



Fluvial thermal erosion during the ice break-up of the Lena river (Siberia)

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The Lena River is one of the largest Arctic rivers; its periglacial environment implies an excessive fluvial regime and a spectacular flood occurring at the end of the winter. From the beginning of November to May, a continuous ice cover can be observed as thick as 2 m on the Lena River in Central Siberia. The break up starts around May 15 at the latitude of Yakutsk, corresponding to a flood wave coming from the South and to an increase of the water stream temperature up to 18°C.

In spite of a relatively good understanding of the initial stage of the breakup period of these periglacial rivers [Beltaos and Burrell, 2002; Shen, 2003; Billfalk, 1982], only a few studies report on the role of mechanical and thermal erosion during the breakup

Observations and measurements of erosion of the island heads during the first days of the ice breakup were made during breakup periods over a 4-year period (2008-2011). Here, we reassess the efficiency of the fluvial thermal erosion using both high resolution records from field measurements and modeling. We analyze the impact of the breakup on the erosional process on the head of several fluvial islands. Only a few days are enough to produce erosion rate as high as 30 m. The protective effect of the ice cover at the very beginning of the break up has been studied in more detailed during 3 field trips. These values are relatively high but are in good agreement with our modeling.