Reviewer 1: I would like to congratulate the authors on their work. This was a very interesting manuscript and its always exciting to see the diversity of tsunami foraminiferal signatures in the sedimentary record explored, particularly from a deep-sea setting.

I think this manuscript needs moderate amendments before publication. My main concerns are largely cosmetic and relate to further detail (substantially more in some areas), clarification and explanation of various elements. I would also advise the use of more cautious language to describe your results as they're based on some relatively low sample sizes in some areas.

*Response: Thank you very much for your positive and constructive comments on our manuscript. Reviewer's comments and suggestions were really helpful to improve our manuscript. Detailed responses to the comments are below. Added or improved sentences are written in red-letters in the manuscript.*

Scientific questions:

Pg 3 Lines 11-13: Did you complete any sedimentological analyses or recordings of your cores? Any grainsize or stratigraphic record that you can link your foraminiferal assemblages to? Or sediment coloration (e.g. Munsell colours)? Perhaps an image of the core? This would be particularly useful in highlighting your allochthonous sediments and where you mention the deposition of diatomaceous ooze.

*Response: We performed mud contents analysis on our core as presented in the original manuscript, but we did not perform other sedimentological analyses of the analyzed cores. However, we collected other cores from same sites for detailed sedimentological analyses. In the revised manuscript, we added X-ray CT data as supplementary material (Figure S4) to provide more robust background of our findings on foraminiferal faunal changes. The image of 4W site-2012 clearly indicates event deposit comparable with our analyzed core. Laminated layer between ca. 11 to 5 cm depth in the image of 4W site-2012 is interpreted as turbidite. This turbidite layer coincides with sediment facies FII and foraminiferal cluster Ib in our core 4W-2012. We added this description in the text.*

Pg 3 Line 17: What temperature did you oven dry the samples at? This can affect the preservation of agglutinated specimens.

*Response: We oven-dried at 50 ºC. We often use this temperature and confirm that this temperature does not affect the preservation of agglutinated specimens. We added the temperature in the text.*

Pg 3 Line 40: Why a 106 μm sieve for foraminiferal analyses? That sieve size is an usual gauge

and you'd already sieved at 63 μm which is standard. Given the depth of your samples (I've found them as small as 30 μm from a nearby sample), a 106 μm sieve would have caused the loss of many, small heterotrophic species.

*Response: This size fraction follows our conventional procedure by Nomura (1995), Tsujimoto et al. (2013), and Takata et al. (2015), which studied deep sea benthic foraminifera. We added these references in the text. We aware that most ecological studies used either 63 μm or 125 μm sieves, and the differences in sieve size in our studies hampers direct comparison with such ecological or environmental monitoring studies. We noted these methodological limitations in our revised manuscript. However, even though there are such limitations if we try to compare with other studies, we believe that the temporal and spatial trends found in our study based on consistent taxonomical works and worth to publish with such notes.*

Pg 4 Section 3.1: Could you explain the significance of measuring mud and water content stability/lack of stability?

*Response: Mud content varies in accordance with the changes in depositional condition. Generally, mud content becomes low under high-energy condition such as turbidites, and water content varies in accordance with the changes in mud content and sediment compaction. Thus, Mud and water content in sediment core become indicators for sedimentary environment. We added this explanation in the text.*

Pg 4 Section 3.3: Given the inherent difficulties in foram taxonomy and their potential benefit in being identified to species level in biogeographical studies, it would be good to have a plate of the identified species either as a figure or as a supplementary file/appendix to help future researchers.

*Response: We will add SEM images of dominant and characteristic species as a supplementary file.*

Pg 4 Section 3.3: How many species of foraminifera both live and total were identified?

*Response: Full faunal list was available in the supplementary Table S1, however, for better understandings for readers, we added number of specimens and number of species in Table S1.*

Pg 5 Section 3.3: I would like to see a figure that illustrates the clustering discussed, particularly showing the sub-clustering of the two main assemblages. This can be either as a figure in the main manuscript or as a supplement/appendix. Given the low raw numbers in some sections of core I'm not sure such extensive subdivision is necessary, and I think their subdivision confuses the story you're trying to tell.

*Response: We re-examined Q-mode cluster analysis based on the samples containing more than 50 individuals, and we added the result as a supplementary file (Figure S2). Although sub-cluster IIa was composed of one sample, the result of others did not change. The boundary of sub-cluster II-a and II-b correspond to the boundary of sediment facies, so we think sub-cluster is useful for discussion.*

Pg 6, section 4.2: You link your foram assemblages to 3 sediment facies that you never explained in your results. What facies? You cannot discuss these without establishing them in the first place. Just saying they exist and marking them on a figure is not enough.

*Response: We discussed 3 sediment facies based on radionuclides distribution in the last paragraph of section 4.1. Please see the text. We changed the name of sediment facies to FI, FII, and FIII in order to avoid confusion with foraminiferal cluster Ia, Ib, IIa, IIb, and IIc.*

Pg 6, Line 14: Why would diatom blooms accelerate 134Cs deposition?

*Response: Otosaka et al. (2014) studied time-series sinking particles from August 2011 to June 2013 at about 100 km east of the FNPP1. They reported that the production of diatoms and subsequent sinking of biogenic particles caused the increase in total mass flux of sinking particles from April to June. They concluded that adsorption or incorporation of radiocesium onto particles in the surface water and following rapid sinking of particles are considered as primary mechanisms of accumulation of radiocesium on the seafloor.*

*We added these descriptions in the text with reference.*

Pg 6, Lines 19-21: You talk about diatoms and radiolarians in your discussion but they're not mentioned in your methodology or results. How have you quantified them and their significance? Why would diatom blooms accelerate 134Cs deposition? Why mention the radiolarians?

*Response: We observed the siliceous biogenic particles (diatoms and radiolarians) of the >106-μm fraction under stereoscopic microscope while picking benthic foraminifera. We added this explanation in methods. Although we performed only qualitative observation, the lower part of core 4W-2012 was rich in radiolarians and the upper part (above ca. 9 cm depth) is rich in diatoms. This observation, together with high TOC data added in the supplement, support the diatom bloom and its deposition after the earthquake. We added the photographs of the >106-μm fraction at representative depths (4.5-5.0 cm and 15.5-16.0 cm) as supplementary figure (Figure S5).*

*Please also see above mentioned response about diatom blooms and $^{134}$Cs deposition.*

Pg 7, Line 10: "High species diversity" is relative given your small sample size, actual diversity

values would be clearer here.

*Response: We recalculated diversity index based on the samples containing more than 50 individuals. We also determined the rarefaction diversity E ($S_{100}$) (= the expected number of species in samples rarefied to 100 individuals) in addition to the Shannon Index (H) for total assemblage of core 4W-2012 (Fig. 8). We deleted the Shannon Index (H) for living and dead assemblages because of its small sample size. New diversity indices indicate relatively high species diversity in cluster Ib.*

Pg 8, Section 5: Despite mentioning it in both your abstract and your conclusions nowhere do you report on your allochthonous foraminifera that are deposited between your pre-earthquake and post-earthquake/opportunistic form assemblage. Or did you mean for your downslope transported foraminifera to be your allochthonous assemblage? In any case, it is not clear in your results/discussion.

*Response: We discussed the possibility of reworking in section 4.2 by the appearance of Bolivina spissa, which is reported from shallower than a water depth of 2319 m in the Japan Trench area. We rephrased "allochthonous" in abstract and conclusions to "reworked".*

Technical comments:

The title's wording is very long, contains unnecessary detail for a title and is a bit awkward. I would recommend altering to something like "Impact of the 2011 Tohoku-oki Earthquake on the deep-sea benthos: evidence from foraminifera of the Japan Trench slope". Even "Deep-sea benthic foraminiferal evidence of the 2011 Tohoku-oki Earthquake impact on the Japan Trench" as you only really mention the significance of the downward slope location of your samples in one sentence.

*Response: We changed title based on reviewer's suggestion as "Impact of the 2011 Tohoku-oki Earthquake on the deep-sea benthos: Evidence from foraminifera of the Japan Trench slope", and mentioned official earthquake name in the introduction*

The English needs correction and tightening up. Many sentences are too long and should be subdivided and the grammar needs a lot of work.

*Response: The original manuscript was edited by a native English speaker using a commercial service. We revised entire text in particular long sentences, and will have additional native English checks (probably by a different company) by an experienced editor whose first language is English and who is specialized in the editing of papers written by scientists whose native language is not English.*

“The 2011 off the Pacific coast of Tohoku earthquake” is a very long-winded name for an even that is well-known and greatly established both in the media and in scientific literature. It should just be referred to as the “2011 Tohoku-oki earthquake”.

*Response: Because the official name of the earthquake given by Japan Meteorological Agency is “the 2011 off the Pacific coast of Tohoku earthquake”, we used that also in the title, however, we agree that we do not need to use this as a title. We rephrase “2011 off the Pacific coast of Tohoku earthquake” to “2011 Tohoku-oki earthquake” in Introduction, so we used “2011 Tohoku-oki earthquake” in other part as reviewer’s suggestion.*

Figure 10: Why is there a dotted diagonal line above “Reophax Recurvoides, Silicosigmoilina” on the right-side Y-axis?

*Response: This figure is quotation from Thompson (1980). The dotted diagonal line indicates differences between west side and east side across the Japan Trench. We added this explanation in the figure caption.*

Pg 7, Line 3 (and elsewhere throughout the manuscript): You cannot start a sentence with an abbreviated species name, it needs to be written in full.

*Response: We corrected as the reviewer 1 suggested.*

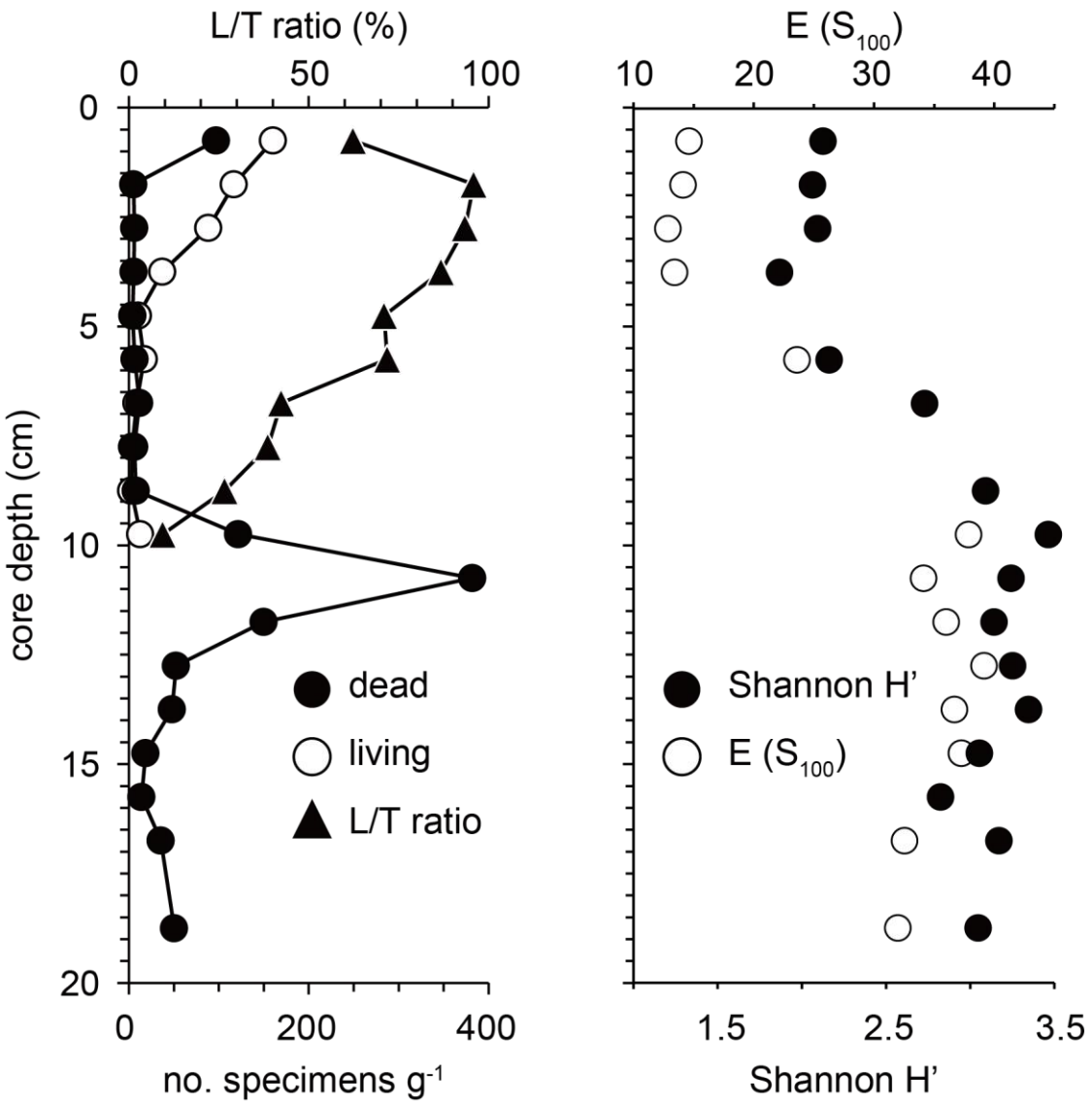


Fig. 8. Vertical profiles of dead and living foraminiferal density (ind. $g^{-1}$), and diversity index of total foraminiferal assemblage in core 4W-2012.

Supplementary figures

Figure S1. Scanning Electron Microscope (SEM) images of dominant and characteristic species.

*(We will add SEM images of dominant and characteristic species as a supplementary file.)*

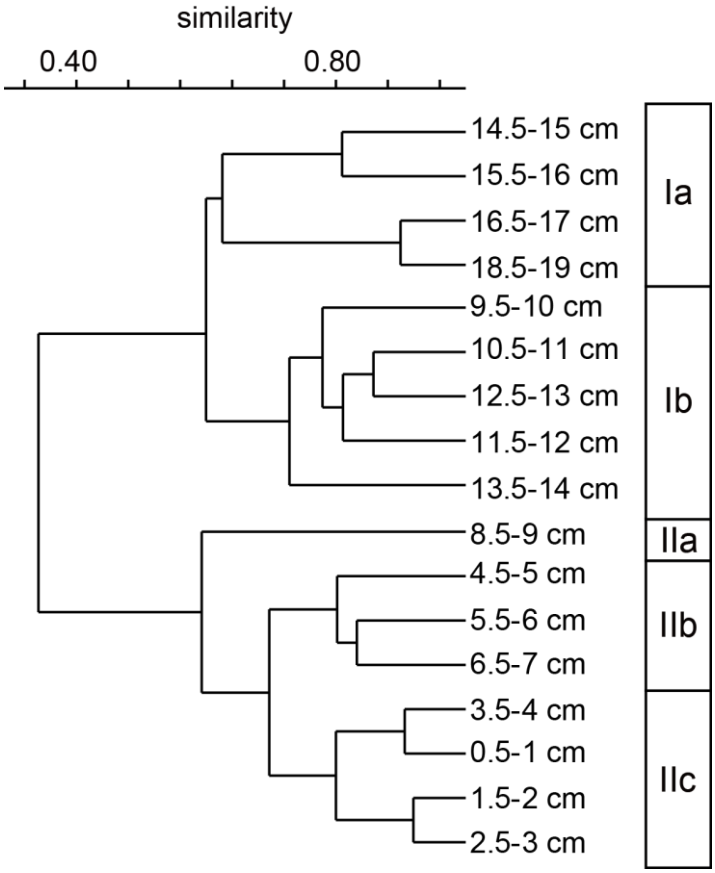


Figure S2. Dendrogram of Q-mode cluster analysis of 4W-2012 core.

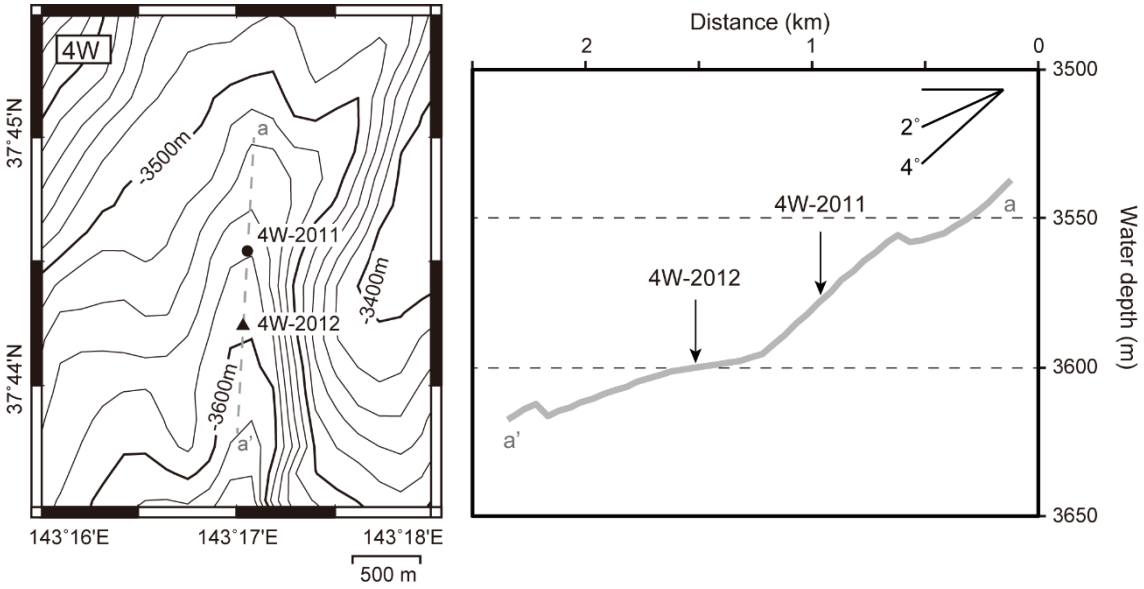


Figure S3. Bathymetric map of site 4W (left) and bathymetric profile (right) along the gray dash line in left figure (same map to Figure 1C).

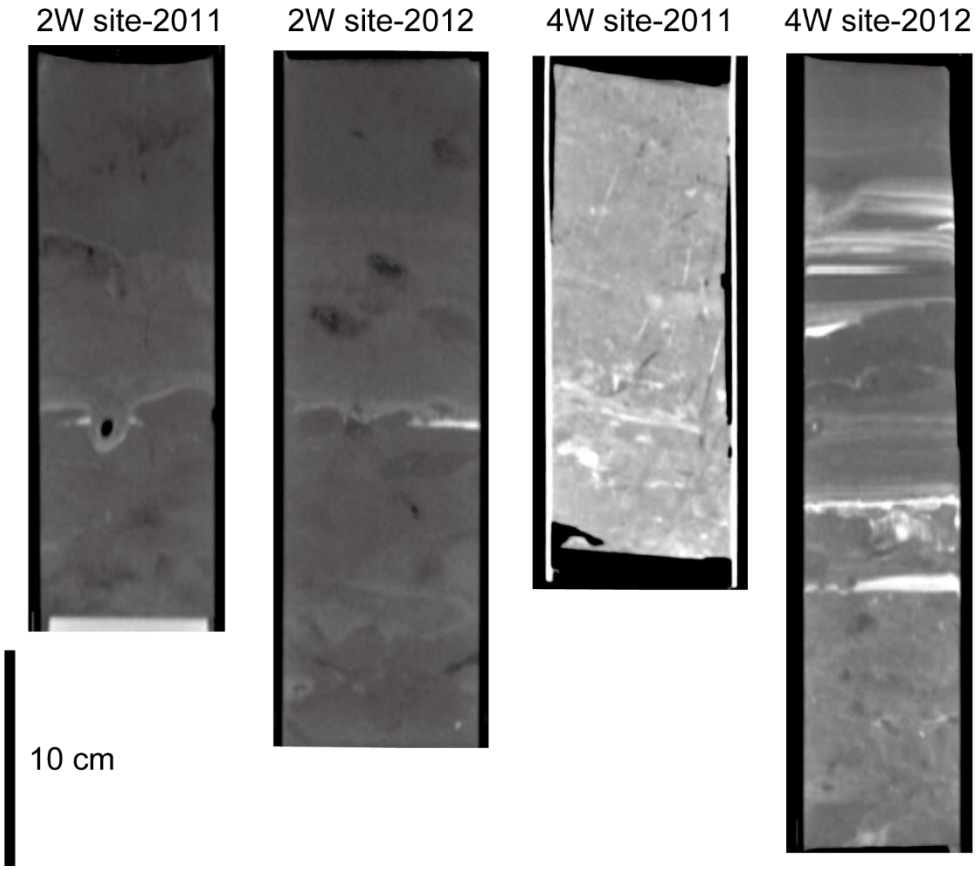


Figure S4. X-ray CT reslice images (Window Level 650, Window Width 1000) of cores for sedimentological analysis collected at same sites to foraminiferal cores within a few meters. The X-ray CT scanning was performed on HITACHI X-ray CT unit (RADIX-PRATICO, FR version, Hitachi Medical Corporation) in the Center for Advanced Marine Core Research, Kochi University.

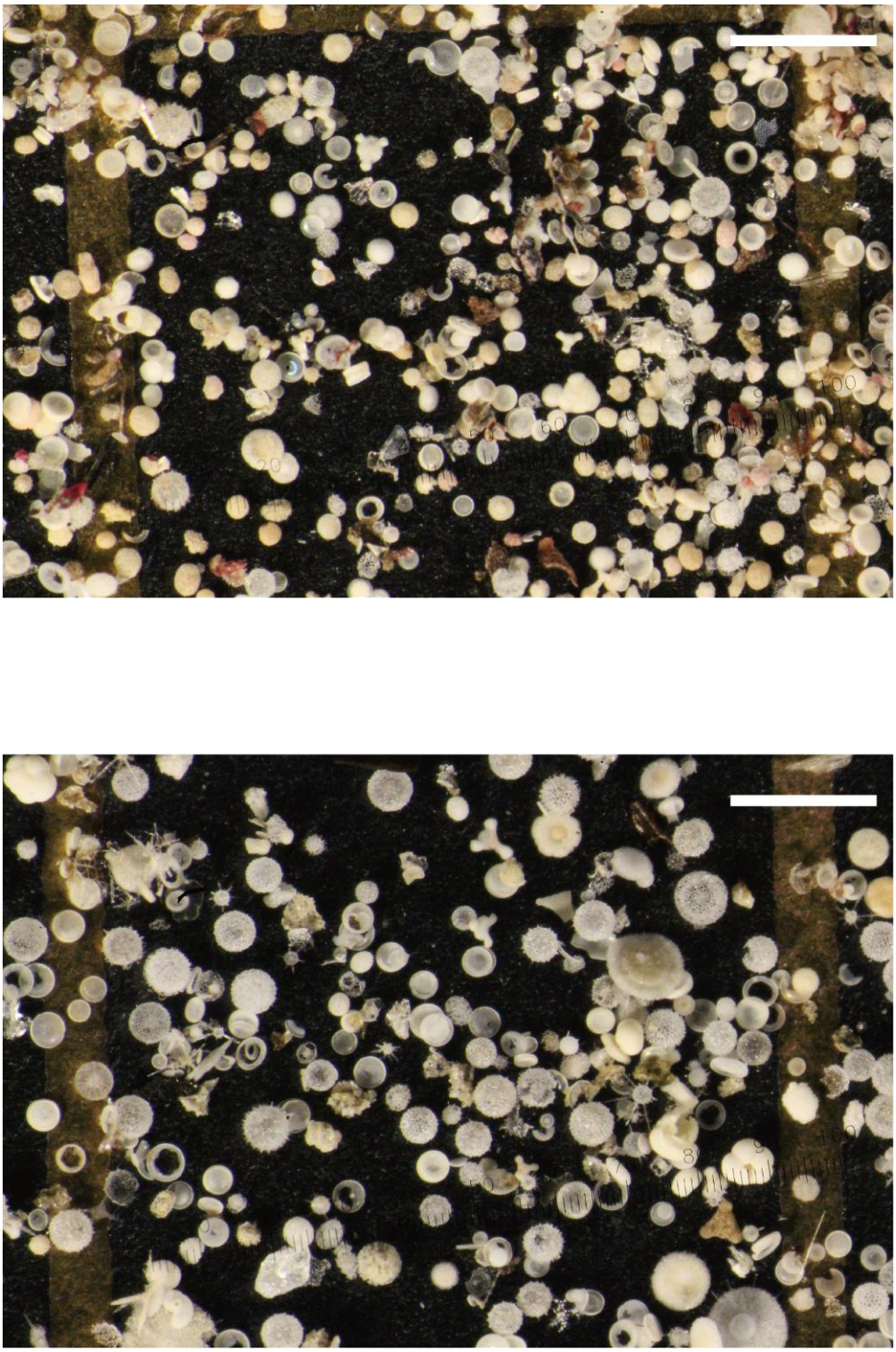

Figure S5. Images of the >106-μm fraction taken with a digital single-lens reflex camera through stereoscopic microscope at 4.5-5.0 cm (upper image) and 15.5-16.0 cm (lower image) of 4W-2012 core. White bars = 1 mm

Table S2. Total organic carbon concentration (TOC), total nitrogen (TN) concentrations, C/N ratio (weight ratio), carbon isotopic compositions, and nitrogen isotopic compositions of the core collected some tens cm away from 4W-2012 core. Sample preparations and measurements followed Nomaki et al. (2016b).

| Depth in sediments (cm) | TOC (wt %) | TN (wt %) | C/N (wt/wt) | $d^{13}C$ (‰) | $d^{15}N$ (‰) |
|---|---|---|---|---|---|
| 0.25 | 4.5 | 0.58 | 7.7 | -21.1 | 5.2 |
| 0.75 | 4.7 | 0.61 | 7.8 | -21.0 | 5.1 |
| 1.25 | 4.5 | 0.57 | 7.8 | -21.1 | 5.5 |
| 1.75 | 4.6 | 0.59 | 7.8 | -21.1 | 5.2 |
| 2.25 | 3.7 | 0.48 | 7.8 | -21.0 | 5.0 |
| 2.75 | 3.3 | 0.43 | 7.8 | -21.0 | 4.9 |
| 3.5 | 4.5 | 0.58 | 7.7 | -21.0 | 5.1 |
| 4.5 | 4.1 | 0.52 | 7.8 | -21.2 | 5.0 |
| 5.5 | 4.1 | 0.53 | 7.8 | -21.0 | 5.3 |
| 7.5 | 3.9 | 0.49 | 7.9 | -21.0 | 5.2 |
| 10.5 | 4.1 | 0.52 | 7.9 | -21.1 | 5.3 |