



Variability of the fluvial thermal process during ice breakups of the Lena river (Siberia)

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A 4-years observation program was initiated to quantify the variability of the fluvial thermal erosion during the ice breakups of the Lena River in Central Siberia. Parameters affecting fluvial thermal erosion have been collected in the middle valley near Yakutsk city where active fluvial thermal erosion on frozen islands has been recorded. The heads of islands undergo strong erosion with mean values of 12 m per year and maximal values reaching 40 m. The careful analysis of the annual data shows a high variability of the erosion rate, mostly due to the variability of the water stream temperature and to the duration and timing of the flood season.

A laboratory simulation was proposed to quantify the potential impact of the recent global warming, by means of an increase of the water stream temperature. A hydraulic channel in a cold chamber simulate the ground thawing produced by heat transfer from the flow of water through the frozen ground; followed by mechanical transport of the thawed sediments. The measured increase up to 2°C of the water stream temperature could alone multiply the erosion rate by 16% and explains the acceleration of the mobility of fluvial islands on the Lena river.