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Small scale high resolution LiDAR measurements of a subglacial conduit

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We present direct measurements of surface roughness in a sub-glacial conduit system underneath the Rieperbreen Glacier, Svalbard, Norway. Data was collected with a low-cost ($129 USD) Microsoft Kinect video game device used as a LIDAR sensor. Surface roughness is a primary control on water flow in rivers, channels, and cave conduit systems and understanding the effects of surface roughness on water flow has been problematic due to lack of direct measurements of roughness in natural systems. We use the ice scallop dimensions to derive flow velocity and explore implications of the changing roughness parameters as the cave grows and shrinks.