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Climate of the Past Discussions

Interactive comment on "Deglacial sea-level history of the East Siberian Sea Margin" *by* Thomas M. Cronin et al.

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This is an interesting study that attempts to use ostracods of known environmental affiliation to estimate paleosea-level along the continental shelf of the Arctic Ocean. However, as with so many studies of sediment cores from the Arctic Ocean, this paper is bedeviled by dating problems, making the conclusions untenable.

The entire interpretation of the lower record rests on undated sediments that are assumed to be of "Younger Dryas" age (∼12.9-11.7ka BP) by extrapolation from a date at 417cm (11,112) and 4 samples below it (which are essentially of the same age over 32cm [467-499cm: range in mean age is 11,870-12,079, and range in median age is 11,987-12,094). In this way, the authors conclude that the base of the core, at 609cm, is "approximately 13.5ka". Based on the interpreted age of 13.5ka at the base of the

record, the authors then conclude that regional sea-level was 40-50m lower than geophysical models predict, but that discrepancy is entirely based on the assumption that the age extrapolation to the base of the core is correct. A simpler explanation is that it is not correct, and that the basal sediments are older, a possibility that is not considered. The authors mention (without discussion) that "Unit B' has 2 facies (B1 and B2). The first time this is mentioned is in Section 4.1. This "lithologic transition" does not enter into their assumption of a linear sedimentation rate below the lowest date (which appears to be in unit B1) but may explain why the sediments towards the base of the core are older than assumed.

It also appears that the 417cm sample is immediately below a hiatus of unknown duration in the core. A hiatus in the record seems highly likely. From ∼11.5-11.0ka B.P., (MWP-1B) sea level rose by 16m (>3m/century). During this time, water depths at the core site would have been quite shallow, and it is hard to imagine that sediment deposition in this dynamic environment was not completely disturbed. It also seems unlikely that the ∼8500 B.P date (on unidentified organics) is correct as this would imply a dramatic reduction in sediment deposition from ∼2835 to ∼8500 BP., followed by a sharp increase.

The discussion of core 20-GC [Section 3.2] is bizarre as there is no consistency in the dates on that record, and the authors simply decide to ignore older ages as being reworked, concluding that the entire record is "probably around 11ka". Similar logic is not applied to old dates on samples dated in cores 23-GC and 24-GCâĂŤthese are accepted as correct.

There is also a puzzling use of reservoir correctionsâĂŤ300 years for the upper section, but only 50 years for the lower section. In a recent paper–on which the first author here was a co-author (Poirier et al, 2012, Marine Micropaleontology) a reservoir age of 1,000 years was used for samples >10,000 years, as Hanslik et al., 2010 (QSR) also did. One might expect that restricted circulation in the Canada Basin, prior to the opening of Bering Strait, would result in "old water" in this area, requiring a bigger

reservoir correction. That would shift the age of the radiocarbon dates in Unit B1 towards younger calibrated ages.

Other points: Inconsistencies in core IDs (in text, Figure). Also appear to be errors in Lab ID of C-14 dates in Table [some numbers are duplicated and Beta-455001 in Fig 4 not listed]. This often makes it a challenge to follow the arguments in the paper.

The conclusions reached in the paper are unconvincing.

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