Supplement of

Glacier extraction based on high-spatial-resolution remote-sensing images using a deep-learning approach with attention mechanism

Xinde Chu et al.

Correspondence to: Xiaojun Yao (xj_yao@nwnu.edu.cn)

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| ID               | Date       | Resolution(m) | Utilization          |
|------------------|------------|---------------|----------------------|
| Gaofen6_PMS_E90.9_N35.8 | 2020-09-21 |               |                      |
| Gaofen6_PMS_E91.1_N36.5   | 2020-09-21 |               |                      |
| Gaofen6_PMS_E91.5_N35.8   | 2020-09-25 |               | Training and validation |
| Gaofen6_PMS_E91.7_N36.5   | 2020-09-25 |               |                      |
| Gaofen6_PMS_E91.5_N35.8   | 2020-11-05 |               |                      |
| Gaofen6_PMS_E91.0_N33.6   | 2020-11-16 |               |                      |
| Gaofen6_PMS_E91.4_N32.8   | 2020-12-20 |               |                      |
| Gaofen6_PMS_E97.3_N38.7   | 2019-09-13 |               | 2                    |
| Gaofen6_PMS_E92.5_N32.8   | 2020-07-25 |               |                      |
| Gaofen6_PMS_E91.9_N32.8   | 2020-08-19 |               |                      |
| Gaofen6_PMS_E92.1_N35.8   | 2020-09-29 |               |                      |
| Gaofen6_PMS_E92.4_N32.8   | 2020-10-07 |               |                      |
| Gaofen6_PMS_E93.2_N35.8   | 2020-10-07 |               |                      |
| Gaofen6_PMS_E93.8_N35.8   | 2020-10-11 |               |                      |
| Gaofen6_PMS_E91.6_N33.6   | 2020-12-20 |               |                      |
| Gaofen6_PMS_E92.6_N32.8   | 2020-12-28 |               |                      |
Table S2: Results of each method in different test areas.

| Regional centroid coordinates | Time       | Evaluation metrics | SBTM  | RF    | FCN   | U-Net | DeepLab V3+ | Attention DeepLab V3+ with TTA |
|------------------------------|------------|--------------------|-------|-------|-------|-------|-------------|--------------------------------|
| 91.54° E, 33.40° N          | 2020-10-20 | Kappa              | 0.8892| 0.9755| 0.9779| 0.9903| 0.9937      | 0.9950                         |
|                             |            | MIoU               | 0.8960| 0.9759| 0.9781| 0.9903| 0.9937      | 0.9950                         |
|                             |            | F1                 | 0.9205| 0.9827| 0.9844| 0.9931| 0.9955      | 0.9964                         |
|                             |            | ASD                | 324.7753| 143.6025| 20.9975| 25.4124| 8.8409      | 2.6390                         |
| 91.81° E, 32.96° N          | 2020-08-19 | Kappa              | 0.9565| 0.9730| 0.9678| 0.9739| 0.9761      | 0.9800                         |
|                             |            | MIoU               | 0.9577| 0.9735| 0.9684| 0.9743| 0.9765      | 0.9802                         |
|                             |            | F1                 | 0.9660| 0.9790| 0.9749| 0.9797| 0.9814      | 0.9844                         |
|                             |            | ASD                | 75.5751| 38.9206| 32.3906| 120.5889| 101.4194   | 82.2209                        |
| 91.95° E, 35.83° N          | 2020-09-29 | Kappa              | 0.9790| 0.9807| 0.9761| 0.9866| 0.9885      | 0.9897                         |
|                             |            | MIoU               | 0.9792| 0.9809| 0.9764| 0.9867| 0.9885      | 0.9898                         |
|                             |            | F1                 | 0.9857| 0.9869| 0.9838| 0.9909| 0.9921      | 0.9930                         |
|                             |            | ASD                | 27.4711| 31.3941| 27.2212| 28.2873| 43.2248     | 7.3042                         |
| 92.08° E, 33.11° N          | 2020-08-19 | Kappa              | 0.9453| 0.9669| 0.9592| 0.9692| 0.9694      | 0.9746                         |
|                             |            | MIoU               | 0.9471| 0.9676| 0.9602| 0.9698| 0.9700      | 0.9750                         |
|                             |            | F1                 | 0.9606| 0.9761| 0.9706| 0.9778| 0.9779      | 0.9817                         |
|                             |            | ASD                | 55.8389| 39.7680| 24.4735| 74.9717| 74.2903     | 41.05                          |
| 92.27° E, 32.96° N          | 2020-10-07 | Kappa              | 0.8699| 0.8861| 0.9516| 0.9448| 0.9585      | 0.9601                         |
|                             |            | MIoU               | 0.8808| 0.8940| 0.9531| 0.9468| 0.9597      | 0.9612                         |
|                             |            | F1                 | 0.8916| 0.9085| 0.9606| 0.9552| 0.9663      | 0.9675                         |
|                             |            | ASD                | 65.0882| 105.3618| 26.5124| 56.2230| 45.9240     | 28.1458                        |
| 92.27° E, 32.96° N          | 2020-07-25 | Kappa              | 0.9408| 0.9453| 0.9767| 0.9742| 0.9819      | 0.9916                         |
|                             |            | MIoU               | 0.9431| 0.9473| 0.9771| 0.9747| 0.9821      | 0.9916                         |
|                             |            | F1                 | 0.9521| 0.9557| 0.9810| 0.9790| 0.9852      | 0.9931                         |
|                             |            | ASD                | 69.5710| 42.7818| 7.6966| 58.2140| 13.9026     | 3.8659                         |
| 92.27° E, 32.96° N          | 2020-12-28 | Kappa              | 0.7460| 0.9504| 0.9674| 0.9870| 0.9866      | 0.9872                         |
|                             |            | MIoU               | 0.7841| 0.9520| 0.9681| 0.9872| 0.9867      | 0.9873                         |
|                             |            | F1                 | 0.7913| 0.9595| 0.9734| 0.9894| 0.9890      | 0.9895                         |
|                             |            | ASD                | 278.6174| 103.1949| 11.8665| 10.7183| 6.9738      | 3.4854                         |
| Location      | Date       | Kappa   | MIoU    | F1      | ASD      |
|---------------|------------|---------|---------|---------|----------|
| 93.40° E, 35.79° N | 2020-10-07 | 0.9299  | 0.9617  | 0.9655  | 0.9786   |
|               |            | 0.9332  | 0.9627  | 0.9664  | 0.9789   |
|               |            | 0.9410  | 0.9676  | 0.9709  | 0.9819   |
|               |            |         |         |         | 0.9837   |
|               |            |         |         |         | 0.9846   |
|               |            | 160.3477| 62.7534 | 14.3601 | 53.0317  |
|               |            |         |         |         | 9.3329   |
|               |            |         |         |         | 10.5393  |
| 93.66° E, 35.78° N | 2020-10-11 | 0.9203  | 0.9416  | 0.9442  | 0.9577   |
|               |            | 0.9249  | 0.9440  | 0.9465  | 0.9590   |
|               |            | 0.9314  | 0.9501  | 0.9524  | 0.9637   |
|               |            |         |         |         | 0.9717   |
|               |            |         |         |         | 0.9718   |
|               |            | 55.4797 | 101.6829| 81.4872 | 172.2861 |
|               |            |         |         |         | 85.5861  |
|               |            |         |         |         | 30.2161  |
| 97.25° E, 38.69° N | 2019-09-13 | 0.9698  | 0.9739  | 0.9803  | 0.9826   |
|               |            | 0.9704  | 0.9744  | 0.9805  | 0.9829   |
|               |            | 0.9754  | 0.9788  | 0.9839  | 0.9859   |
|               |            |         |         |         | 0.9877   |
|               |            |         |         |         | 0.9922   |
|               |            | 55.4721 | 35.9832 | 24.0894 | 17.6056  |
|               |            |         |         |         | 12.2884  |
|               |            |         |         |         | 6.2285   |
| Total         |            | 0.9147  | 0.9555  | 0.9667  | 0.9745   |
|               |            | 0.9217  | 0.9572  | 0.9675  | 0.9751   |
|               |            | 0.9316  | 0.9645  | 0.9736  | 0.9797   |
|               |            |         |         |         | 0.9830   |
|               |            |         |         |         | 0.9854   |
|               |            | 116.8237| 70.5443 | 27.1095 | 61.734   |
|               |            |         |         |         | 40.1783  |
|               |            |         |         |         | 21.5695  |