Supplementary Materials: Detection of Glacier Calving Margins with Convolutional Neural Networks: A Case Study

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Table S1.

Architecture of the neural network corresponding to Figure 2 in the main text. "Conv" denotes a convolutional layer with ReLU activation a 3×3 kernel, unless specified otherwise as in layer 28. All layers are as described in Methods.

Layer	Type	Output Size
1	Input	$240 \times 152 \times 1$
2-4	Conv $\rightarrow$ Dropout (0.2) $\rightarrow$ Conv	$240 \times 152 \times 32$
5	MaxPool (2×2)	$120 \times 76 \times 32$
6-8	Conv $\rightarrow$ Dropout (0.2) $\rightarrow$ Conv	$120 \times 76 \times 64$
9	MaxPool (2×2)	$60 \times 38 \times 64$
10-12	Conv $\rightarrow$ Dropout (0.2) $\rightarrow$ Conv	$60 \times 38 \times 128$
13	MaxPool (2×2)	$30 \times 19 \times 128$
14-16	Conv $\rightarrow$ Dropout (0.2) $\rightarrow$ Conv	$30 \times 19 \times 256$
17	Upsample (2×2) and Concatenate with layer 12	$60 \times 38 \times 256$
18-20	Conv $\rightarrow$ Dropout (0.2) $\rightarrow$ Conv	$60 \times 38 \times 128$
21	Upsample (2×2) and Concatenate with layer 8	$120 \times 76 \times 128$
22-24	Conv $\rightarrow$ Dropout (0.2) $\rightarrow$ Conv	$120 \times 76 \times 64$
25	Upsample (2×2) and Concatenate with layer 4	$240 \times 152 \times 64$
26-28	Conv $\rightarrow$ Dropout (0.2) $\rightarrow$ Conv	$240 \times 152 \times 32$
27	Conv	$240 \times 152 \times 3$
28	Conv (1×1 - Sigmoid)	$240 \times 152 \times 1$
29	Flatten for dynamic weighting	36480×1

Figure S1.

The outputs and corresponding errors of the Neural Network (NN), Sobel filter, and manual technique for 10 test images from Helheim Glacier.
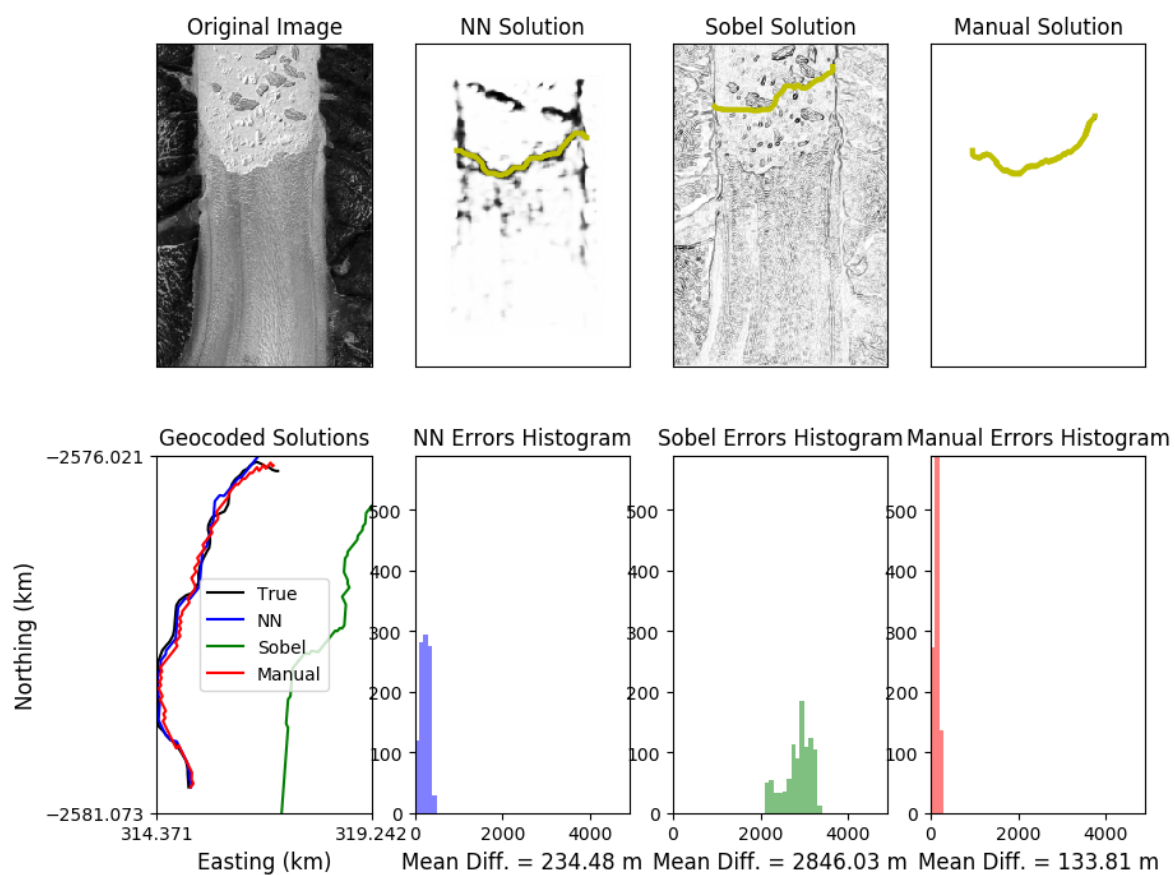
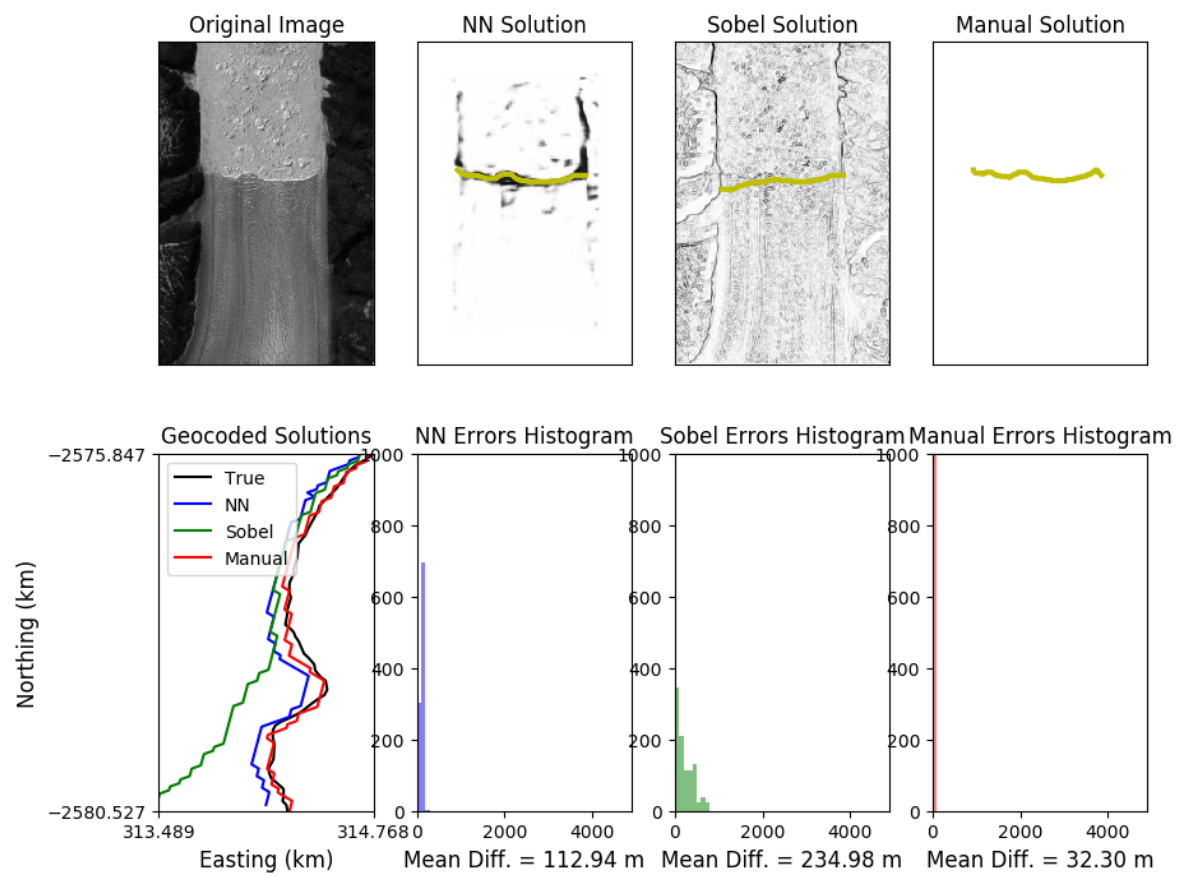**Figure S1.1.** Landsat 5 - 19890629 - 20170202
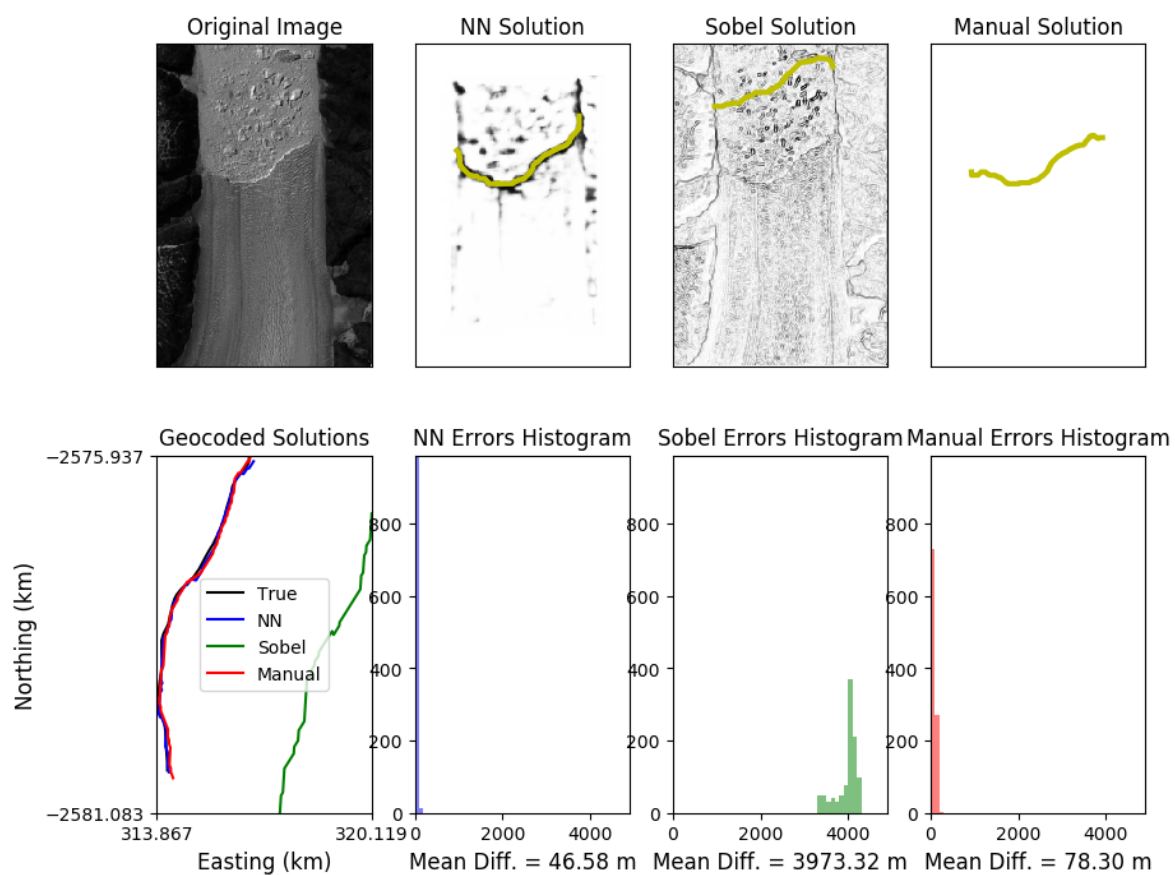
Figure S1.2. Landsat 5 - 19940830 - 20170113

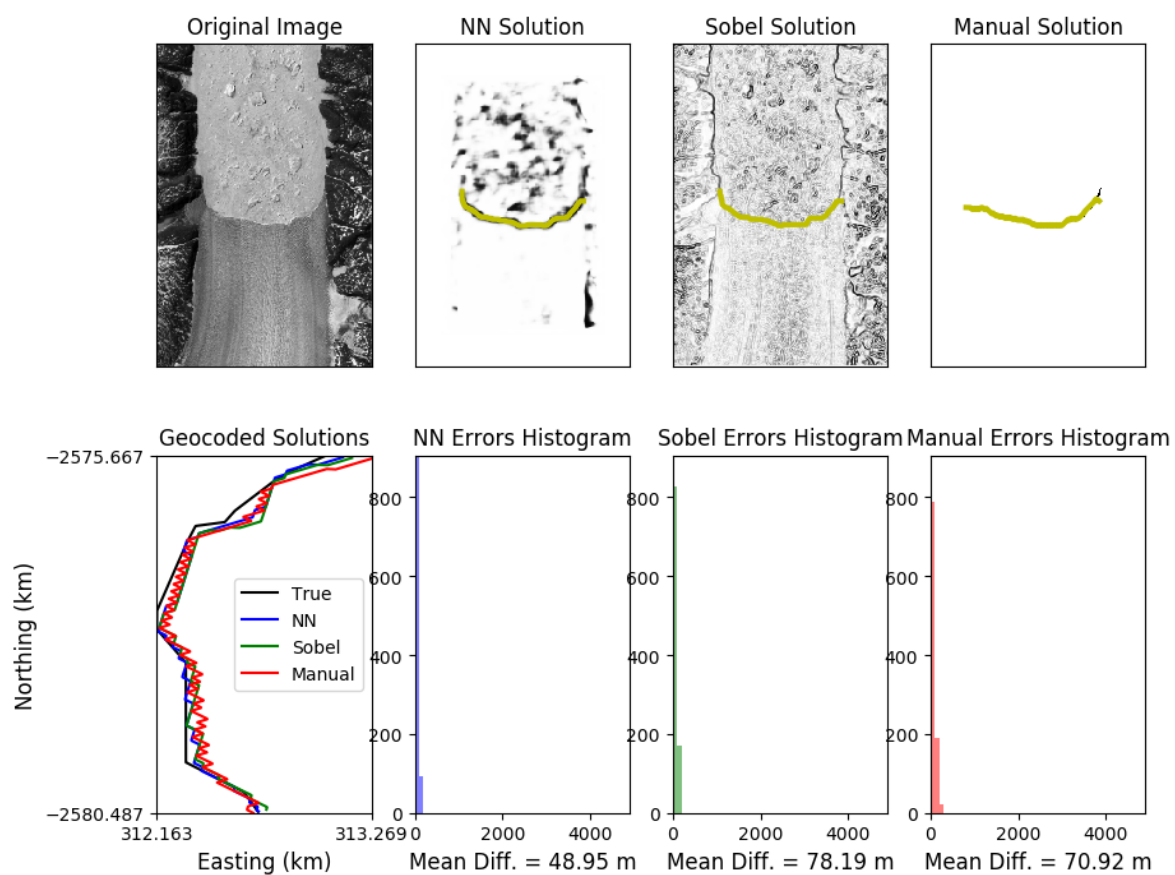**Figure S1.3.** Landsat 5 - 19850908 - 20170218

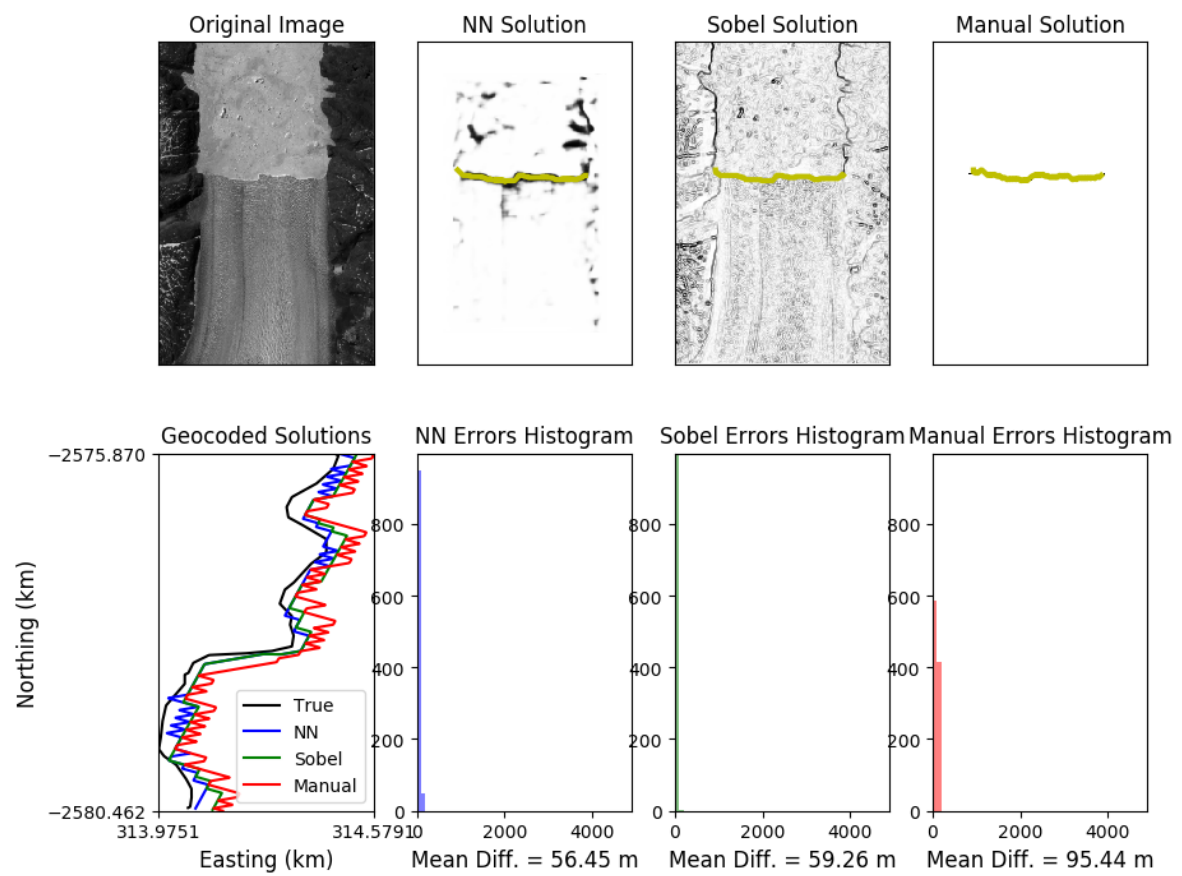**Figure S1.4.** Landsat 7 - 20020625 0 20170129

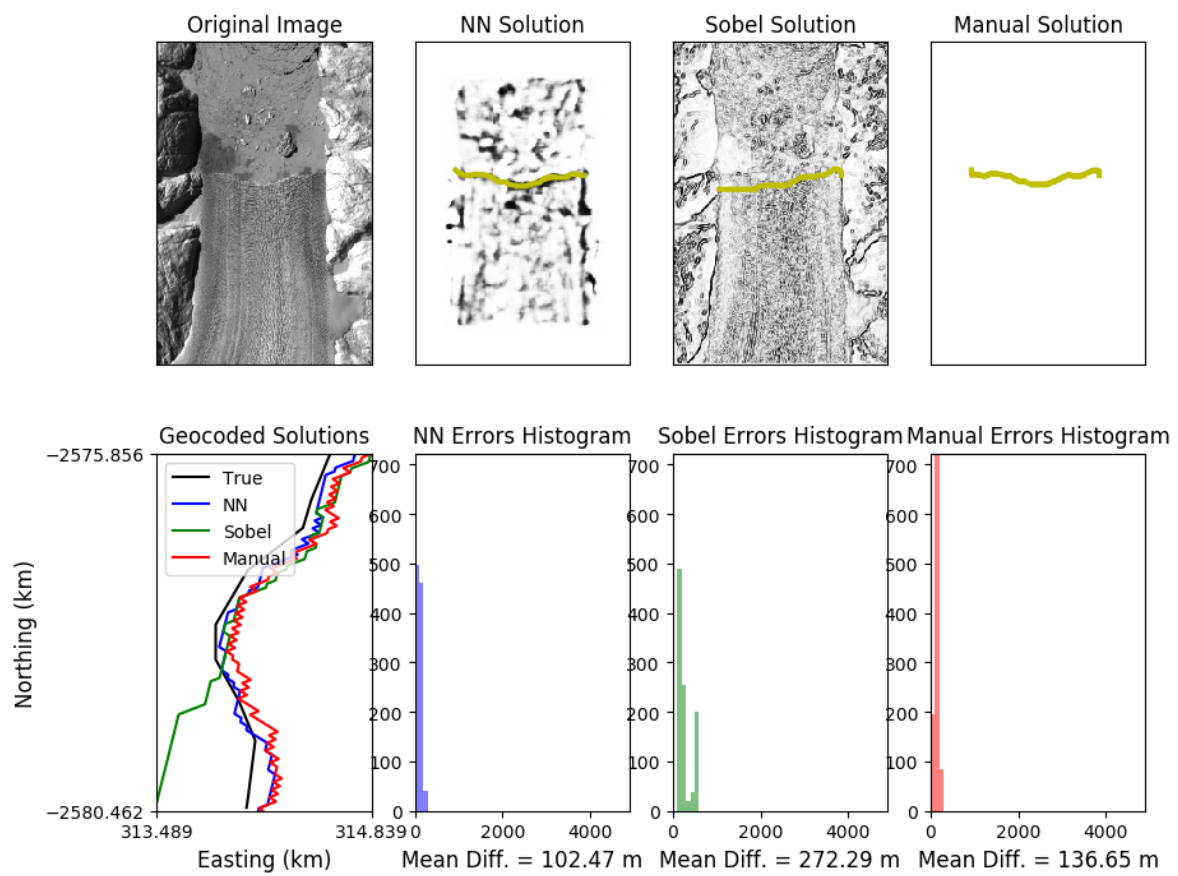**Figure S1.5.** Landsat 7 - 20000721 - 20170210
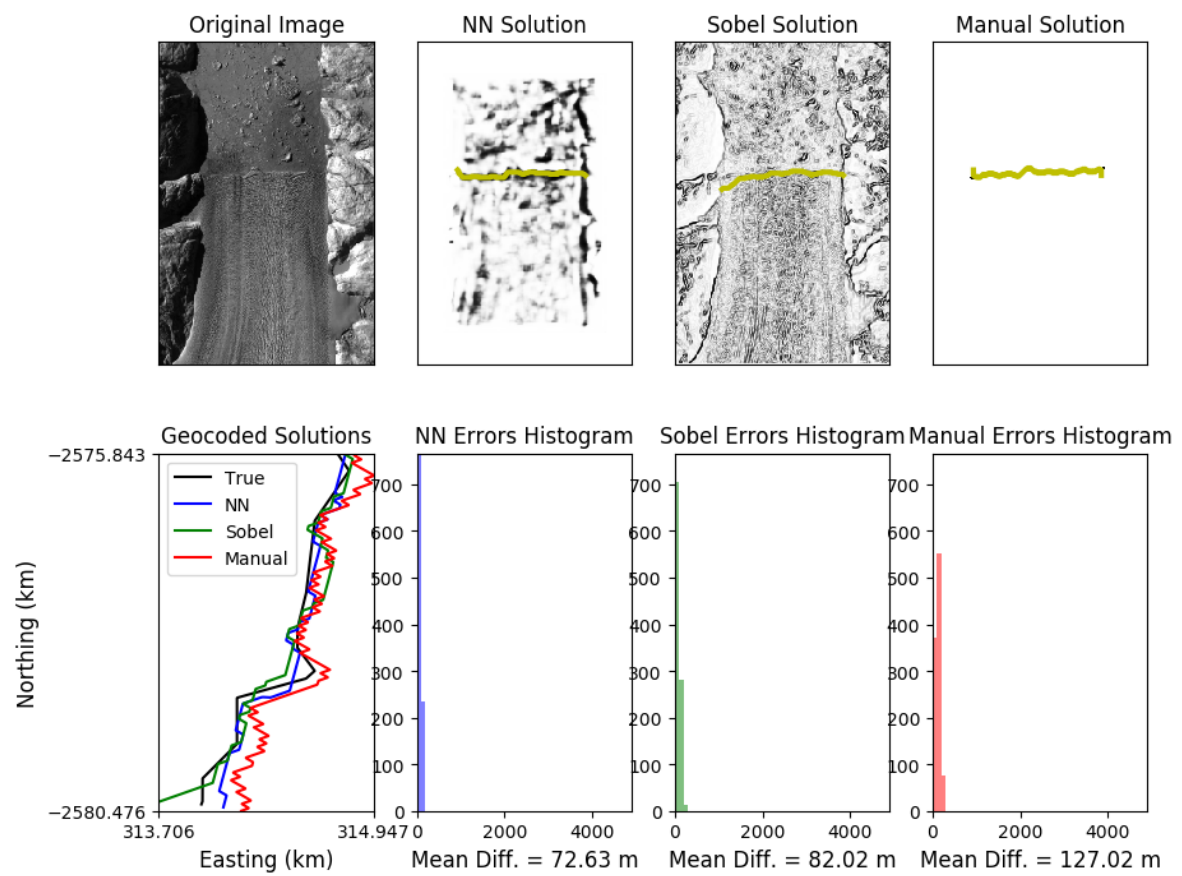
Figure S1.6. Landsat 7 - 20000331 - 20170212

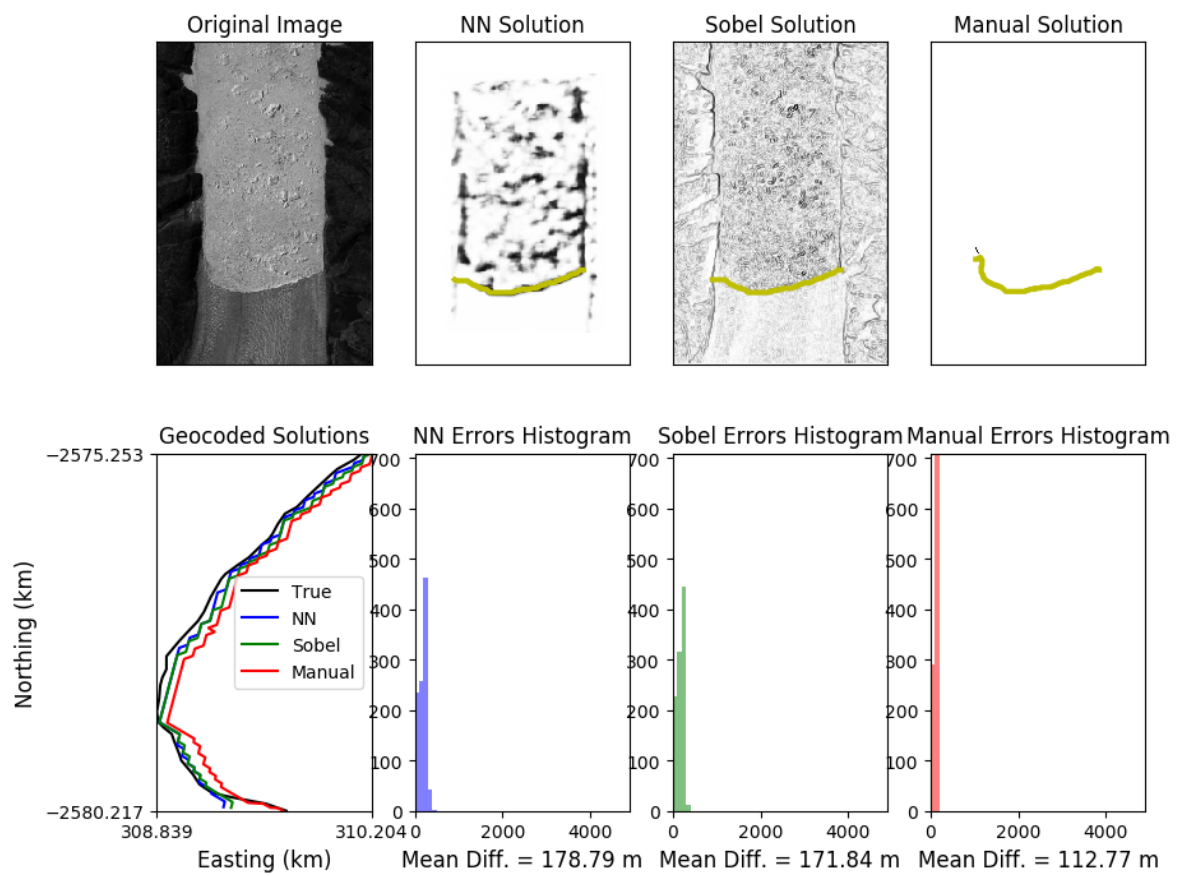**Figure S1.7.** Landsat 7 - 20010318 - 20170206

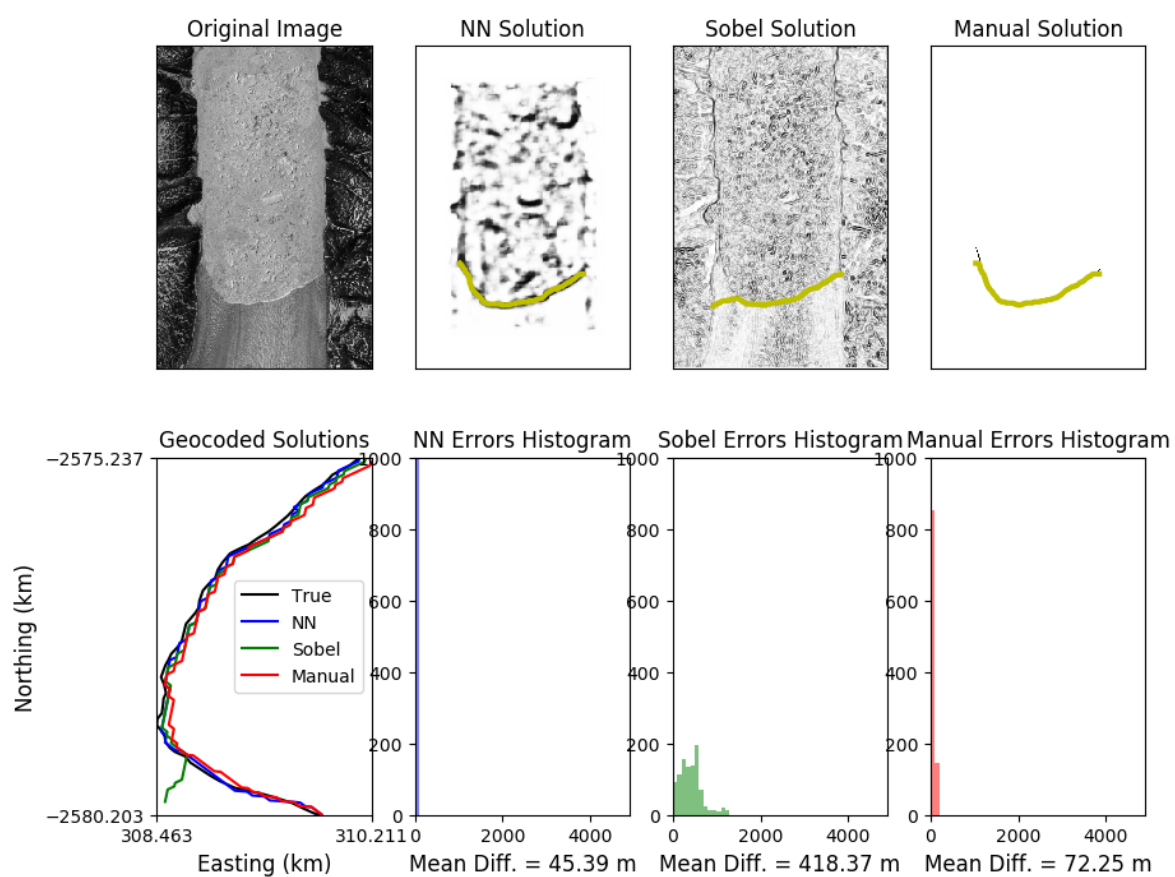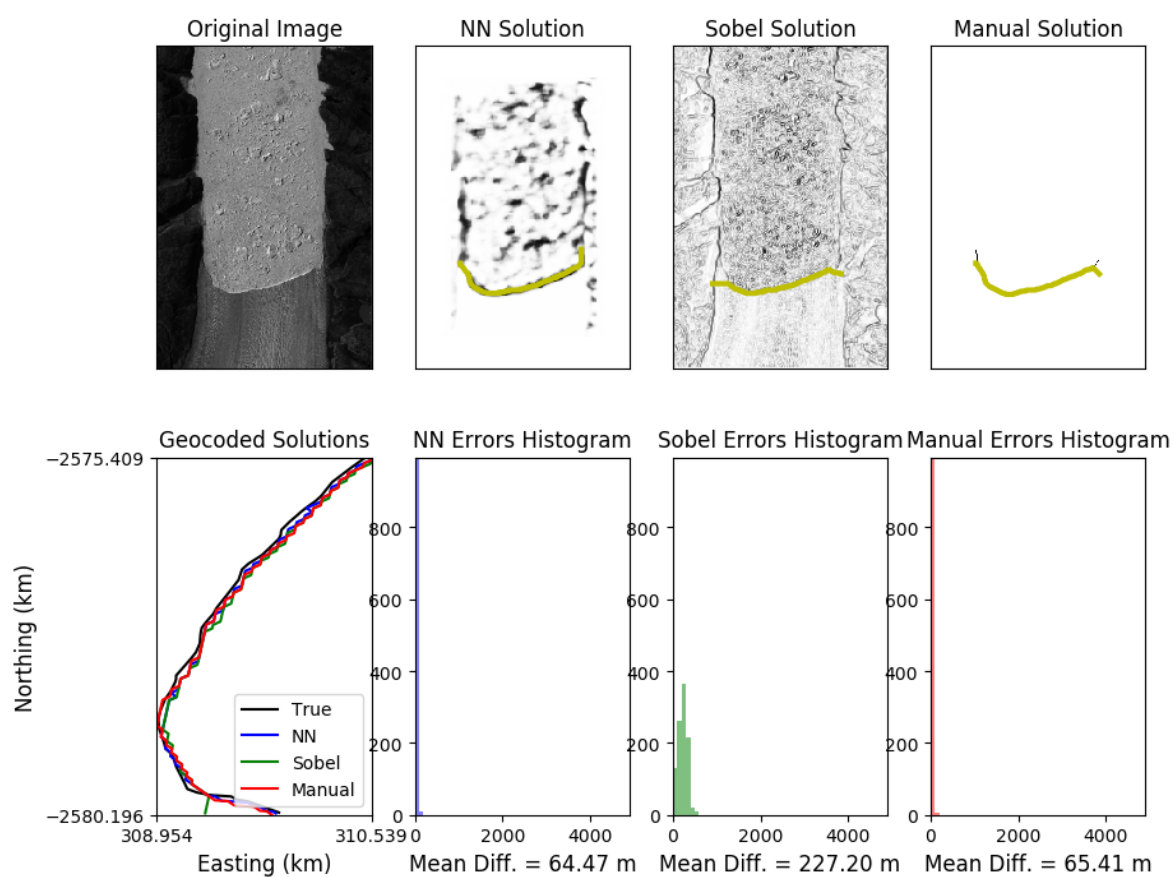**Figure S1.8.** Lansat 8 - 20160725 - 20170322

Figure S1.9. Lansat 8 - 20150707 - 20170407

Figure S1.10. Lansat 8 - 20140821 - 20170420