

マット状微細光合成生物群集塊が結氷下の南極湖沼で一斉・大量浮上した

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Massive, simultaneous floatation of phytobenthic microbial assemblages under the lower ice surface of a frozen Antarctic lake

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In spring, massive, floating fragments of phytobenthic assemblages were found under the ice of a frozen lake on the Sôya Coast, East Antarctica. These assemblages occupied 77% of the area beneath the ice and were found in the period between 11 and 21 October 2010, when the daily averaged solar radiation increased to more than 200 W m^{-2} , which was 50% of the yearly maximum. Photosynthetically active radiation (PAR) that reached the benthic surface was at least $10 \mu\text{mol photons m}^{-2} \text{ s}^{-1}$. These seasonally increased radiations may accelerate photosynthetic activity in the phytobenthos, leading to oxygen bubble formation and positive buoyancy. Increased solar heating of the lake water led to disruption of the inverse thermal stratification in the water column and enhanced vertical mixing. This combination of physiological and physical changes may have triggered formation of massive floating phytobenthic assemblages that were released from the lake bottom.



Photos: Photographs of Lake Skallen Oike with ice-cover in October (1); floating phytobenthic assemblage visible through transparent snow-free ice (2); sampling activity with an ice drill at the center of the eastern basin (3); estimation of relative coverage of the assemblage* (4); assemblage transferred onto the ice (5); spontaneously floating assemblages that have drifted into a drill hole (6); shapes of the floating assemblages (7); microscopic image of the dominant taxon *Oedogonium* sp. in the floating assemblages (8).

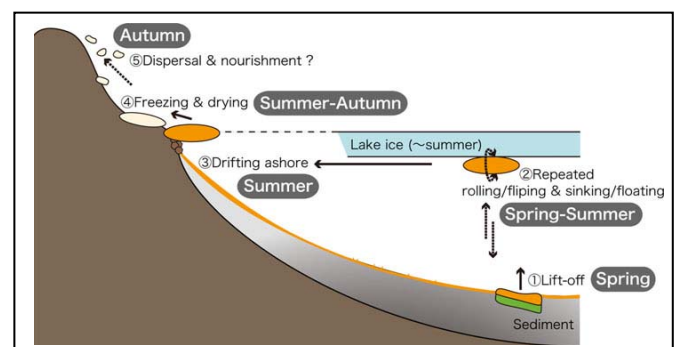


Figure: Schematic diagrams of possible ecological implications of the floating assemblages, after Tanabe & Kudoh (2012)

References

Tanabe Y, Kudoh S (2012) Possible ecological implications of floating microbial assemblages lifted from the lakebed on an Antarctic lake. *Ecological Research* 27:359–367.