

A variation in chlorophyll concentration during the thaw period in the snowpack of Tohkamachi City, Niigata-Prefecture

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It is known that snow algae breed on the surface of the snowpack in thawing season. Breeding of snow algae colors the surface of the snowpack with red and causes the phenomenon of red snow. Snow algae are the special organism which was adapted to cold environment. But, about detailed ecology, such as conditions of breeding, it does not understand in many cases. Although especially acidification of the snowfall in Japanese each place in recent years, come flying of yellow sand, and change of the snowfall by global warming are considered to have influence also on the ecology of snow algae, it is not known at all about those details. Snow algae in snowpack can be evaluated quantitatively by analysis of chlorophyll concentration. Then, in this study, I analyze the chlorophyll concentration on the surface of snowpack in the period of winter to spring, and aim at clarifying the seasonal variation and clarifying the environmental factor of the change. Comparison with the chlorophyll concentration and the snow cover model.

The target samples are snowpack of the Tohkamachi Experimental Station, FFPRI in this research. The samples extracted every about two weeks were analyzed until the snowpack was disappeared in the period from January to April in each year in 2009 to 2011. The analysis items of the samples are EC, pH, and chlorophyll concentration.

As a result of analysis, there is almost no change of the chlorophyll concentration on the snowpack in the period from January to March in 2011 below at 3.29microg /L, and it increased to 20microg /L from 5microg /L rapidly from the end of March. As a result of comparing with the meteorological data which the Tohkamachi Experimental Station, FFPRI observed, it became clear that the thawing season in Tohkamachi in 2011 began in the end of March. It is related to the increase in the amount of thaw and chlorophyll concentration, and it is thought that water content of snow has influenced.

When compared with change of chlorophyll concentration on the snowpack surface in 2009 and 2010, it became clear similarly that chlorophyll concentration increased to 25microg /L from 5microg /L in the end of March also 2010. As a result of correlation with the analysis results from 2009 to 2011, and EC, pH, the water content, the density, the temperature, and depth of each snowpack in 2009 to 2010, correlation was accepted by the amount of chlorophyll, the water content, the density, the temperature, and depth of snowpack in 2011. But, there was a parameter without correlation for other years. From this result, the factor which chlorophyll concentration increases may exist besides the water content of snowpack. In addition to the parameter which correlation above, there is a possibility that solar radiation and nutrient salt have affected chlorophyll concentration.

Keywords: snow algae, chlorophyll, the thawing season, the snow cover model