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## **Formation and evolution of the river ice cover along sedimentary links**

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### **Abstract :**

Gravel-bed rivers can often be segmented into a number of discrete sedimentary links, each characterized by a node of coarse sediment recruitment followed by a gradual downstream fining of substrate and an associated reduction of channel slope. Because the downstream changes in substrate and slope along sedimentary links are associated with changes in channel morphology and hydraulics, they create a longitudinal sequence of river forms moving from steep, fast flowing and turbulent boulder bed channels at the head of links to meandering, slow-flowing, low-gradient sand channels at the downstream end. Because river ice types (e.g. frazil, anchor ice, border ice) and formation processes (static and dynamic) are closely related to local hydraulic conditions and bed material size, we hypothesize that the sedimentary link structure exerts a strong control on the large-scale distribution and evolution of river ice types. In order to test this hypothesis, we will document, during two consecutive freeze-up periods, the formation and evolution of river ice on the sedimentary links of the Sainte-Marguerite River (Saguenay, Québec). During freeze-up, river ice formation will be documented using georeferenced oblique digital photographs of the river surface obtained from shore-based digital cameras (Campbell CC640) powered by solar panels. Image analysis algorithms will be developed to automate the classification of river ice types and measurement of their surface areas. Once, and where, a solid ice cover has formed, the growth of river ice will continue to be monitored using an ice drill and a ground penetrating radar. The results of this study should lead to the development of a river ice formation and evolution model along sedimentary links