Supporting Information for "Insights into anisotropy development and weakening of ice from in-situ p-wave velocity monitoring during laboratory creep"

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Introduction

This supplementary section provides additional information on the methods employed in this work, mechanical data from repeat experiments, as well as a table of experimental conditions for the experiments considered. Figure S1 is a schematic diagram of the vacuum manifold used to manufacture the standard ice samples. Figure S2 shows the relationship between the sample and oil temperatures during the experiments. Figure S3 is a plot of mechanical data from several additional deformation experiments to illustrate the repeatability of the mechanical behaviour of our samples during deformation. Table S1 includes details of the deformation conditions and EBSD acquisition parameters for each experiment.
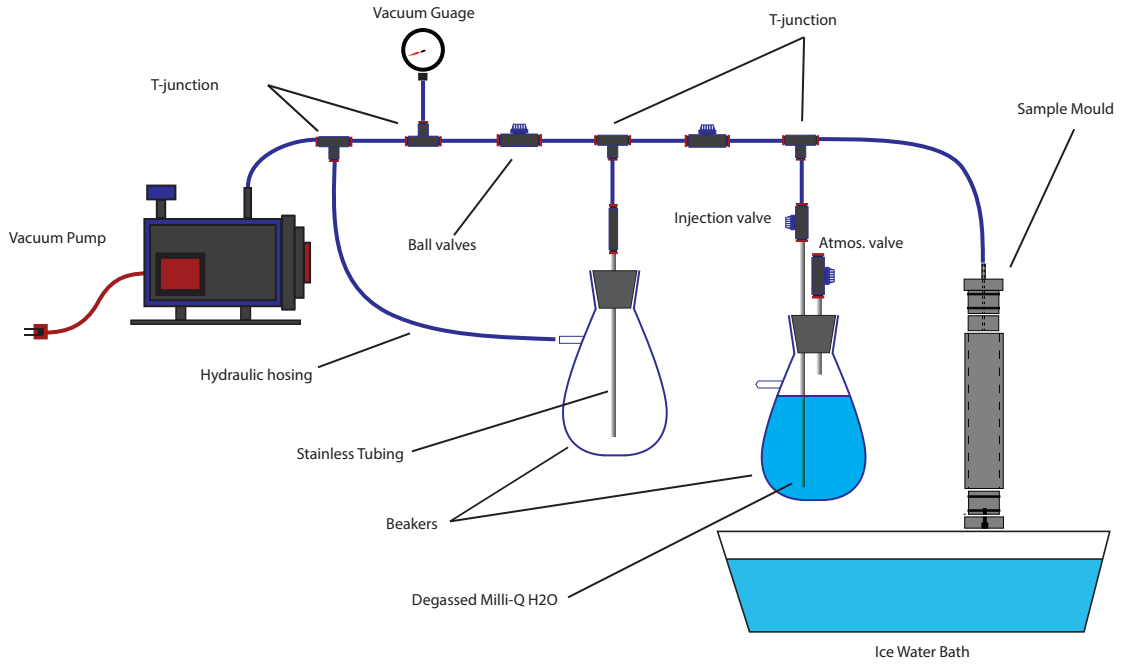
Figure S1. Vacuum manifold and cylindrical mould developed for manufacturing standard ice samples.
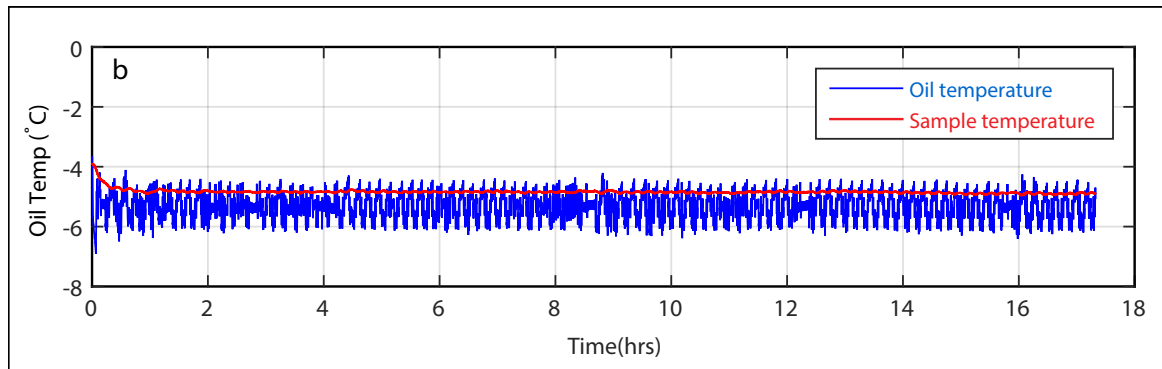
Figure S2. Comparison of the temperature of the oil in the sample chamber to the internal (measured along central axis) temperature of the ice sample. These data were recorded using LabView software on a National Instrument thermocouple module using k-type thermocouples.
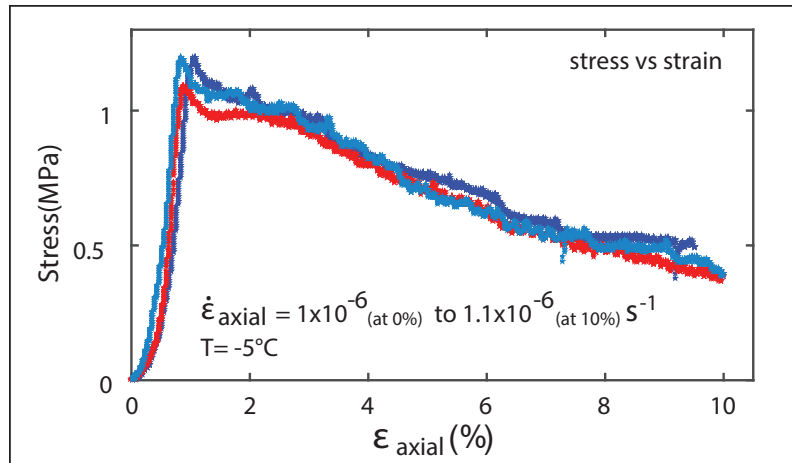
Figure S3. Mechanical data from three repeat deformation experiments on standard ice polycrystals. Samples were deformed to ≈10% strain under the same conditions (-5°C, constant displacement rate).

Table S1. Experimental conditions and data acquisition considerations for all data considered in this paper

Experiment	Target temp.	Mean temp.	Strain rate	% strain	Sample width (final)	Sample length (initial)	Live sensors	Peak stress (MPa)	Strain @ peak stress	Comments	EBSD step size (m)	EBSD max indexing	EBSD min indexing
def004	-5	-4.51	5E10-7	6.8	41.1 mm	82 mm	6	-	-	minor simple shear	-	-	-
def007	-5	-4.56	1E10-6	9.5	41.8 mm	82.5 mm	6	-	-	test	-	-	-
def009	-5	-4.92	1E10-6	9.8	41.9 mm	97 mm	9	-	-	data log malfunction	-	-	-
def010	-5	-4.83	1E10-6	10.0	42 mm	96 mm	10	1.2	0.85	minor simple shear	40	54	39
def011	-5	-4.98	1E10-6	7.5	41.2 mm	94.2 mm	9	1.17	0.87	sensor 4 offline	40	60	25
def012	-5	-4.96	1E10-6	5.0	40.9 mm	96 mm	10	1.22	0.96	-	40	80	67
def013	-5	-4.6	1E10-6	3.0	40.4 mm	98 mm	10	1.13	0.8	-	50	43	34
def014	-5	-4.6	1E10-6	1.0	40 mm	96.5 mm	10	1.12	1	-	40	82	52
Undeformed				0.0							40	77	38