Date: Thu, 08 Jun 2006 17:17:45 +0000 (UT)
From: EarthSurface@agu.org
To: engels@hawaii.edu
Subject: 2006JF000513 Decision Letter

Dear Dr. Engels:

Your article "Seafloor evidence for ice shelf flow across the Alaska/Beaufort margin of the Arctic Ocean" has been reviewed by two reviewers and the AE. I have attached their reports for your reference. I have read your manuscript, the reviews of it, the assessment of the AE and your letter of submittal. While the reviewers have chosen to remain anonymous, I assure you that they are well-versed in this topic, and are experts in the field. I am afraid that I have to agree with the AE that this version of the manuscript should be rejected as well. While the data set is indeed novel, and potentially of great interest to the community, I agree from close comparison of Figure 5 and those figures used by authors such as Julian Dowdeswell and John Anderson and their coauthors that the evidence is nowhere as convincing as at their sites off Europe and off Antarctica.

I agree as well with the AE that the modifications to accommodate the strong concerns about the interpretations of ice shelf causation were more or less cosmetic. Even the reviewer who was more supportive (Reviewer #2) writes strongly about this interpretation and how you have arrived at it. Submission to another journal (perhaps J. Glaciology, perhaps Geomorphology) might be a better outlet for these data. I would urge however that wherever you submit this you take to heart the criticisms leveled against your interpretation.

Thank you for the opportunity to examine this work.

Sincerely,

Robert Anderson
Editor, Journal of Geophysical Research - Earth Surface

Associate Editor Evaluations:
Recommendation: Reject
Improve Grammar: No
Anonymous: No
Annotated Manuscript: No

Associate Editor(Remarks to Author):

This is a resubmission of a paper that was rejected primarily for three reasons:

1) The most crucial figures were not of sufficient quality to evaluate the authors' interpretations.

2) The glaciology was vague. It was never completely clear what the authors envisioned with their "grounded ice shelf."
3) The interpretations of the discussion section reached too far beyond the database.

Although the figures have been improved, the comments of Reviewer 1, who has now seen the paper twice, indicate that figure quality is still not sufficient to interpret the origin of the lineations that the authors call flutes. Reviewer 1's comments prompted me to look at similar published data (e.g., Dowdeswell et al., 2004). The clarity of Figure 5 in the resubmitted paper, which is the most crucial figure because it is aimed at illustrating the flutes, indeed falls short of the standard set in this earlier publication. The result is that the interpreted origin of the faint lineations in Figure 5 is somewhat equivocal. Unfortunately, the most important conclusions of the paper are based on these lineations.

In addition, the comments of Reviewer 2, who reviewed this paper for the first time, indicate that the second item above has not been adequately addressed. The authors continue to invoke a massive "ice shelf" to explain their observations, despite their emphasis on widespread ice grounding, and this again has caused confusion.

Finally, with respect to item 3 above, the authors state in their cover letter that they have "reduced and streamlined the interpretations presented in the discussion section." Comparison of the discussion sections of the two versions does not support this claim. There have been minor cosmetic changes and shortening, but little attempt has been made to reduce the degree of interpretation. For example, all of the interpretations of the most contentious section of the discussion (Ice flow provenance and trajectory) have been retained; the two versions are nearly identical.

Thus, none of the three items above has been addressed successfully. Although one of the reviewers has suggested acceptance with minor revisions, my suggestion is that this paper again be rejected. Unless the authors can provide more convincing visual evidence for the flutes on par with earlier publications, I suggest, consistent with Reviewer 1's comment, submission elsewhere as a short note, which would enable an explicit acknowledgment that the evidence is equivocal but potentially important.

Reviewer #1 Evaluations:
Recommendation: Reject
Improve Grammar: No
Anonymous: Yes
Annotated Manuscript: No

Reviewer #1(Remarks to Author):

The problem with this contribution is that the visual evidence for what the authors call 'flutes' is simply not that strong. There is a single figure, 5, that shows the data. I assume this is presented because it is the most convincing area of data coverage. The side-scan image (8 m grid) shows

weak features. The flutes cannot be seen in the 25 m gridded swath data. In many other areas of the Arctic and Antarctic margins, swath data gridded at lower resolution shows very clear-cut flutes, usually termed 'mega-scale glacial lineations'. The quantification of sea-floor roughness is not a substitute for visual evidence, especially given that such features are in fact very easy to identify in many other glacier-influenced margin areas.

I do not think that a dataset such as this, because figure 5 is the key, can justify a major paper in JGR. The implication that the Arctic Basin was largely ice-covered during one or more past glaciations is a very important one, but it needs more than the data presented in this contribution to warrant publication.

Maybe the authors could present a short note on their data in another journal, remarking that the evidence is equivocal but potentially very important.

Reviewer #2 Evaluations:
Recommendation: Publish with minor changes made by author
Improve Grammar: No
Anonymous: Yes
Annotated Manuscript: No

Reviewer #2(Remarks to Author):

Review of "Seafloor evidence for ice shelf flow across the Alaska/Beaufort margin of the Arctic Ocean" by Engels, Edwards, Polyak and Johnson.

Note this is a review of the REVISED version of the above manuscript for JGR Earth Surface.

CHECKLIST
Is this paper significant and appropriate for the journal? Yes

Are the interpretations and conclusions adequately supported by the evidence presented? That is, are the assumptions valid, is the methodology sound, is the evidence adequate, and do the conclusions logically follow? Generally yes but please see comments below re. ice shelf.

Does this paper put the progress it reports in the context of existing published work? Is there adequate referencing and introductory discussion? Yes

Is the paper clearly and concisely written? Yes

Are all parts of the text, references, graphics and tables necessary for the new results and main points to be understood? Yes

Are the conclusions and potential impacts of the paper clear? Yes

Does the abstract clearly and concisely summarize the paper and state the main results? Can the abstract and main body of the paper each stand alone? Yes

Are the graphics and tables clear and their captions self-explanatory? Yes

Does the title adequately represent the content of the paper? Yes

COMMENTS
This is an interesting and novel paper which details new marine geophysical data from the Alaska/Beaufort continental margin of the Arctic Ocean. It is suitable in scope for JGR Earth Surface and is likely to be of interest to a large section of its readership, especially researchers on Arctic Ocean climate history and glaciation as well as marine geophysics. The figures are appropriate and clear, and the paper is well written and structured, reflecting the fact that it has already been revised once.

In general the paper is acceptable for publication in JGR Earth Surface. However, I have one significant reservation with the authors' interpretation which I would like to see addressed prior to publication. This reservation concerns the authors' interpretation that an ice shelf was responsible for the production of the glaciogenic bedforms which they document on the ABM margin. I do not feel the authors present a compelling case as to why an ICE SHELF was responsible for their formation. I agree that these bedforms record flow of grounded ice along the margin but this does not equate to a much larger ice shelf and I feel the authors' state this conclusion without sufficient support. For example lines 308-310 the authors state "We infer that the ABM flutes were formed by a large ice mass (ice shelf) moving parallel to the continental margin and sliding....reaching ~700m".

I have no problem with part of this interpretation in that the flutes record the movement of a large grounded ice mass but why an ice shelf? You need to provide a fuller and stronger interpretation to justify this interpretation at this point in the paper. If you think it is an ice shelf and can justify this (as you attempt to do later in the paper) then fine, but you need to provide this more comprehensive interpretation here. Alternatively remove the words "(ice shelf)" from line 309 and provide this fuller interpretation later in the paper. Similarly, on the next page you talk about an "ice shelf" (lines 318-319) without providing much support for this interpretation.

Lines 418-425 you refer to the idea of an extensive Arctic Ocean ice shelf. I would just ask how do you envisage such an ice shelf forming? Several hundred km's of ice thickness are necessary in order to ground on the Lomonosov Ridge and this would surely be difficult to generate from sea ice? Perhaps you could clarify this.

Lines 446-447. I suggest you reword this sentence as follows: "The encroachment of grounded ice onto the ABM could have affected sedimentation...glaciomarine sediments".

Page 21, lines 458-472. re. the timing of formation of such a large ice shelf. Is it feasible to grow such a large ice shelf during an interglacial? Obviously large ice shelves currently exist in Antarctica, but not in the Arctic. Is there any paleo-climatic data from OIS 5b in the Arctic that

supports your proposal?

Line 485. I suggest you replace the term "sliding ice shelf" which is confusing with "a large grounded ice mass".

Lines 501-503. This is a key piece of support for an ice shelf and needs to be emphasized earlier in the paper where you first mention the ice shelf interpretation (i.e., lines 308-310). However, following on from this I would ask do you need an ice shelf to explain this pattern? As an alternative is it possible that flow of grounded ice emanating from the CAA could have been sustained along the ABM purely because this region of the shelf would have been shallow during full glacial periods? Thus the ice might have been able to extend along the shelf but would have been prevented from extending offshore of the shelf further to the north on account of deeper water?