Melting history of the East Antarctic Ice Sheet during the Marine isotope stage 3 and 2.

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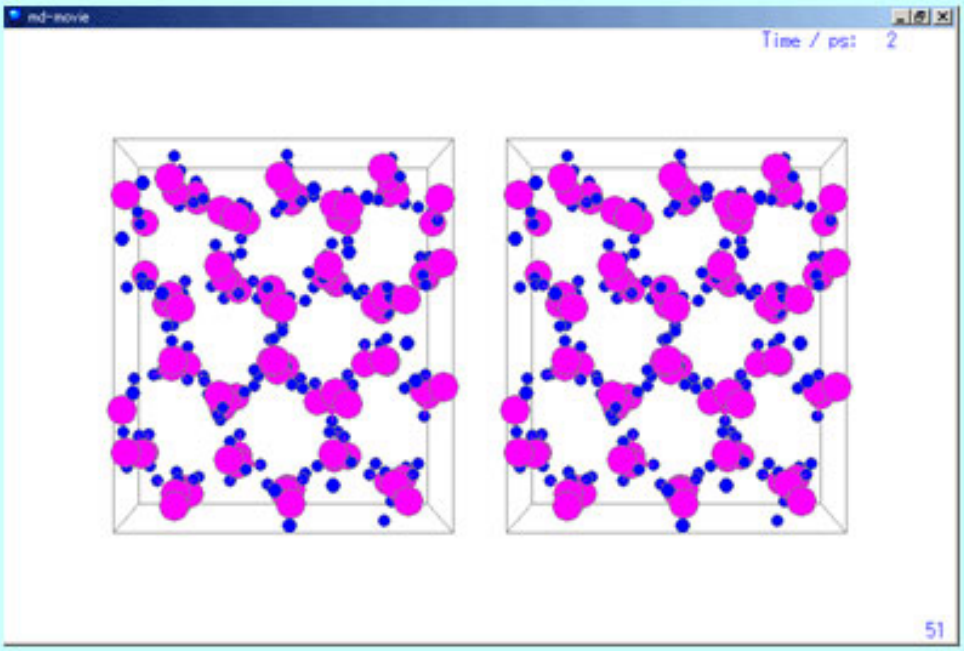
The changes in the volume of the Antarctic Ice Sheet has been played as the key role in the global climate changes during the last glacial. The ice sheet carrying large quantity of freshwater masses has been anticipated its impact on global sea-level changes, though the estimated total amount of meltwater since the Last Glacial Maximum expressed as eustatic sea-level are varied among the studies. As part, this is because of lacking of geologic data sets due to the difficulties underlain for sampling. Therefore collecting reliable spatial and temporal records of the ice sheet to constrain the sea-level history are being desired and which is in turn a key to improve our understanding the climate system.

We have studied the Soya coast of Antarctica as well as the Mt. Riiser-Larsen to study the melting history of East Antarctic Ice Sheet (EAIS). Distinct geomorphologic features of raised beach sediments formed during the sea-level highstands in the past were observed and several trenches were made to investigate the internal structure. More than 80 AMS radiocarbon measurements on in-situ fossil mollusks were conducted to constrain the timing of the past highstands. Radiocarbon dating results were clustered in 2 groups showing 2 major highstands during the Holocene and OIS3. Reliability of the dating results is ensuring the quality of the samples including the nature of the tests that are free from secondary younger carbon contamination. We applied step-wise dissolution experiments on those mollusks and successfully replicated the earlier dating results indicating that the samples were free from contamination.

Glacial erratics as well as bedrock samples from Mt. Riiser-Larsen were collected for Cosmogenic Radio Nuclides (CRN) dating. Mt. Riiser-Larsen is useful to study melting history of the ice sheet since it is located near the coast so that the temporal variation in ice thicknesses of the ice margin can be reconstructed using CRN dated glacial deposits obtained from different altitudes. The results of the CRN dating (altitudes between 300 and 700m) are approximately 50ka that is consistent with the TL and radiocarbon age results from the lake sediments in the coastal site. The lake sediments contained till layers separated by lake sediment indicated that the ice sheet was retreated from this area and thus the lake sediment was deposited. The lowest glacial erratics recovered from 290m in altitude show the minimum CRN age of 24ka indicating the timing of the final melting of the ice sheet in this area.

Given that the trimline at the Mt. Riiser-Larsen indicates the maximum height of the most recent episode of expansion of the ice sheet, EAIS in this area experienced 2 distinct events of retreat since about 50ka to the Holocene. This finding is consistent with earlier glacio-hydro-isostastic modeling study using available relative sea-level datasets around the Antarctic continent.

○ 融解する前の氷（ステレオ図）



○ 融解したばかりの水（ステレオ図）

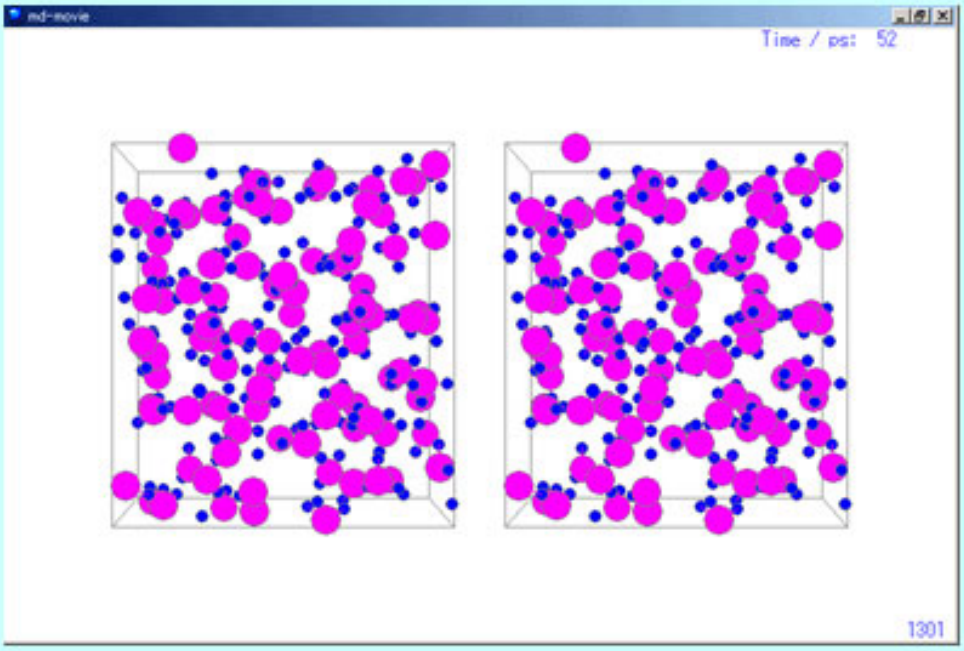


図１．Web 教材画面の一部分（氷および水のステレオ静止図）