The repository codes corresponding to the specimen codes below

are given in Figure 2 of the main paper

‘EARLY PLIOCENE’ (EPLI) SPECIMENS

Middle Atlantic Coastal Plain (MACP)

Two specimens: both from the Sunken Meadow Member of the (lower) Yorktown Formation. One specimen from Lee Creek Mine, Aurora, North Carolina (EPLI-MACP 1); one from Claremont, Virginia (EPL1-MACP 2). Foraminiferan biostratigraphy indicates an age of 4.8 to ~3.5 Ma for the Sunken Meadow Member, but the age has been tentatively determined more precisely as 4.5–4.4 Ma by reference to the record of global changes in ice volume and sea level (Krantz 1991). Ward et al. (1991) favored an age of 4.0–3.8 Ma.

Gulf Coastal Plain (GCP)

Two specimens: both from Unit 11 (Petuch 1982) at Sarasota, west-central Florida (EPLI-GCP 1, 2). Unit 11 has been referred by some authors (e.g. Allmon et al. 1996; Cronin and Dowsett 1996; Williams et al. 2009) to the Tamiami Formation, but in a comprehensive review and revision of south Florida stratigraphy, Petuch and Roberts (2007) defined it as the Sarasota Member of the Murdock Station Formation. Like previous authors, Petuch and Roberts (2007) correlate this unit with the Sunken Meadow Member of the Yorktown Formation, more specifically the upper beds of the latter. As such, the ages given above (MACP) can be applied. However, Petuch and Roberts (2007) provide molluscan evidence that the Sarasota Member is very latest Zanclean in age, which conflicts with the precise (4.5–4.4 Ma) age for the Sunken Meadow Member given above.

‘LATE PLIOCENE’ (LPLI) SPECIMENS

Middle Atlantic Coastal Plain (MACP)

Eight specimens: all from the upper Yorktown Formation. One specimen from spoil, probably from the Rushmere Member (L.W. Ward, personal communication, 2007), at Lee Creek Mine, Aurora, North Carolina (LPLI-MACP 1); four from the Morgarts Beach Member on the Nansemond River, near Suffolk, Virginia (LPLI-MACP 2–5); one from spoil, either from the Morgarts Beach Member or Moore House Member (L.W. Ward, personal communication, 2016), adjacent to the junction of US highway 58 with state highway 10, immediately north of Suffolk, Virginia (LPLI-MACP 6); one from the Morgarts Beach Member at Lieutenant Run, Petersburg, Virginia (LPLI-MACP 7); one from the Moore House Member at Yadkin Pit, Deep Creek, Virginia (LPLI-MACP 8). Foraminiferan biostratigraphy combined with reference to the record of global changes in ice volume and sea level indicates an age of 4.0–3.2 Ma for the Rushmere and Morgarts Beach members (Krantz 1991). This spans the Zanclean-Piacenzian boundary and also overlaps the biostratigraphically determined age range for the Sunken Meadow Member (see above). However, the Rushmere and Morgarts Beach members overlie the Sunken Meadow Member (the Rushmere being in unconformable contact with the Sunken Meadow) and are therefore unequivocally younger. Ward et al. (1991) favored an age of 3.4–3.0 Ma. The Moore House Member is still higher in the sequence (unconformably overlying the Rushmere-Morgarts Beach strata) but is not separable biostratigraphically. It has been dated to 3.1–3.0 Ma by reference to the record of global changes in ice volume and sea level (Krantz 1991) but Sr-isotope dating indicates an age of 2.6–2.5 Ma (Goewert 2010). Ward et al. (1991) favored an age of 2.8–2.4 Ma.

Gulf Coastal Plain (GCP)

Six specimens: one (LPLI-GCP 3) from the Jackson Bluff Formation of Leon County, north Florida; five (LPLI-GCP 1, 2, 4–6) from the Tamiami Formation/Pinecrest Beds of Sarasota County, west-central Florida. Of the latter group, LPLI-GCP 4 is from Unit 4 and hence from the Fruitville Member of the Tamiami Formation (Petuch and Roberts 2007). LPLI-GCP 2 is from Unit 5 and LPLI-GCP 1 (the specimen investigated by Jones and Allmon 1995) from Unit 6/7, hence both derive from the underlying Pinecrest Member (Petuch and Roberts 2007). LPLI-GCP 5 (collected from spoil) is probably also from Unit 6/7 but might be from as low as Unit 9 (Pinecrest Member) or as high as Unit 4 (R.W. Portell, personal communication, 2016); hence it is conceivably from the lower Fruitville Member. LPLI-GCP 6, from the ‘Pinecrest Sand’ (= Unit 2–10; Allmon et al. 1995), is from the Buckingham, Pinecrest or Fruitville Member (Petuch and Roberts 2007). It is unlikely to be from as high as Unit 2 (Fruitville Member) because *C. eboreus* was apparentlyabsent from the Sarasota area during its deposition (Petuch and Roberts 2007). On the evidence of their molluscan fauna, Petuch and Roberts (2007) correlated the Buckingham Member, Pinecrest Member, and Units 3/4 ( Fruitville Member) with, respectively, the Rushmere, Morgarts Beach and Moore House members of the Yorktown Formation in the MACP. On this basis, the LPLI-GCP shells from Sarasota fall within the age range of the LPLI-MACP shells and, together with the latter, are younger than both the EPLI-GCP and EPLI-MACP shells. This conclusion is supported by the ostracod fauna and consistent with magnetic and strontium isotope (87Sr/86Sr) age indications from the ‘Pinecrest Beds’ (Jones et al. 1991); corrected He-U dates of 3.9 and 3.5 Ma (Bender 1973) do not seriously challenge it (Allmon 1993). The ostracod fauna of the Jackson Bluff Formation correlates with that of Units 5–10 (Tamiami Formation, Pinecrest and Buckingham members) at Sarasota (Jones et al. 1991), so LPLI-GCP 3 clearly falls within the age range of the other LPLI-GCP shells.

EARLY PLEISTOCENE (EPLE) SPECIMENS

Middle Atlantic Coastal Plain (MACP)

12 specimens: six from the Edenhouse Member of the Chowan River Formation at Colerain Beach, North Carolina (EPLE-MACP 1–6); one from the Colerain Member of the Chowan River Formation at the same location (EPLE-MACP 7); three from an unspecified level within the Chowan River Formation at Yadkin Pit, Deep Creek, Virginia (EPLE-MACP 8–10); two from the lower James City Formation at Lee Creek Mine, Aurora, North Carolina (EPLE-MACP 10-12). An age indication from paleomagnetism combined with reference to the record of global changes in ice volume and sea level (2.4–1.9 Ma; Krantz 1991) and two He-U dates from corals (2.4 and 1.9 Ma; Blackwelder 1981) provide evidence that the Chowan River Formation falls in the Gelasian Stage (2.6–1.8 Ma); Ward et al. (1991) favored an age of 2.2–2.0 Ma. The overlying James City Formation is difficult to date biostratigraphically or by reference to the record of global changes in ice volume and sea level (Krantz 1991). It is generally considered to be approximately age-equivalent to the Waccamaw Formation of North Carolina, whose lower part is dated to 1.9–1.7 Ma on foraminiferal evidence (Akers 1972). However, the lower James City Formation may be younger (Krantz 1991). Ward et al. (1991) favored an age of 1.7–1.3 Ma.

Gulf Coastal Plain (GCP)

Two specimens: one from the Bermont or Caloosahatchee Formation, Charlotte County, west-central Florida (EPLE-GCP 1); one from the Bermont Formation, Hillsborough County, west-central Florida (EPLE-GCP 2). Palaeomagnetism indicates an age of 1.4–1.6 Ma for the basal Bermont Formation (MacFadden 1995), while uranium isotope dating gives an age of around 0.8 Ma for the upper Bermont (Lyons 1991), showing that the formation falls within the Calabrian (1.8–0.8 Ma) rather than Gelasian (2.6–1.8 Ma) stage of the early Pleistocene. If EPLE-GCP 1 is from the underlying Caloosahatchee Formation it may date from the Gelasian because corrected He-U dates from Caloosahatchee corals are 1.9–2.5 Ma (Bender 1973). However, the basal (Fordville) Member of the Caloosahatchee Formation (Unit 1 of the Sarasota sequence; Petuch and Roberts 2007) yields an 87Sr/86Sr ratio suggestive of a 1–2 Ma age (Jones et al. 1991), so even if EPLE-GCP 1 is from the Caloosahatchee rather than the Bermont Formation, it may date from the Calabrian, like EPLE-GCP 2.

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