

Supplement of The Cryosphere, 14, 1009–1023, 2020  
<https://doi.org/10.5194/tc-14-1009-2020-supplement>  
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*Supplement of*

## **Pressure and inertia sensing drifters for glacial hydrology flow path measurements**

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**Table S1.** Ensemble statistics of all multi-modal time series: mean, variance, standard deviation, skewness and kurtosis.

Sensor mode	mean	variance	standard deviation	skewness	kurtosis
Pressure left	1006.05 hPa	16.19 hPa <sup>2</sup>	4.02 hPa	0.45	3.11
Pressure right	1006.15 hPa	16.69 hPa <sup>2</sup>	4.09 hPa	0.38	3.45
Magnetometer X	13.14 $\mu$ T	567.70 $\mu$ T <sup>2</sup>	23.83 $\mu$ T	-0.62	2.83
Magnetometer Y	14.35 $\mu$ T	284.65 $\mu$ T <sup>2</sup>	16.87 $\mu$ T	0.17	2.28
Magnetometer Z	30.78 $\mu$ T	729.40 $\mu$ T <sup>2</sup>	27.01 $\mu$ T	-1.33	4.23
Magnetometer	53.76 $\mu$ T	17.63 $\mu$ T <sup>2</sup>	4.20 $\mu$ T	-0.30	3.09
Accelerometer X	-0.06 m s <sup>-2</sup>	4.48 m <sup>2</sup> s <sup>-4</sup>	2.12 m s <sup>-2</sup>	-0.95	94.84
Accelerometer Y	-0.49 m s <sup>-2</sup>	4.52 m <sup>2</sup> s <sup>-4</sup>	2.13 m s <sup>-2</sup>	4.53	218.62
Accelerometer Z	0.04 m s <sup>-2</sup>	5.78 m <sup>2</sup> s <sup>-4</sup>	2.40 m s <sup>-2</sup>	-1.75	124.54
Accelerometer	2.34 m s <sup>-2</sup>	9.54 m <sup>2</sup> s <sup>-4</sup>	3.09 m s <sup>-2</sup>	7.55	102.39
Gyroscope X	0.12 deg s <sup>-1</sup>	4.32 deg <sup>2</sup> s <sup>-2</sup>	2.08 deg s <sup>-1</sup>	0.58	10.31
Gyroscope Y	0.02 deg s <sup>-1</sup>	14.88 deg <sup>2</sup> s <sup>-2</sup>	3.86 deg s <sup>-1</sup>	-0.10	8.18
Gyroscope Z	-0.07 deg s <sup>-1</sup>	3.83 deg <sup>2</sup> s <sup>-2</sup>	1.96 deg s <sup>-1</sup>	-0.41	11.22
Gyroscope	3.65 deg s <sup>-1</sup>	9.73 deg <sup>2</sup> s <sup>-2</sup>	3.12 deg s <sup>-1</sup>	2.20	11.59
Quaternion X	-0.003	0.10	0.32	-0.02	3.68
Quaternion Y	0.05	0.48	0.69	-0.12	1.48
Quaternion Z	0.02	0.31	0.56	-0.09	1.88
Quaternion W	-0.006	0.12	0.34	-0.01	3.35
Euler X	177.47 deg	8599.48 deg <sup>2</sup>	92.73 deg	0.20	2.16
Euler Y	-14.42 deg	1008.31 deg <sup>2</sup>	31.75 deg	0.41	3.18
Euler Z	75.68 deg	15,963.50 deg <sup>2</sup>	126.35 deg	-1.26	2.91

**Table S2.** Ensemble statistical measures of comparison for all sensor modes. Shown are Chi Squared error (Chi), Kullback Leibler divergence (KLD), mean average error (MAE), mean squared error (MSD) and data range normalized root mean square (RMSD).

Sensor mode	Mean Chi	Mean KLD	Mean MAE	Mean MSD	Mean RMSD
Pressure left	$1.9 \times 10^{-4}$	$9.3 \times 10^{-2}$	$-5.2 \times 10^{-22}$	$1.4 \times 10^{-7}$	$3.1 \times 10^{-6}$
Pressure right	$1.3 \times 10^{-2}$	$1.3 \times 10^{-1}$	$1.5 \times 10^{-21}$	$9.1 \times 10^{-6}$	$9.6 \times 10^{-6}$
Magnetometer X	$1.6 \times 10^{-3}$	$2.5 \times 10^{-1}$	$3.7 \times 10^{-20}$	$1.5 \times 10^{-6}$	$8.0 \times 10^{-6}$
Magnetometer Y	$1.9 \times 10^{-3}$	$1.4 \times 10^{-1}$	$-2.7 \times 10^{-20}$	$2.2 \times 10^{-6}$	$8.0 \times 10^{-6}$
Magnetometer Z	$1.3 \times 10^{-3}$	$1.5 \times 10^{-1}$	$3.3 \times 10^{-20}$	$1.1 \times 10^{-6}$	$5.5 \times 10^{-6}$
Accelerometer X	$3.2 \times 10^{-3}$	$3.6 \times 10^{-2}$	$3.5 \times 10^{-21}$	$1.4 \times 10^{-5}$	$2.1 \times 10^{-5}$
Accelerometer Y	$5.4 \times 10^{-3}$	$1.0 \times 10^{-1}$	$-5.6 \times 10^{-20}$	$2.8 \times 10^{-5}$	$3.4 \times 10^{-5}$
Accelerometer Z	$3.9 \times 10^{-3}$	$4.2 \times 10^{-2}$	$-2.1 \times 10^{-21}$	$2.0 \times 10^{-5}$	$2.5 \times 10^{-5}$
Gyroscope X	$5.5 \times 10^{-3}$	$3.4 \times 10^{-2}$	$-2.4 \times 10^{-20}$	$3.8 \times 10^{-5}$	$6.9 \times 10^{-5}$
Gyroscope Y	$5.3 \times 10^{-3}$	$5.7 \times 10^{-2}$	$5.9 \times 10^{-21}$	$1.9 \times 10^{-5}$	$3.2 \times 10^{-5}$
Gyroscope Z	$5.4 \times 10^{-3}$	$3.8 \times 10^{-2}$	$1.5 \times 10^{-20}$	$3.8 \times 10^{-5}$	$6.2 \times 10^{-5}$
Quaternion X	$8.6 \times 10^{-3}$	$6.8 \times 10^{-2}$	$3.8 \times 10^{-19}$	$5.5 \times 10^{-4}$	$4.4 \times 10^{-3}$
Quaternion Y	$8.3 \times 10^{-3}$	$8.3 \times 10^{-2}$	$-1.1 \times 10^{-19}$	$4.4 \times 10^{-4}$	$4.4 \times 10^{-3}$
Quaternion Z	$6.2 \times 10^{-3}$	$6.4 \times 10^{-2}$	$-3.3 \times 10^{-19}$	$3.2 \times 10^{-4}$	$3.5 \times 10^{-3}$
Quaternion W	$1.1 \times 10^{-2}$	$1.0 \times 10^{-1}$	$1.7 \times 10^{-19}$	$6.4 \times 10^{-4}$	$5.2 \times 10^{-3}$