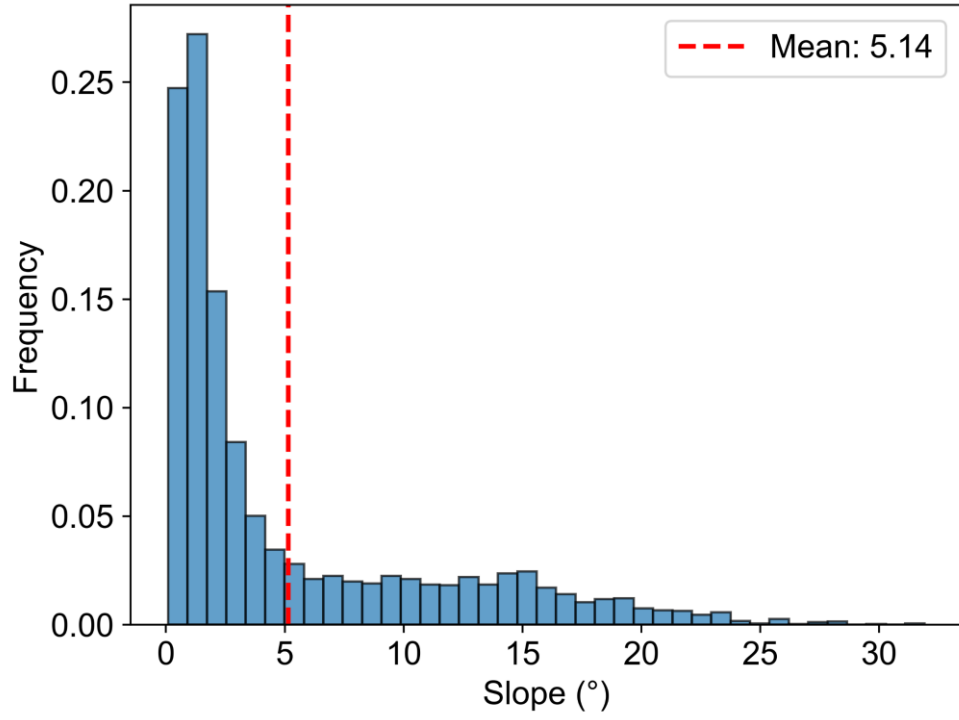
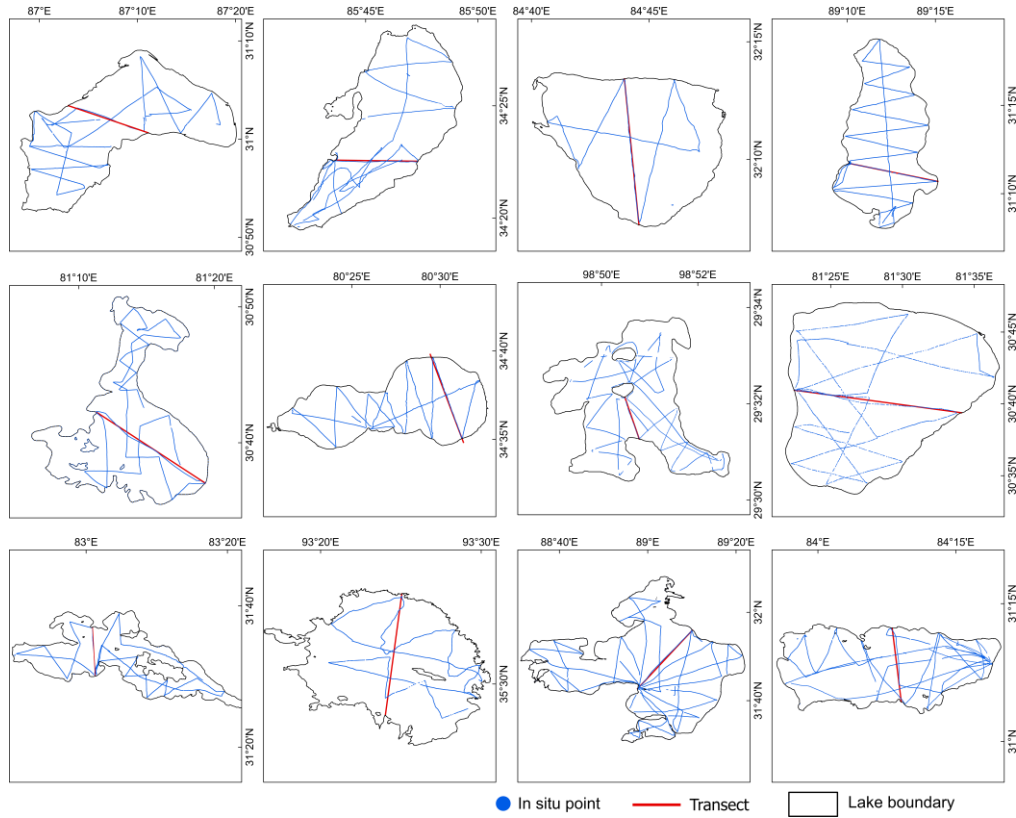




**Fig. S1.** Histogram of shoreline slope statistics for 4,000 lakes on the Tibetan Plateau from the HydroLAKES database.



**Fig. S2.** Locations of lake transects used for comparison in Fig. 3.

**Table S1.** Comparison of maximum depth and lake volume between in situ measurements and simulated bathymetry maps derived from the ALOS PLASAR.

| Lake name      | Maximum depth (m) |           | PE      | Volume (km <sup>3</sup> ) |           | PE      |
|----------------|-------------------|-----------|---------|---------------------------|-----------|---------|
|                | In situ           | Simulated |         | In situ                   | Simulated |         |
| Angzicuo       | 18.83             | 27.47     | 45.91%  | 4.81                      | 6.67      | 38.82%  |
| Buruocuo       | 100.55            | 73.52     | -26.88% | 3.86                      | 3.66      | -5.20%  |
| Dongcuo        | 3.99              | 21.88     | 448.35% | 0.22                      | 1.19      | 441.62% |
| Guomangcuo     | 39.49             | 33.60     | -14.92% | 1.76                      | 2.33      | 32.54%  |
| Laangcuo       | 49.20             | 56.80     | 15.45%  | 5.53                      | 6.44      | 16.44%  |
| Longmucuo      | 67.52             | 49.96     | -26.00% | 2.70                      | 2.98      | 10.49%  |
| Mangcuo        | 22.28             | 29.35     | 31.73%  | 0.18                      | 0.28      | 53.04%  |
| Mapang Yongcuo | 79.45             | 106.20    | 33.68%  | 17.20                     | 25.25     | 46.81%  |
| Ngangla Ringco | 74.94             | 57.18     | -23.70% | 9.09                      | 15.00     | 64.93%  |
| Salt Lake      | 32.78             | 43.86     | 33.81%  | 2.76                      | 3.91      | 42.08%  |
| Siling Co      | 52.50             | 32.57     | -37.96% | 52.72                     | 30.70     | -41.76% |
| Taro Co        | 130.95            | 64.50     | -50.74% | 28.02                     | 12.26     | -56.25% |

**Table S2.** Comparison of maximum depth and lake volume between in situ measurement and simulated bathymetry maps derived from the MERIT DEM.

| Lake name      | Maximum depth (m) |           | PE      | Volume (km <sup>3</sup> ) |           | PE      |
|----------------|-------------------|-----------|---------|---------------------------|-----------|---------|
|                | In situ           | Simulated |         | In situ                   | Simulated |         |
| Angzicuo       | 18.83             | 19.65     | 4.35%   | 4.81                      | 4.97      | 3.40%   |
| Buruocuo       | 100.55            | 56.76     | -43.55% | 3.86                      | 3.12      | -19.23% |
| Dongcuo        | 3.99              | 11.35     | 184.62% | 0.22                      | 0.71      | 223.27% |
| Guomangcuo     | 39.49             | 25.81     | -34.64% | 1.76                      | 1.53      | -13.25% |
| Laangcuo       | 49.20             | 53.09     | 7.91%   | 5.53                      | 4.92      | -11.14% |
| Longmucuo      | 67.52             | 39.30     | -41.80% | 2.7                       | 2.33      | -13.62% |
| Mangcuo        | 22.28             | 20.99     | -5.79%  | 0.18                      | 0.12      | -33.22% |
| Mapang Yongcuo | 79.45             | 90.97     | 14.51%  | 17.2                      | 22.38     | 30.14%  |
| Ngangla Ringco | 74.94             | 32.68     | -56.39% | 9.09                      | 8.31      | -8.56%  |
| Salt Lake      | 32.78             | 32.36     | -1.29%  | 2.76                      | 3.57      | 29.61%  |
| Siling Co      | 52.50             | 29.12     | -44.53% | 52.72                     | 38.36     | -27.23% |
| Taro Co        | 130.95            | 88.22     | -32.63% | 28.02                     | 20.1      | -28.27% |

**Table S3.** Mean absolute percentage error results used in the generation of **Fig. 9**.

| <b>Lake name</b> | <b>Mean absolute percentage error</b> |              |             |
|------------------|---------------------------------------|--------------|-------------|
|                  | <b>ALOS</b>                           | <b>MERIT</b> | <b>NASA</b> |
| Angzicuo         | 35.70%                                | 21.24%       | 22.13%      |
| Buruocuo         | 33.38%                                | 38.99%       | 58.52%      |
| Dongcuo          | 291.39%                               | 48.58%       | 136.51%     |
| Guomangcuo       | 33.09%                                | 29.30%       | 35.78%      |
| Laangcuo         | 31.75%                                | 36.15%       | 45.29%      |
| Longmucuo        | 32.22%                                | 32.62%       | 34.49%      |
| Mangcuo          | 79.14%                                | 61.31%       | 75.92%      |
| Mapang Yongcuo   | 90.01%                                | 87.99%       | 61.86%      |
| Ngangla Ringco   | 162.68%                               | 103.62%      | 98.15%      |
| Salt Lake        | 18.22%                                | 9.49%        | 11.61%      |
| Siling Co        | 44.36%                                | 22.28%       | 38.36%      |
| Taro Co          | 65.19%                                | 49.15%       | 52.92%      |