



Supervised classification of slush and ponded water on Antarctic ice shelves using Landsat 8 imagery – CORRIGENDUM

Corrigendum

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First, a methodological error and a typographic error were found in the accuracy assessment, which affects Sections 3.1 and 4.1 and **Tables 2–5** of this paper. During expert interpretation of Shackleton Ice Shelf, one expert erroneously classified pixels from another ice shelf. To solve this, we have removed this set of expert interpretations for the Shackleton Ice Shelf from the accuracy assessment dataset, and the classified data for this ice shelf is therefore now compared against a set of three expert interpretations instead of four. Additionally, the accuracy score reported for slush on Amery Ice Shelf for Expert 4 was a typographic error and has been corrected. This corrigendum presents revised **Tables 2–5**, with changes to correct for both the expert interpretation and typographic errors presented in bold text. We advise readers to refer to the numbers in these tables when considering data and text related to accuracy scores.

Table 2. Accuracy scores for the intercomparison dataset (the 50 pixels shared by experts for each ice-shelf validation image), listed by expert

	Ponded Water (%)							Slush (%)						
	Roi B	Nansen	Nivlisen	Shackleton	GVI	Amery	Mean	Roi B	Nansen	Nivlisen	Shackleton	GVI	Amery	Mean
Expert 1	88	91	71	84	65	64	77	70	85	71	65	67	63	70
Expert 2	90	80	88	88	80	69	82	76	52	92	73	76	69	73
Expert 3	96	94	80	78	65	50	77	88	94	83	60	65	37	71
Expert 4	92	64	85	N/A	68	58	73	68	15	82	N/A	70	57	58
Mean	91	82	81	83	70	60	78	76	61	82	66	69	57	68

Table 3. High-confidence accuracy scores for the intercomparison dataset (the 50 pixels shared by experts for each ice-shelf validation image), listed by expert

	Ponded Water (%)							Slush (%)						
	Roi B	Nansen	Nivlisen	Shackleton	GVI	Amery	Mean	Roi B	Nansen	Nivlisen	Shackleton	GVI	Amery	Mean
Expert 1	83	80	83	88	89	67	82	59	86	83	64	89	67	75
Expert 2	94	50	94	89	88	75	82	76	33	100	89	88	67	76
Expert 3	100	92	83	88	91	40	82	87	92	89	70	100	40	80
Expert 4	100	100	100	N/A	77	62	88	50	25	100	N/A	91	57	65
Mean	94	81	90	88	86	61	83	68	59	93	74	92	58	74

Table 4. Accuracy scores for the main validation dataset (which is 200 individual pixels (50 per expert) for each ice-shelf validation image excluding Shackleton for which there are only 150 individual pixels (50 for experts 1-3 only) for the ponded water and slush classes separately. The percentage of pixel confidence scores for each ice shelf are also given.

	Ponded Water Accuracy (%)	Slush Accuracy (%)	Low Confidence Pixels (%)	Medium Confidence Pixels (%)	High Confidence Pixels (%)
Nivlisen	80	80	13	48	40
Roi	87	65	19	32	50
Baudouin					
Amery	61	64	15	59	27
Shackleton	93	79	15	54	31
Nansen	81	60	22	47	31
George VI	70	74	13	52	36
Mean	79	70	16	49	36

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Table 5. High-confidence accuracy scores for the main validation dataset (which is 200 individual pixels (50 per expert) for each ice-shelf validation image excluding Shackleton for which there are only 150 individual pixels (50 for experts 1-3 only) for the ponded water and slush classes separately.

	Ponded Water (%)	Slush (%)
Nivlisen	92	92
Roi Baudouin	86	72
Amery	65	73
Shackleton	98	89
Nansen	80	74
George VI	86	91
Mean	84	82

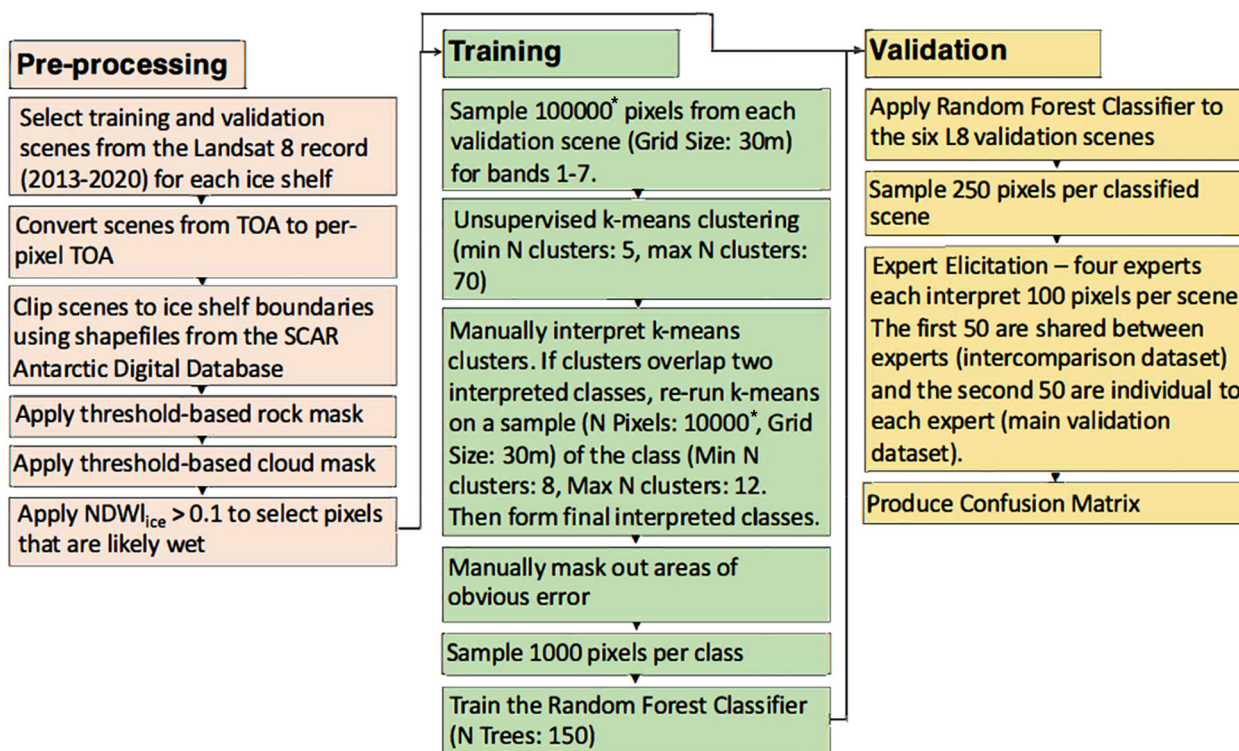


Fig. 2. Workflow detailing the pre-processing, training, and validation steps for creating a supervised classifier to map slush and ponded water across Antarctic ice shelves using GEE. *Sampling sizes of 100,000 and 10,000 pixels for k-means clustering reflect the number of pixels we aimed to sample in GEE, but fewer pixels are retrieved as the sampling function was run on a partially masked image. Other sampled figures reported here reflect the number of sampled pixels retrieved and used.

Second, a few typographic and calculation errors were found in Figure 2, and within Sections 2.4, 3.1, and 4.1. These errors, which are unrelated to the first errors described above, are listed below:

- Figure 2 states that 200 pixels were sampled per scene; this has been corrected to 250 (see new Figure 2 in this corrigendum). Figure 2 caption also clarifies sampling sizes, which should be noted when referring to both Figure 2 and Section 2.3 of the manuscript.
- The final paragraph in Section 2.4 states that we present confusion matrices. However, whilst these data are calculated, readers should note we only present the overall accuracy scores.
- Within the first paragraph of Section 3.1, some of the spreads between accuracy scores are incorrect, and these should be recalculated from the new tables presented below.
- To correct for the typographic errors within the last paragraph of Section 3.1, we provide the following alternative text: “For the ponded water class, Expert 1 had the lowest agreement with the classifier (Table 3). This was due to the classifier designating certain pixels as slush and ‘other’ (e.g. non-wet surface facies),

whereas the expert interpreted the pixels to be ponded water. For the slush class, Expert 4 had the lowest agreement with the classifier (Table 3), which classified certain pixels as ‘other’ that were interpreted to be slush by the expert.”

- Within Section 4.1 we previously state that “the classifier accuracy was lowest over Amery, achieving 65% accuracy for ponded water and 73% for slush”. This should be corrected to: “the classifier accuracy was lowest over Amery for ponded water (65%), and lowest over Roi Baudouin for slush (72%)”

Third, we would like to add to the Data Availability section that ice shelf boundaries are from the SCAR Antarctic Digital Database, acquired using Quantarctica (Matsuoka and others, 2021).

References

- Dell RL and 6 others (2022) Supervised classification of slush and ponded water on Antarctic ice shelves using Landsat 8 imagery. *Journal of Glaciology* 68(268), 401–414. doi: 10.1017/jog.2021.114
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