

Ice break-up in spring 2013 at Lake Kilpisjärvi, Finnish Lapland

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Abstract

Lake Kilpisjärvi is a seasonally ice-covered tundra lake located in the northwest Finnish Lapland at 473 m above sea level and only 60 km from the shore of the North Atlantic Ocean. The ice season is the longest in Finland with an annual duration of 200-250 days, and the records starting from 1953 show the average ice break-up date of June 18th. A two-week field study was performed between May 24th and June 5th, 2013, during an exceptionally fast melting season when the ice was already snow-free. The properties of the ice cover and the water column were measured with several instruments including CTDs, thermistor chains, current meters, PAR-sensors, and an autonomous underwater vehicle. The objective was to learn more about the spring convection and radiatively driven currents under lake ice, and to study the melting of the ice. The unusually warm weather resulted in ice thickness decreasing at the mean rate of 4.5 cm d⁻¹ with internal deterioration producing candled ice. Due to weak winds the ice cover remained almost unbroken until the ice break-up in June 3rd. Here, the field investigations and ice conditions are described and some preliminary results presented.