.81	3125-2703	-26.83	0.67	Colman et al. (2002)	3
Town Point	38.538	76.430	OS-18662	Shell	3360 ± 100	-0.73	3446-2937	-26.88	0.67	Colman et al. (2002)	3
Mayo	38.878	76.446	OS-18412	Shell	1400 ± 40	-2.68	1052-854	-9.32	0.66	Colman et al. 2002	3
Mayo	38.878	76.446	OS-18900	Shell	1260 ± 30	-3.36	893-723	-9.28	0.66	Colman et al. 2002	3
Mayo	38.878	76.446	OS-18528	Shell	1520 ± 40	-2.97	1174-958	-9.52	0.66	Colman et al. 2002	3
Mayo	38.878	76.446	OS-18524	Shell	1750 ± 35	-5.32	1375-1234	-10.18	0.66	Colman et al. 2002	3
Mayo	38.878	76.446	OS-18523	Shell	1880 ± 35	-2.43	1517-1332	-10.54	0.66	Colman et al. 2002	3
Mayo	38.878	76.446	OS-18902	Shell	1970 ± 30	-2.01	1615-1412	-10.94	0.66	Colman et al. 2002	3
Mayo	38.878	76.446	OS-18527	Shell	2050 ± 45	-1.79	1748-1505	-11.25	0.66	Colman et al. 2002	3
Mayo	38.878	76.446	OS-18901	Shell	2030 ± 35	-2.05	1696-1506	-11.33	0.66	Colman et al. 2002	3

Mayo	38.878	76.446	OS-18529	Shell	2230 ± 50	-2.29	1957-1700	-11.70	0.66	Colman et al. 2002	3
Mayo	38.878	76.446	OS-18526	Shell	2290 ± 35	-2.4	1996-1805	-11.92	0.66	Colman et al. 2002	3
Mayo	38.878	76.441	OS-21262	Shell	2780 ± 75	-3.14	2701-2332	-12.47	0.66	Colman et al. 2002	3
Mayo	38.878	76.441	OS-20056	Shell	3760 ± 55	-1.63	3849-3547	-13.90	0.66	Colman et al. 2002	3
Mayo	38.879	76.440	OS-20052	Shell	4410 ± 45	-1.3	4769-4422	-14.40	0.77	Colman et al. 2002	3
Mayo	38.879	76.440	OS-20054	Shell	5240 ± 55	-2.02	5719-5471	-14.75	0.77	Colman et al. 2002	3
Mayo	38.879	76.440	OS-20053	Oyster	5340 ± 40	-2.75	5832-5598	-14.75	0.77	Colman et al. 2002	4
Mayo	38.879	76.440	OS-20055	Oyster	6060 ± 55	-3.52	6628-6348	-15.33	0.77	Colman et al. 2002	4
Mayo	38.879	76.440	OS-21270	Shell	6850 ± 110	-4.26	7557-7160	-16.01	0.77	Colman et al. 2002	3
Mayo	38.879	76.440	OS-25830	Oyster	7180 ± 40	-4.66	7735-7564	-16.26	0.77	Colman et al. 2002	4
Mayo	38.887	76.392	OS-19213	Shell	320 ± 60	-0.65	121-0	-28.06	0.66	Colman et al. 2002	3
Mayo	38.887	76.392	OS-19212	Shell	325 ± 60	-0.04	124-0	-28.56	0.66	Colman et al. 2002	3
Mayo	38.887	76.392	OS-19216	Shell	325 ± 30	-0.4	52-0	-29.17	0.66	Colman et al. 2002	3
Mayo	38.887	76.392	OS-19940	Shell	555 ± 35	-0.6	278-0	-29.88	0.66	Colman et al. 2002	3
Mayo	38.887	76.392	OS-19215	Shell	725 ± 55	-0.87	471-273	-30.54	0.66	Colman et al. 2002	3
Mayo	38.887	76.392	OS-19214	Shell	1150 ± 85	-1.03	883-555	-31.71	0.66	Colman et al. 2002	3
Mayo	38.887	76.392	OS-21226	Shell	610 ± 30	-0.87	311-139	-30.10	0.66	Colman et al. 2002	3
Mayo	38.887	76.392	OS-21381	Shell	745 ± 35	-0.57	464-299	-30.83	0.66	Colman et al. 2002	3
Mayo	38.887	76.392	OS-21382	Shell	1150 ± 40	-0.68	780-634	-31.69	0.66	Colman et al. 2002	3
Mayo	38.887	76.392	OS-21227	Shell	1240 ± 30	-1.29	880-701	-31.99	0.66	Colman et al. 2002	3
Mayo	38.887	76.392	OS-21383	Shell	1600 ± 35	-0.9	1251-1064	-32.87	0.66	Colman et al. 2002	3
Mayo	38.887	76.392	OS-21384	Shell	2050 ± 40	-1.73	1728-1512	-33.79	0.66	Colman et al. 2002	3
Mayo	38.887	76.392	OS-21228	Shell	2210 ± 35	-0.77	1901-1704	-34.47	0.66	Colman et al. 2002	3
Mayo	38.887	76.392	OS-21229	Shell	2500 ± 35	-0.74	2290-2058	-34.94	0.66	Colman et al. 2002	3
Mayo	38.887	76.392	OS-21385	Shell	4230 ± 40	-0.18	4440-4185	-35.34	0.66	Colman et al. 2002	3
Mayo	38.887	76.392	OS-21230	Shell	5530 ± 40	-0.7	6020-5781	-36.18	0.66	Colman et al. 2002	3
Mayo	38.887	76.392	OS-21231	Shell	5690 ± 40	-0.14	6208-5976	-37.45	0.67	Colman et al. 2002	3
Mayo	38.887	76.392	OS-21232	Shell	5960 ± 40	-0.08	6463-6280	-38.74	0.67	Colman et al. 2002	3
Mayo	38.887	76.392	OS-21233	Shell	5980 ± 40	0.02	6485-6290	-39.14	0.67	Colman et al. 2002	3
Mayo	38.887	76.392	OS-21488	Shell	6250 ± 35	-0.74	6801-6603	-41.54	0.67	Colman et al. 2002	3
Mayo	38.887	76.392	OS-21386	Shell	6290 ± 35	-3.73	6850-6649	-43.21	0.68	Colman et al. 2002	3
Mayo	38.887	76.392	OS-21489	Shell	8670 ± 45	-3.53	9457-9229	-44.10	0.68	Colman et al. 2002	3
Mayo	38.887	76.392	OS-21387	Oyster	6660 ± 45	-1.04	7298-7072	-44.10	0.68	Colman et al. 2002	4
Mayo	38.887	76.392	OS-21388	Shell	7050 ± 40	-1.49	7611-7448	-44.21	0.68	Colman et al. 2002	3
Mayo	38.887	76.392	OS-21389	Shell	7100 ± 45	-1.5	7663-7486	-44.36	0.68	Colman et al. 2002	3
Potomac River	38.028	76.220	CAMS-39237	Shell	540 ± 50	0.1	276-0	-23.38	0.70	Colman et al. 2002	3
Potomac River	38.028	76.220	CAMS-43711	Shell	990 ± 40		643-512	-24.20	0.68	Colman et al. 2002	3
Potomac River	38.028	76.220	CAMS-39238	Gastropod	1240 ± 50	0.1	896-681	-26.06	0.68	Colman et al. 2002	3
Potomac River	38.028	76.220	OS-15679	Shell	540 ± 30	0.01	266-0	-22.76	0.68	Colman et al. 2002	3
Potomac River	38.028	76.220	OS-15680	Shell	885 ± 35	-0.29	555-440	-23.56	0.68	Colman et al. 2002	3
Potomac River	38.028	76.220	OS-15681	Shell	1150 ± 25	0.01	753-648	-24.06	0.68	Colman et al. 2002	3
Potomac River	38.028	76.220	OS-17242	Forams	1230 ± 30	-1.72	870-690	-24.24	0.68	Colman et al. 2002	3
Potomac River	38.028	76.220	OS-15689	Shell	1530 ± 70	0.1	1236-933	-24.92	0.68	Colman et al. 2002	3
Potomac River	38.028	76.220	OS-17508	Forams	2450 ± 256	-2.41	2723-1515	-25.26	0.68	Colman et al. 2002	3
Potomac River	38.028	76.220	OS-17241	Forams	2400 ± 85	-1.94	2280-1846	-25.87	0.68	Colman et al. 2002	3
Potomac River	38.031	76.215	OS-21487	Shell	855 ± 25	-0.42	522-439	-24.16	0.68	Colman et al. 2002	3
Potomac River	38.031	76.215	OS-21670	Shell	4100 ± 45	0.11	4296-3984	-25.83	0.68	Colman et al. 2002	3
Potomac River	38.031	76.215	OS-21671	Shell	4470 ± 45	-0.13	4798-4521	-27.69	0.68	Colman et al. 2002	3
Potomac River	38.031	76.215	OS-25826	Shell	4590 ± 55	0.14	4952-4627	-28.83	0.68	Colman et al. 2002	3
Potomac River	38.031	76.215	OS-21664	Shell	6130 ± 55	0.2	6698-6420	-29.72	0.68	Colman et al. 2002	3
Potomac River	38.031	76.215	OS-21665	Shell	6430 ± 65	0.18	7113-6746	-30.29	0.68	Colman et al. 2002	3
Potomac River	38.031	76.215	OS-25827	Shell	6540 ± 45	0.7	7171-6924	-30.96	0.68	Colman et al. 2002	3
Potomac River	38.031	76.215	OS-21666	Shell	9150 ± 65	-8.09	10144-9697	-30.96	0.68	Colman et al. 2002	3
Potomac River	38.031	76.215	OS-25828	Shell	8150 ± 55	-1.94	8853-8474	-31.55	0.68	Colman et al. 2002	3
Potomac River	38.031	76.215	OS-21667	Shell	7080 ± 60	0.37	7666-7446	-31.88	0.68	Colman et al. 2002	3

Potomac River	38.031	76.215	OS-25829	Shell	8930 ± 65	-7.27	9802-9460	-33.49	0.69	Colman et al. 2002	3
Potomac River	38.031	76.215	OS-21668	Shell	9400 ± 100	-9.66	10504-9963	-33.57	0.69	Colman et al. 2002	3
Potomac River	38.053	76.221	OS-21669	Shell	9350 ± 70	-7.57	10393-9958	-22.72	0.68	Colman et al. 2002	3
Potomac River	38.053	76.221	OS-21486	Shell	9670 ± 50	-10.62	10631-10414	-23.29	0.68	Colman et al. 2002	3
Eastern Shore											
Index Points											
Oyster	37.287	75.917	OS-70464	Salt peat	1461 ± 31		1398-1303	-1.35	0.26	Engelhart et al. (2009)	1
Magothy Bay	37.145	75.946	OS-70465	Seed in salt peat	2213 ± 18	-27.8	2316-2152	-2.69	0.26	Engelhart et al. (2009)	1
Magothy Bay	37.145	75.946	OS-70466	Salt peat	1598 ± 14	-21.1	1532-1416	-2.15	0.26	Engelhart et al. (2009)	1
Boxtree Farm	37.396	75.867	OS-70467	Salt peat	1537 ± 23	-22.6	1518-1366	-1.62	0.26	Engelhart et al. (2009)	1
Metompkin Island	37.750	75.560	B-1952	Juncus peat	4620 ± 80		5582-5048	-7.02	0.47	Finkelstein and Ferland (1987)	2
Assawoman Island	37.810	75.520	B-2662	Juncus peat	3580 ± 60		4078-3700	-5.83	0.47	Finkelstein and Ferland (1987)	2
Custis Neck	37.622	75.678	GrN-16341	HM peat	4470 ± 50		5303-4891	-8.46	0.47	van de Plassche (1990)	3
Custis Neck	37.622	75.678	GrN-16340	HM peat	4445 ± 40		5286-4878	-8.42	0.47	van de Plassche (1990)	3
Custis Neck	37.622	75.678	GrN-16339	HM peat	4430 ± 40		5279-4871	-8.00	0.47	van de Plassche (1990)	3
Marine Limiting											
Parramore Island	37.580	75.650	W-4792	C. vir	600 ± 60		397-0	-2.57	0.44	Finkelstein and Ferland (1987)	4
Parramore Island	37.580	75.650	B-1955	C. vir	1380 ± 90		1130-727	-1.66	0.44	Finkelstein and Ferland (1987)	4
Parramore Island	37.580	75.650	W-4787	C. vir	2900 ± 110		2888-2342	-5.16	0.44	Finkelstein and Ferland (1987)	4
Hog Island	37.430	75.760	B-2664	C. vir	450 ± 50		226-0	-1.30	0.44	Finkelstein and Ferland (1987)	4
Hog Island	37.430	75.760	B-2665	C. vir	890 ± 50		607-430	-1.40	0.44	Finkelstein and Ferland (1987)	4
Cobb Island	37.350	75.810	B-1957	C. vir	890 ± 60		624-413	-1.99	0.44	Finkelstein and Ferland (1987)	4
Cobb Island	37.350	75.810	B-1958	C. vir	610 ± 70		419-0	-1.54	0.44	Finkelstein and Ferland (1987)	4
Terrestrial Limiting											
Wachapreague	37.580	75.650	ML-191	Undiff peat	2550 ± 70		2767-2365	-1.92	0.53	Newman and Rusnak (1965)	3
Wachapreague	37.580	75.650	ML-192	Undiff peat	5120 ± 145		6260-5592	-5.17	0.53	Newman and Rusnak (1965)	3
Wachapreague	37.580	75.650	ML-193	Undiff peat	3160 ± 195		3835-2871	-3.73	0.54	Newman and Rusnak (1965)	3
Wachapreague	37.580	75.650	ML-193	Undiff peat	3390 ± 75		3834-3464	-3.73	0.54	Newman and Rusnak (1965)	3
Wachapreague	37.580	75.650	ML-194	Undiff peat	4350 ± 75		5284-4728	-6.26	0.53	Newman and Rusnak (1965)	3
Magothy Bay	37.150	75.900	B-1950	Wood	1740 ± 100		1873-1415	0.10	0.10	Finkelstein and Ferland (1987)	2
Northern North Carolina											
Index Points											
Frisco	35.260	75.520	OS-39722	Salt peat	205 ± 40		310-0	-0.71	0.70	Horton et al. (2009)	3
Hatteras Island	35.230	75.680	Beta-187692	Salt peat	250 ± 40	-26.3	436-0	-0.86	0.54	Horton et al. (2009)	3
Hatteras Island	35.520	75.480	OS-54058	Salt peat	265 ± 35	-22.49	456-0	-0.54	0.20	Horton et al. (2009)	3
Northern Outer Banks	35.970	75.660	Beta-187694	Salt peat	1580 ± 40	-23	1548-1382	-1.78	0.20	Horton et al. (2009)	3
Pamlico Sound	35.220	75.660	Beta-187689	Salt peat	500 ± 40	-26.6	630-496	-0.66	0.54	Horton et al. (2009)	3
Sand Point	35.880	75.680	OS-43066	Salt peat	185 ± 30	-24.28	300-0	-0.56	0.20	Kemp (2009)	1
Sand Point	35.880	75.680	OS-43067	Salt peat	900 ± 50	-27.27	927-727	-1.14	0.20	Kemp (2009)	1
Sand Point	35.880	75.680	OS-43068	Salt peat	1520 ± 40	-25.55	1521-1333	-1.84	0.54	Kemp (2009)	1
Sand Point	35.880	75.680	OS-43069	Salt peat	1920 ± 45	-21.98	1986-1734	-2.28	0.20	Kemp (2009)	1
Sand Point	35.880	75.680	OS-43070	Salt peat	2090 ± 35	-22.92	2151-1951	-2.38	0.20	Kemp (2009)	1
Sand Point	35.880	75.680	OS-43071	Salt peat	2420 ± 35	-26.52	2599-2349	-2.70	0.20	Kemp (2009)	1
Sand Point	35.880	75.680	OS-43266	Salt peat	2470 ± 45	-25.47	2715-2363	-3.00	0.20	Kemp (2009)	1
Sand Point	35.880	75.680	OS-58902	Salt peat	315 ± 25	-27.33	461-305	-0.69	0.20	Kemp (2009)	1
Sand Point	35.880	75.680	OS-58897	Salt peat	535 ± 30	-26.67	632-512	-0.81	0.20	Kemp (2009)	1
Sand Point	35.880	75.680	OS-58901	Salt peat	910 ± 30	-27	917-743	-1.26	0.20	Kemp (2009)	1
Sand Point	35.880	75.680	OS-58896	Salt peat	1000 ± 25	-14.08	964-800	-1.40	0.20	Kemp (2009)	1
Sand Point	35.880	75.680	OS-58713	Salt peat	1080 ± 30	-13.26	1057-933	-1.50	0.20	Kemp (2009)	1
Sand Point	35.880	75.680	OS-58712	Salt peat	1190 ± 30	-13.4	1230-1006	-1.71	0.20	Kemp (2009)	1
Sand Point	35.880	75.680	OS-58711	Salt peat	1600 ± 25	-13.28	1539-1413	-1.99	0.20	Kemp (2009)	1

Sand Point	35.880	75.680	OS-58710	Salt peat	2120 ± 25	-13.78	2287-2003	-2.50	0.20	Kemp (2009)	1
Sand Point	35.880	75.680	OS-62716	Salt peat	2620 ± 45	-20.65	2849-2543	-2.67	0.20	Kemp (2009)	1
Kitty Hawk	36.050	75.700	Beta-168063	Salt peat	9720 ± 40	-24.6	11231-10889	-30.37	1.10	Mallinson et al. (2005)	1
Kitty Hawk	36.050	75.700	OS-36176	Salt peat	9930 ± 45	-25.48	11603-11235	-30.37	1.10	Mallinson et al. (2005)	1
Kitty Hawk	36.050	75.710	OS-36174	Salt peat	9460 ± 40	-14.64	11062-10576	-35.76	1.10	Mallinson et al. (2005)	1
Buxton	35.260	75.520	BETA-183551	Salt peat	160 ± 30	-25.1	286-0	-0.42	0.20	Horton et al. (2009)	1
Salvo	35.650	75.460	OS-39790	Salt peat	200 ± 35	-27.43	306-0	-0.43	0.20	Horton et al. (2009)	1
Sand Point	35.880	75.680	OS-64687	Salt peat	615 ± 35	-26.65	658-546	-0.77	0.20	Kemp (2009)	1
Sand Point	35.880	75.680	OS-64688	Salt peat	2410 ± 35	-27.45	2698-2346	-2.49	0.20	Kemp (2009)	1
Sand Point	35.880	75.680	OS-64813	Salt peat	1390 ± 110	-27.97	1523-1067	-1.42	0.20	Kemp (2009)	1
Sand Point	35.880	75.680	OS-64689	Salt peat	2410 ± 40	-28.58	2699-2345	-2.68	0.20	Kemp (2009)	1
Kitty Hawk	36.020	75.720	Beta-168060	Plant frags	7830 ± 50	-28	8853-8455	-15.37	1.10	Mallinson et al. (2005)	3
Marine Limiting											
Albemarle Sound	36.110	76.070	Beta-90661	Crassostrea shell	6140 ± 80		6612-6204	-15.06	0.51	Horton et al. (2009)	4
Albemarle Sound	36.110	76.070	Beta-90671	Crassostrea shell	2880 ± 60		2689-2245	-6.68	0.51	Horton et al. (2009)	4
Albemarle Sound	36.110	76.070	Beta-90672	Cyrtopleura/Tegalus shell	4200 ± 100		4383-3759	-9.11	0.51	Horton et al. (2009)	4
Albemarle Sound	36.110	76.070	Beta-90674	Cyrtopleura shell	4810 ± 40		5049-4679	-8.99	0.11	Horton et al. (2009)	4
Albemarle Sound	36.050	75.690	Not Stated	Mactra/Mercenaria shell	5225 ± 105		5642-5066	-11.88	0.11	Horton et al. (2009)	4
Albemarle Sound	36.050	75.690	Not Stated	Ensis shell	5600 ± 110		6104-5566	-13.37	0.11	Horton et al. (2009)	4
Croatan Sound	35.890	75.720	Beta-115591	Crassostrea shell	4480 ± 80		4767-4155	-7.91	0.11	Horton et al. (2009)	4
Croatan Sound	35.880	75.710	Beta-115593	Macoma shell	3610 ± 50	-5.3	3486-3120	-6.01	0.51	Horton et al. (2009)	4
Croatan Sound	35.920	75.750	Beta-115595	Cyrtopleura shell	4010 ± 150		4225-3403	-6.46	0.51	Horton et al. (2009)	4
Croatan Sound	35.920	75.750	Beta-115596	Crassostrea shell	4540 ± 80		4799-4275	-7.95	0.11	Horton et al. (2009)	4
Croatan Sound	35.920	75.740	Beta-115597	Cyrtopleura shell	3670 ± 50	-0.6	3559-3211	-7.13	0.51	Horton et al. (2009)	4
Croatan Sound	35.920	75.740	Beta-115598	Nassarius shell	3810 ± 50		3722-3364	-7.68	0.51	Horton et al. (2009)	4
Croatan Sound	35.900	75.730	Beta-119895	Mya shell	4130 ± 60		4173-3721	-7.66	0.51	Horton et al. (2009)	4
Nags Head	36.150	75.330	W-1402	C. virginica dredge	8130 ± 400	0	9419-7657	-34.00	0.51	Emery et al. (1967)	4
Pea Island	35.750	75.320	Not Stated	Donax shells	5618 ± 100	0	6090-5584	-24.00	0.51	Sears (1973)	4
Pamlico Sound	35.450	75.490	Beta-201772	Chione cancellata shell	1760 ± 40	0.1	1282-990	-3.70	0.11	Horton et al. (2009)	4
Pamlico Sound	35.470	75.530	Beta-205450	Chione cancellata shell	2070 ± 40	-0.1	1595-1301	-4.94	0.51	Horton et al. (2009)	4
Roanoke Sound	35.950	75.650	Beta-95296	Articulated Crassostrea	1900 ± 60		1468-1116	-4.16	0.11	Horton et al. (2009)	4
Salvo	35.520	75.480	OS-53608	Chione cancellate	1900 ± 30	1.62	1399-1161	-2.91	0.51	Horton et al. (2009)	4
SNL-113A-63	35.460	75.570	OS-39293	Petricola sp.	7780 ± 45	-2.4	8217-7927	-18.38	0.51	Stanton (2008)	4
SNL-161C-90	35.460	75.570	OS-39198	C. virginica	6580 ± 40	-2.34	7084-6721	-13.38	0.51	Stanton (2008)	4
SNL-163B-28	35.460	75.570	OS-39195	C. virginica	8210 ± 40	-2.7	8650-8360	-18.48	0.51	Stanton (2008)	4
SNL-164D-93	35.460	75.570	OS-39196	C. virginica	8980 ± 35	-1.41	9605-9340	-24.98	0.51	Stanton (2008)	4
Terrestrial Limiting											
Albemarle Sound	36.110	76.070	Beta-90666	Wood	6060 ± 60	-30.7	7157-6749	-8.71	0.51	Horton et al. (2009)	2
Buxton	35.160	75.310	OS-39792	Undiff peat	315 ± 35	-27.77	472-302	0.53	0.51	Horton et al. (2009)	3
Broad Creek	35.850	75.620	I-8988	Paleosol	2505 ± 90		2750-2356	-1.78	0.51	Horton et al. (2009)	3
Broad Creek	35.860	75.630	I-9208	Paleosol	3545 ± 100		4141-3577	-1.78	0.51	Horton et al. (2009)	3
Broad Creek	35.870	75.640	I-8990	Paleosol	5315 ± 110		6312-5770	-1.93	0.51	Horton et al. (2009)	3
Broad Creek	35.870	75.640	I-9253	Fresh peat	2290 ± 110		2703-2009	-1.79	0.51	Horton et al. (2009)	3
Southern North Carolina											
Index Points											
Tump Point	34.970	76.380	OS-59677	Salt peat	350 ± 30	-14.35	493-315	-0.36	0.20	Kemp (2009)	1
Tump Point	34.970	76.380	OS-59728	Salt peat	385 ± 35	-26.16	509-317	-0.47	0.20	Kemp (2009)	1
Tump Point	34.970	76.380	OS-59676	Salt peat	915 ± 35	-25.6	921-743	-0.67	0.20	Kemp (2009)	1
Tump Point	34.970	76.380	OS-59675	Salt peat	1350 ± 30	-26.8	1313-1183	-0.97	0.20	Kemp (2009)	1
Wilmington	34.100	78.000	QC793A	Salt peat	3390 ± 110	0	3901-3387	-3.03	0.59	Cinquemani et al. (1982)	3
Jarrett Bay	34.800	76.490	Not Stated	Salt peat	701 ± 230	-25	1170-0	-0.73	0.25	Spaur and Snyder (1999)	2
Jarrett Bay	34.800	76.490	Not Stated	Salt peat	2130 ± 161	-23	2682-1712	-1.91	0.25	Spaur and Snyder (1999)	2

Tump Point	34.970	76.380	OS-59697	Salt peat	1650 ± 35	-14.15	1689-1417	-1.19	0.20	Kemp (2009)	1
Croatan National Forest	34.700	77.100	QC-801	Salt peat	1180 ± 190		1414-698	-0.77	0.58	Cinquemani et al. (1982)	3
Croatan National Forest	34.700	77.100	QC-802	Salt peat	1735 ± 110		1890-1402	-1.27	0.58	Cinquemani et al. (1982)	3
Wilmington	34.100	78.000	QC-799	Salt peat	1385 ± 130		1546-988	-0.93	0.59	Cinquemani et al. (1982)	3
Wilmington	34.100	78.000	QC-793B	Salt peat	3395 ± 110		3905-3389	-3.43	0.60	Cinquemani et al. (1982)	3
Wilmington	34.100	78.000	QC-794	Salt peat	3600 ± 115		4240-3592	-4.23	0.60	Cinquemani et al. (1982)	3
Wilmington	34.100	78.000	QC-796	Salt peat	3870 ± 175		4821-3845	-5.53	0.63	Cinquemani et al. (1982)	3
Wilmington	34.100	78.000	QC-797	Salt peat	5675 ± 250		7156-5922	-8.03	0.60	Cinquemani et al. (1982)	3
Tump Point	34.970	76.380	OS-66999	Salt peat	535 ± 35		635-509	-0.80	0.21	Kemp (2009)	1
Tump Point	34.970	76.380	OS-66915	Salt peat	185 ± 30		300-0	-0.55	0.21	Kemp (2009)	1
Tump Point	34.970	76.380	OS-66916	Salt peat	860 ± 30		901-693	-1.04	0.21	Kemp (2009)	1
Tump Point	34.970	76.380	OS-66917	Salt peat	960 ± 30		929-795	-1.15	0.21	Kemp (2009)	1
Marine Limiting											
Pamlico Sound	34.980	76.200	OS-54866	Argopecten	835 ± 30	0.16	450-146	-2.25	0.11	Horton et al. (2009)	4
Pamlico Sound	34.900	76.260	OS-53604	Elphidium	1670 ± 30	-1.57	1187-919	-2.91	0.51	Culver et al. (2007)	4
Terrestrial Limiting											
Cape Fear Arch	33.590	77.880	GX-2965	Undiff peat	10000 ± 300		12637-10701	-24.64	0.51	Field et al. (1979)	3
Jarrett Bay	34.800	76.490	Not Stated	Fresh peat	3330 ± 263	-27	4282-2880	-2.01	0.19	Spaur and Snyder (1999)	3
Jarrett Bay	34.800	76.490	Not Stated	Fresh peat	5710 ± 142	-28	6856-6214	-2.43	0.19	Spaur and Snyder (1999)	3
Northern South Carolina											
Index Points											
Murrells Inlet	33.580	79.000	GX-16569	Salt peat	4090 ± 235	-24.4	5291-3975	-3.02	0.93	Gayes et al. (1992)	1
Pee Dee River	33.400	79.200	QC-602	Salt peat	3690 ± 150		4434-3638	-3.41	0.95	Cinquemani et al. (1982)	3
Pee Dee River	33.400	79.200	QC-603	Salt peat	2630 ± 110		2957-2363	-2.61	0.95	Cinquemani et al. (1982)	3
Pee Dee River	33.400	79.200	QC-813	Salt peat	5625 ± 130		6737-6129	-6.60	0.95	Cinquemani et al. (1982)	3
Pee Dee River	33.400	79.200	QC-814	Salt peat	6140 ± 200		7429-6555	-6.59	0.97	Cinquemani et al. (1982)	3
Santee River	33.200	79.400	QC-595	Salt peat	4420 ± 405		5986-3924	-4.11	0.96	Cinquemani et al. (1982)	3
Santee River	33.200	79.400	QC-596(1)	Salt peat	3105 ± 85		3554-3068	-3.01	0.95	Cinquemani et al. (1982)	3
Santee River	33.200	79.400	QC-596(2)	Salt peat	3135 ± 140		3687-2959	-3.01	0.95	Cinquemani et al. (1982)	3
Murrells Inlet	33.580	79.000	GX-15987	Salt peat	3340 ± 240	-22.6	4235-2961	-3.05	0.93	Gayes et al. (1992)	1
Pee Dee River	33.400	79.200	QC-604	Salt peat	4680 ± 115		5644-5042	-4.81	0.95	Cinquemani et al. (1982)	3
Terrestrial Limiting											
Santee River	33.200	79.400	QC-597	Paleosol	4550 ± 150		5583-4857	-3.22	0.65	Cinquemani et al. (1982)	3
Murrells Inlet	33.580	79.000	GX-16476	Peat	4550 ± 150	-28.4	2732-1616	-0.11	0.63	Gayes et al. (1992)	3
Murrells Inlet	33.580	79.000	GX-16477	Wood	2510 ± 140	-28.2	2919-2181	-0.21	0.63	Gayes et al. (1992)	2
Murrells Inlet	33.580	79.000	GX-16568	Peat	3460 ± 155	-27.5	4148-3378	-2.13	0.63	Gayes et al. (1992)	3
Murrells Inlet	33.580	79.000	GX-16571	Peat	2355 ± 140	-27.8	2748-2060	-0.12	0.63	Gayes et al. (1992)	3
Murrells Inlet	33.580	79.000	GX-16572	Peat	8575 ± 270	-27.3	10272-8790	-1.43	0.63	Gayes et al. (1992)	3
Murrells Inlet	33.580	79.000	GX-15988	Peat	9035 ± 245	-27.8	11059-9527	-2.51	0.63	Gayes et al. (1992)	3
Murrells Inlet	33.580	79.000	GX-16480	Peat	9510 ± 285	-29	11762-9944	-2.57	0.63	Gayes et al. (1992)	3
Southern South Carolina											
Index Points											
Combahee River	32.700	80.700	QC-589	Salt peat	5400 ± 115		6401-5933	-4.10	1.02	Cinquemani et al. (1982)	3
Combahee River	32.700	80.700	QC-593	Salt peat	5280 ± 115		6297-5753	-3.95	1.02	Cinquemani et al. (1982)	3
Combahee River	32.700	80.700	QC-594	Salt peat	5620 ± 140		6743-6025	-3.58	1.02	Cinquemani et al. (1982)	3
Combahee River	32.700	80.700	QC-609	Salt peat	2880 ± 105		3323-2781	-2.20	1.02	Cinquemani et al. (1982)	3
Combahee River	32.700	80.700	QC-610_a	Salt peat	3325 ± 130		3895-3265	-2.68	1.02	Cinquemani et al. (1982)	3
Combahee River	32.700	80.700	QC-828	Salt peat	4425 ± 170		5577-4577	-3.29	1.04	Cinquemani et al. (1982)	3
Coosawatchie River	32.600	80.900	QC-826	Salt peat	2125 ± 100		2337-1897	-1.28	1.03	Cinquemani et al. (1982)	3
Coosawatchie River	32.600	80.900	QC-827	Salt peat	730 ± 105		907-533	-0.72	1.03	Cinquemani et al. (1982)	3

Savannah River	32.100	81.000	QC-599	Salt peat	3095 ± 95	3553-3003	-2.61	1.11	Cinquemani et al. (1982)	3
Savannah River	32.100	81.000	QC-600	Salt peat	2320 ± 110	2718-2066	-2.41	1.11	Cinquemani et al. (1982)	3
Savannah River	32.100	81.000	QC-821	Salt peat	2440 ± 130	2776-2156	-3.26	1.11	Cinquemani et al. (1982)	3
Savannah River	32.100	81.000	QC-825	Salt peat	3130 ± 125	3637-2995	-1.96	1.11	Cinquemani et al. (1982)	3
Cooper-Wando River	32.900	79.900	QC-584	Salt peat	3100 ± 100	3556-3004	-2.50	0.94	Cinquemani et al. (1982)	3
Cooper-Wando River	32.900	79.900	QC-586	Salt peat	5005 ± 140	6175-5333	-4.40	0.96	Cinquemani et al. (1982)	3
Cooper-Wando River	32.900	79.900	QC-587	Salt peat	4290 ± 125	5287-4525	-3.45	0.95	Cinquemani et al. (1982)	3
Cooper-Wando River	32.900	79.900	QC-588	Salt peat	4135 ± 65	4838-4448	-2.85	0.95	Cinquemani et al. (1982)	3
Cooper-Wando River	32.900	79.900	QC-611	Salt peat	2150 ± 110	2352-1882	-1.60	0.94	Cinquemani et al. (1982)	3
Cooper-Wando River	32.900	79.900	QC-613	Salt peat	2330 ± 140	2740-2012	-1.85	1.00	Cinquemani et al. (1982)	3
Cooper-Wando River	32.900	79.900	QC-702	Salt peat	4665 ± 130	5647-4973	-2.80	0.95	Cinquemani et al. (1982)	3
Cooper-Wando River	32.900	79.900	QC-703	Salt peat	3100 ± 155	3678-2878	-2.00	0.94	Cinquemani et al. (1982)	3
Cooper-Wando River	32.900	79.900	QC-704	Salt peat	4755 ± 285	6181-4665	-3.95	0.95	Cinquemani et al. (1982)	3
Terrestrial Limiting										
Cooper-Wando River	32.900	79.900	QC-583	Stump	2035 ± 105	2311-1739	-0.20	0.62	Cinquemani et al. (1982)	2
Cooper-Wando River	32.900	79.900	QC-585	Stump	2695 ± 115	3144-2464	-1.20	0.62	Cinquemani et al. (1982)	2