

## **New friction mechanisms revealed by ice crushing-friction tests on high-roughness surfaces**

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**ABSTRACT:** Ice crushing occurs to varying degrees in many situations including those that involve a sliding frictional component, such as in sports involving ice contact, ice interaction with bridges, piers, ship hulls, vehicle wheels, rock beds under glaciers and ice-on-ice sliding/crushing interaction within glaciers and extraterrestrial ice masses (on Saturn's moon Enceladus). Here results of ice crushing-friction experiments on high-roughness surfaces with regular arrays of small prominences are presented. Friction coefficients were extraordinarily low and were proportional to the ratio of the tangential sliding rate and the normal crushing rate. All of the friction coefficient variation was determined by the fluid dynamics of a slurry that flowed through channels that developed between leeward-facing facets of the prominences and the moving ice. The slurry originated from a highly-lubricating self-generating squeeze film of ice particles and melt located between the encroaching intact ice and the surfaces.

**ALL ARE WELCOME!**