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## **Frazil blockage of the Québec Water Intake on the St. Lawrence River**

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Québec's municipal intake, located on the left bank of the St. Lawrence River is subject to blockage by frazil ice 15 to 30 times per year. Given the City's concern to protect the water source, a second intake is proposed near the first one. Through observations of the water temperature and frazil in the ice column, this study confirmed that significant blockages occur because there is active frazil in the water column despite the fact that the intake is located in water having significant surface ice runs. Since the intake is in a strongly tidal river, it was found that the critical air temperature leading to blockage is a function not only of the time of day and surface ice conditions but also a function of the tidal phase. For example, for a blockage to occur on the ebb tide, the air temperature need only be  $-2.3\text{ }^{\circ}\text{C}$  whereas for a blockage to occur at night on a flood tide at night, the air temperature must be less than  $-13.1\text{ }^{\circ}\text{C}$ . Due to solar radiation in the daytime, colder air temperatures are required:  $-14.0\text{ }^{\circ}\text{C}$  on the ebb tide and  $-25\text{ }^{\circ}\text{C}$  on the flood tide. Other findings discussed in this poster are the role of border ice in protecting the intake, the buildup of anchor ice and the thickness of surface frazil floes.

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