

# **WV03\_20220417\_1040010074793300\_1040010075 633C00**

Processed on: 2024-04-14 17:55:43

## **DEM Summary**

<b>Property</b>	<b>Value</b>
DEM File	20220417_2252_1040010074793300_1040010075633C00-DEM_1m.tif
Dimensions (px)	14603 x 13971
GSD (m)	1.00
CRS	EPSG:32604
Nodata (%)	18.0
Elevation Range (m)	-26.3 to 24.2
Reference DEM	/Users/ben/Dropbox/UW_Shean/COP/COP30_utqiagvik_lzw-adj_proj.tif

## Input Scenes

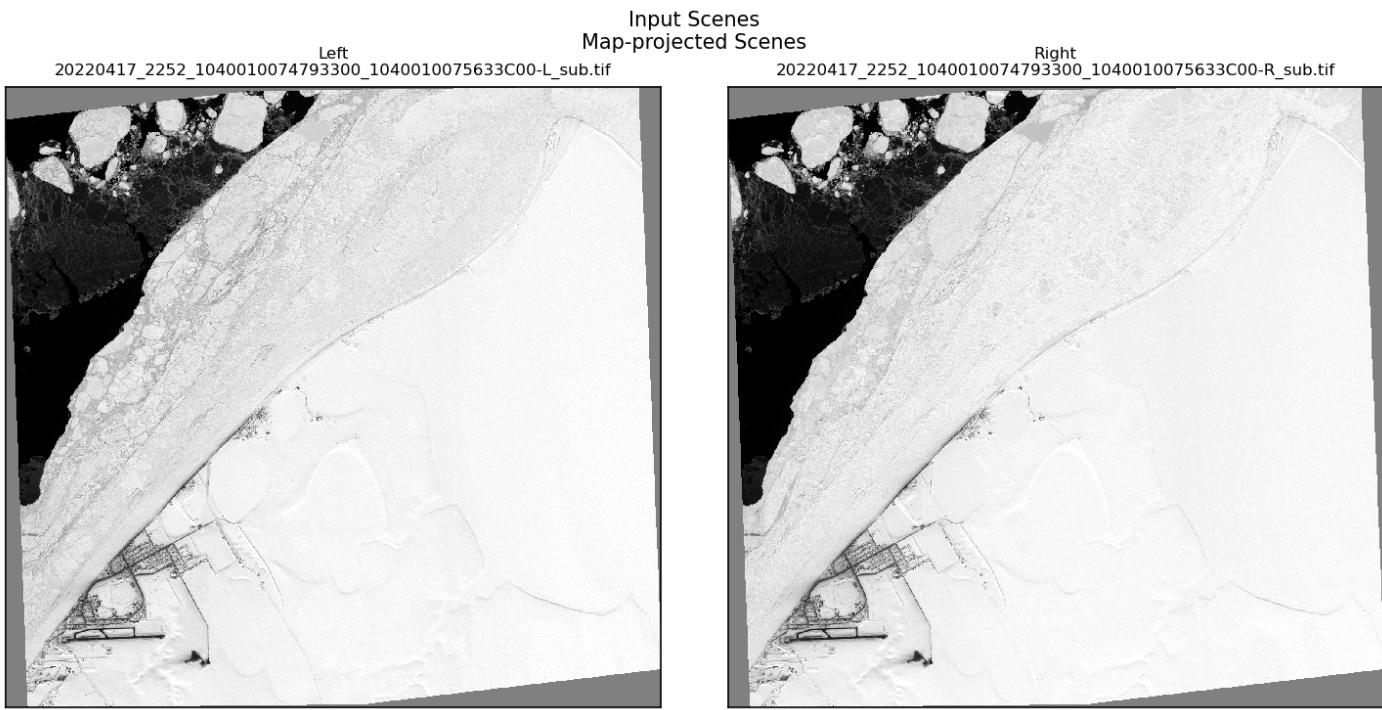


Figure 1: Left and right input scenes used for stereo processing.

## Stereo Geometry

WV03\_20220417\_1040010074793300\_1040010075633C00

Center datetime: 2022-04-17 22:52:18.495475

Time offset: 0:00:58.884600

Conv. angle: 38.57, B:H ratio: 0.70, BIE: 74.74, Assym Angle: 88.56, Int. area: 194.13 km<sup>2</sup>

ID:1040010075633C00, GSD:0.36, off:23.5, az:244.3, el:26.1, it:-19.1, ct:-14.0, scan:Forward, tdi:32

ID:1040010074793300, GSD:0.35, off:20.6, az:350.5, el:22.6, it:15.9, ct:13.3, scan:Forward, tdi:32

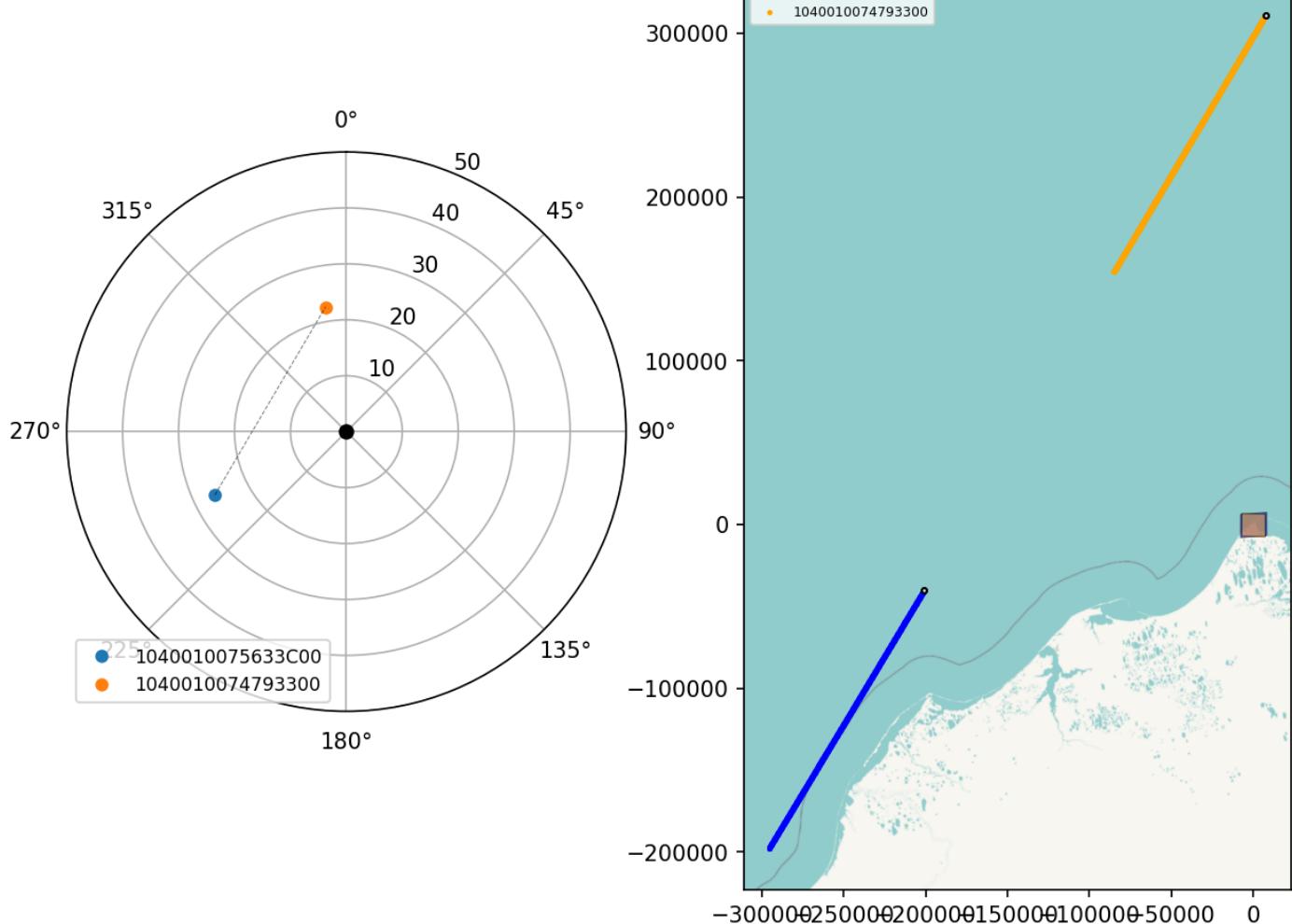


Figure 2: Stereo acquisition geometry skyplot and map view showing satellite viewing angles and scene footprints.

## Match Points

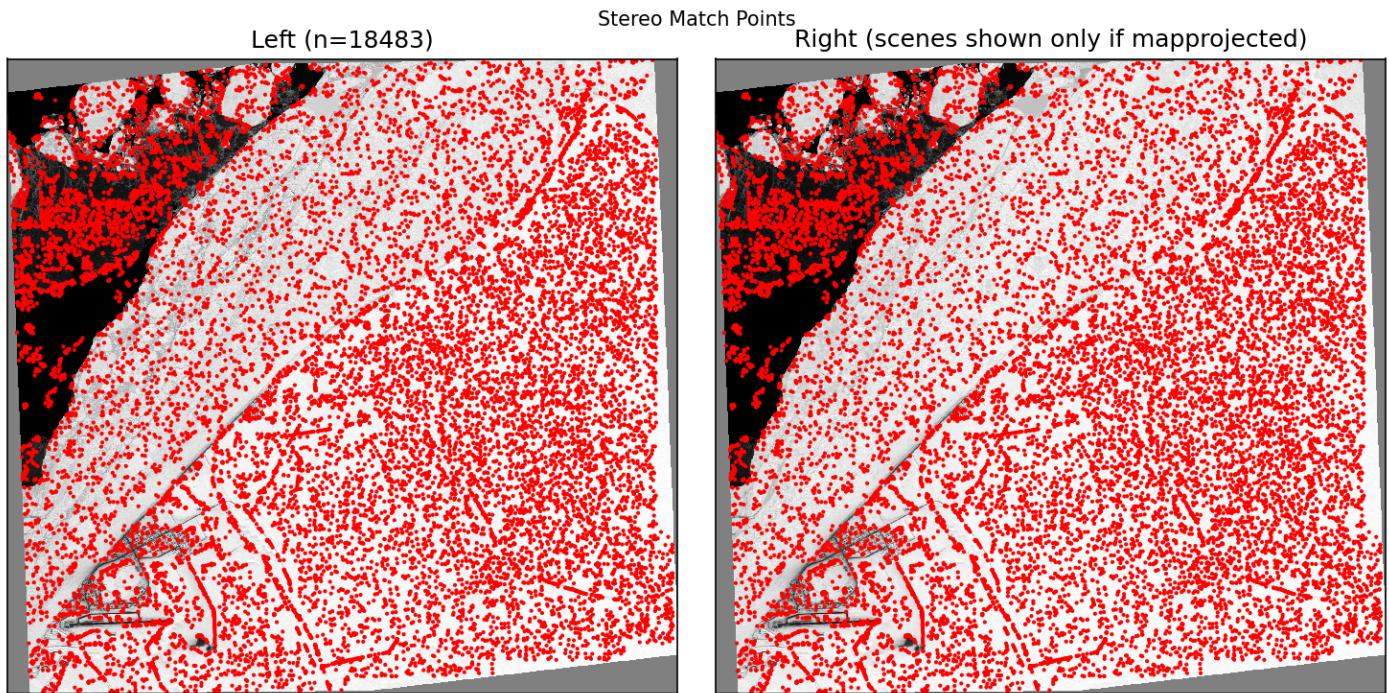
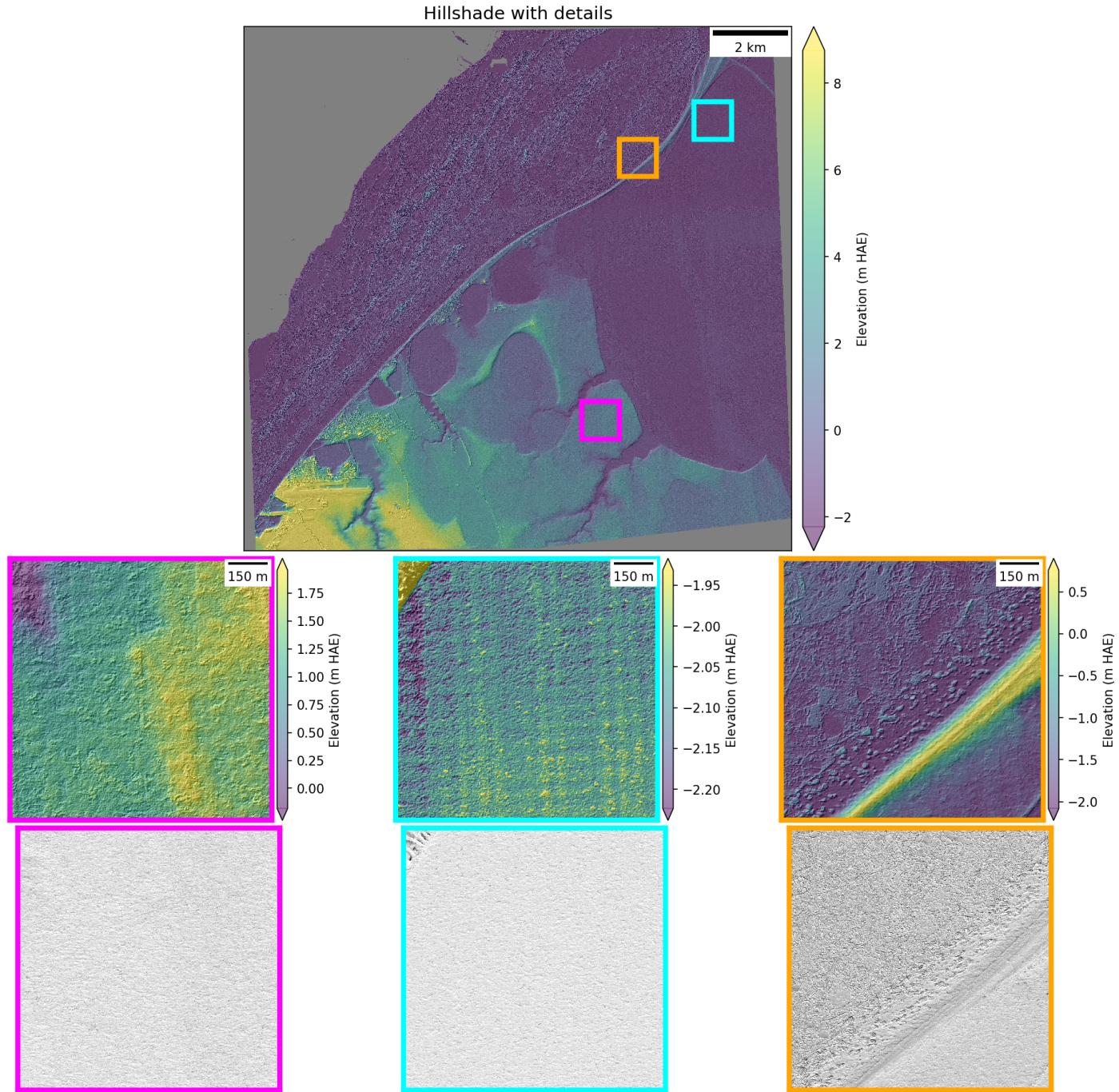


Figure 3: Interest point matches between left and right images identified during stereo correlation.

## Detailed Hillshade



*Figure 4: DEM hillshade with 1.0 km detail subset in second row. If available, corresponding mapprojected ortho image subsets are displayed in the bottom row.*

## DEM Results

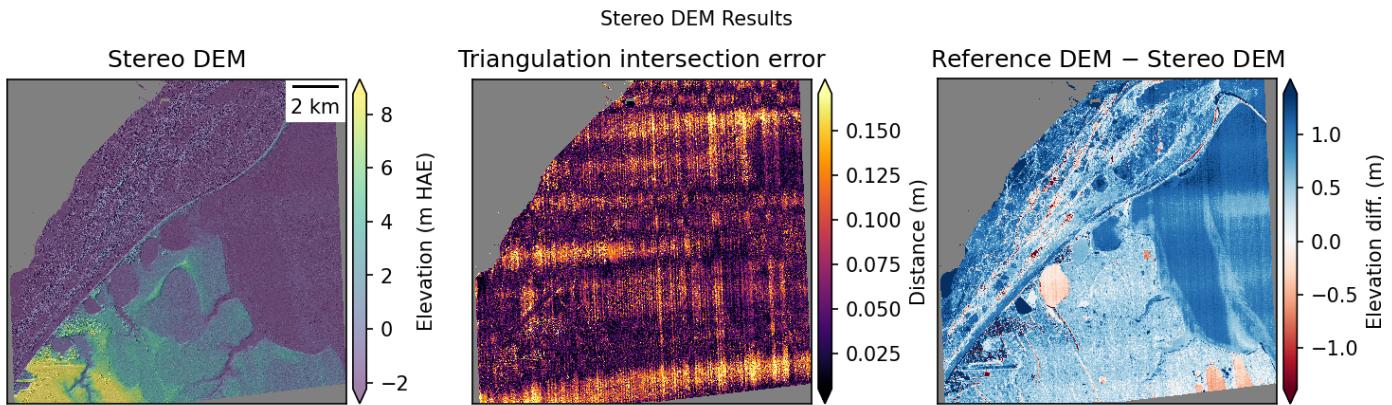


Figure 5: Output DEM with intersection error map and difference relative to the reference DEM used in processing.

## Disparity

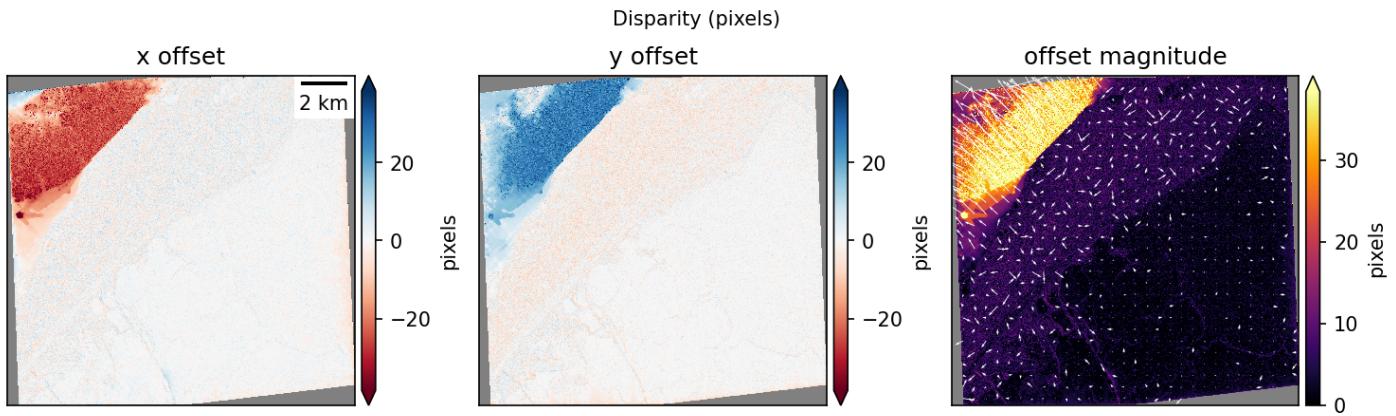


Figure 6: Horizontal and vertical disparity maps in pixels with quiver overlay.

## ICESat-2 ATL06-SR Map (All)

ICESat-2 ATL06-SR  
all (n=32234)

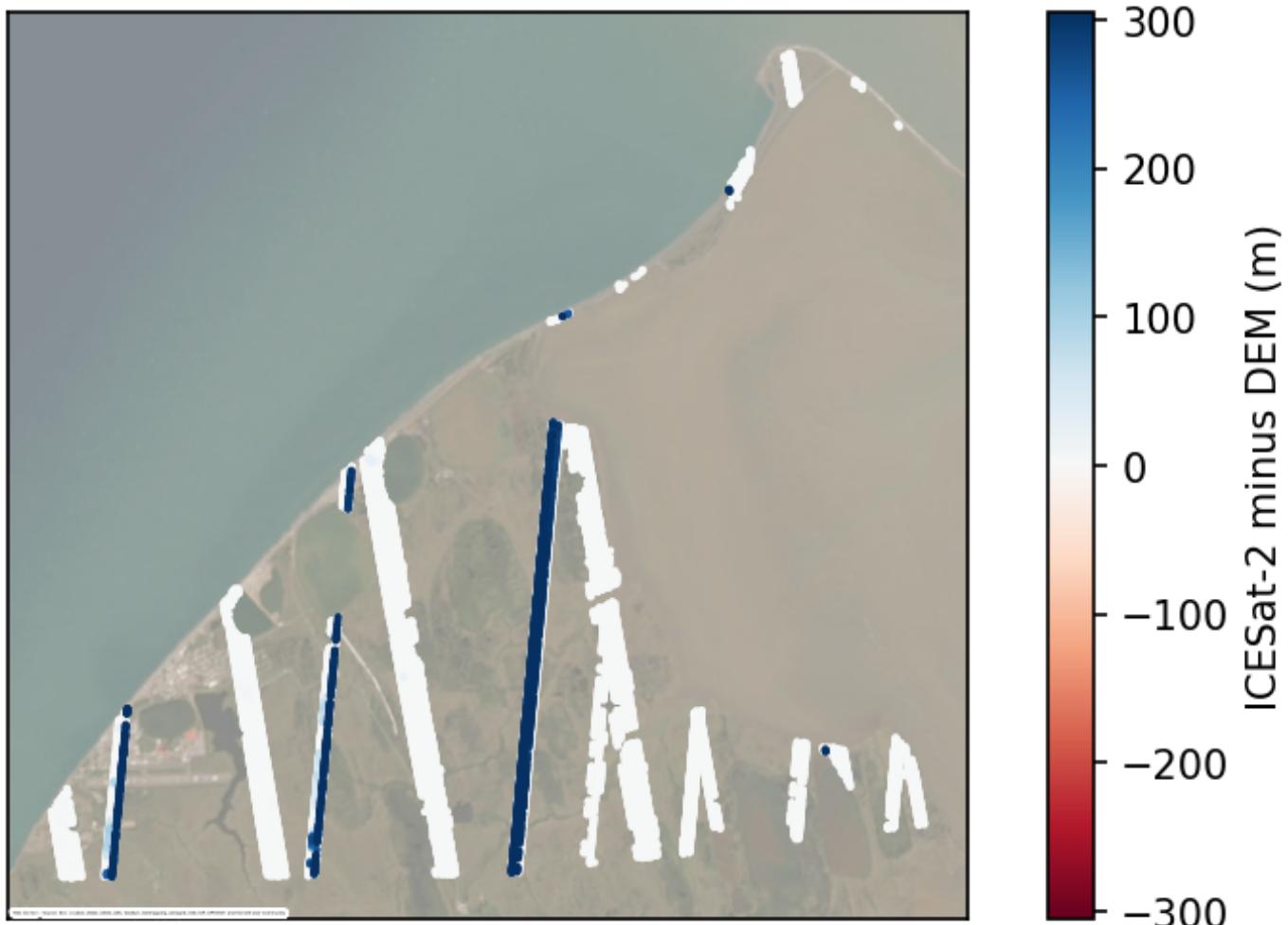


Figure 7: ICESat-2 ATL06-SR elevation differences (all processing levels) vs. ASP DEM.

## ICESat-2 ATL06-SR Histogram (All)

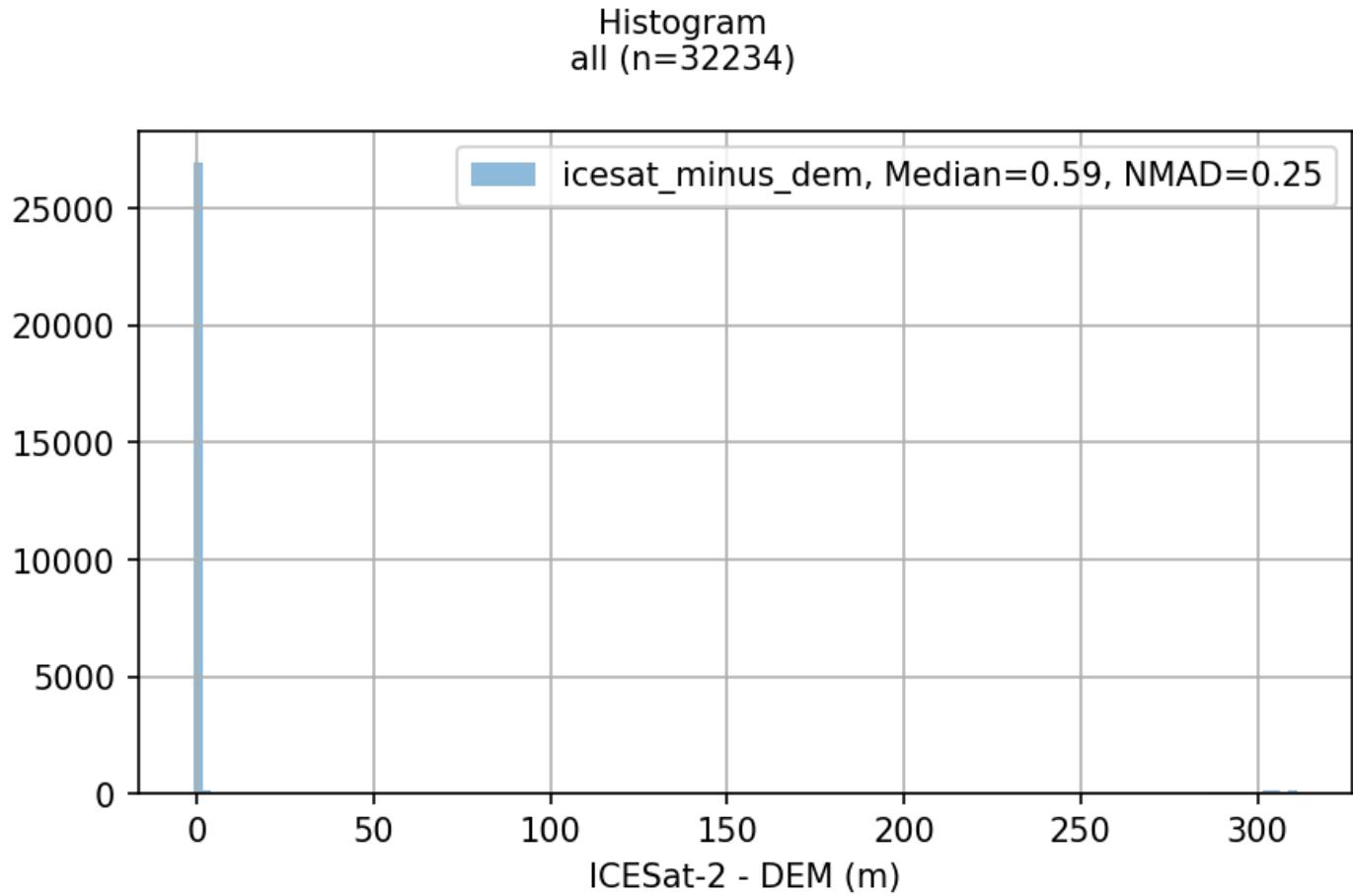


Figure 8: Distribution of elevation differences between ICESat-2 ATL06-SR (all) and ASP DEM.

## ICESat-2 ATL06-SR Map (Ground, Seasonal)

ICESat-2 ATL06-SR  
ground\_seasonal (n=8909)

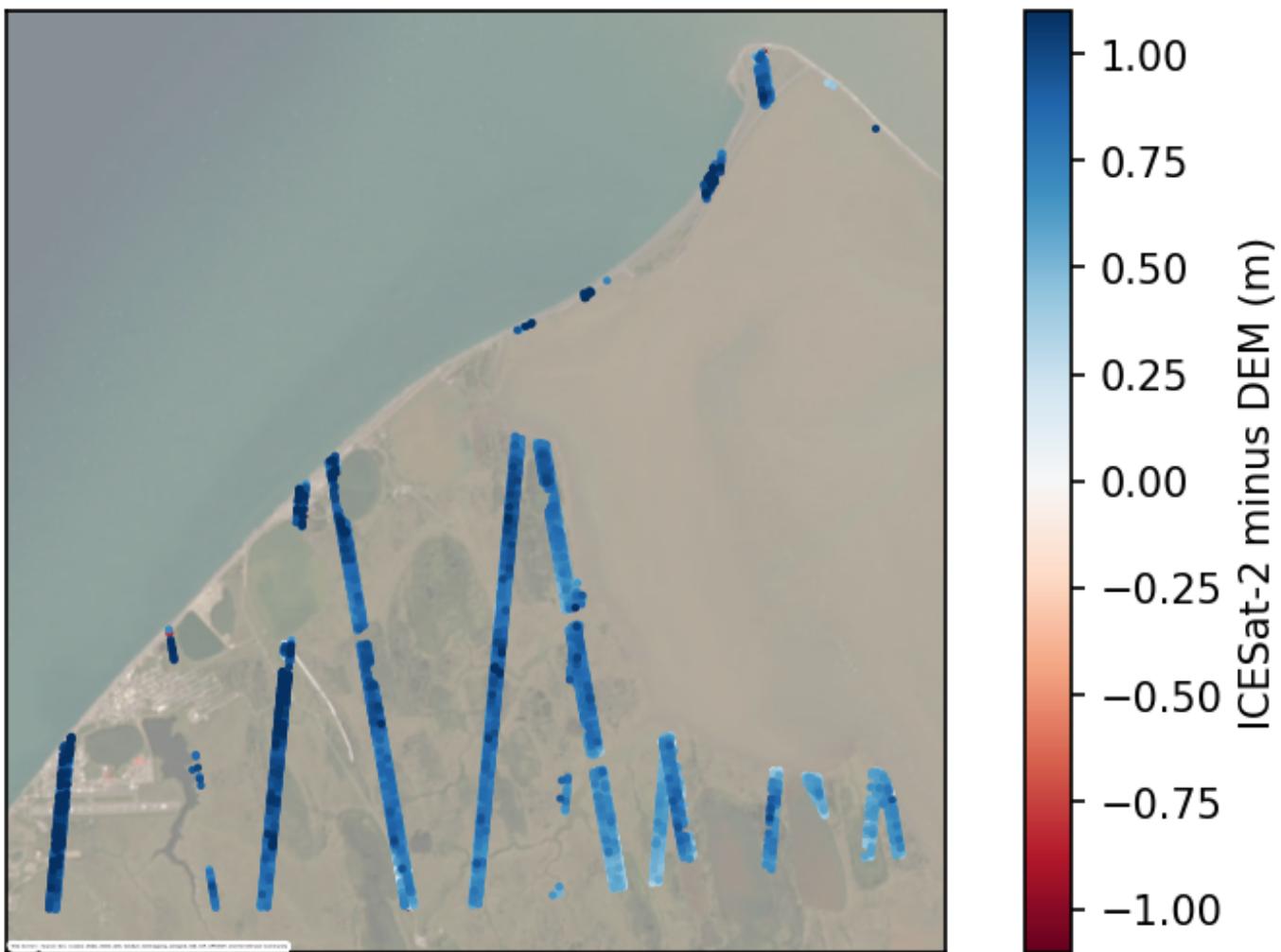


Figure 9: ICESat-2 ATL06-SR elevation differences (ground, seasonally filtered) vs. ASP DEM.

## ICESat-2 ATL06-SR Histogram (Ground, Seasonal)

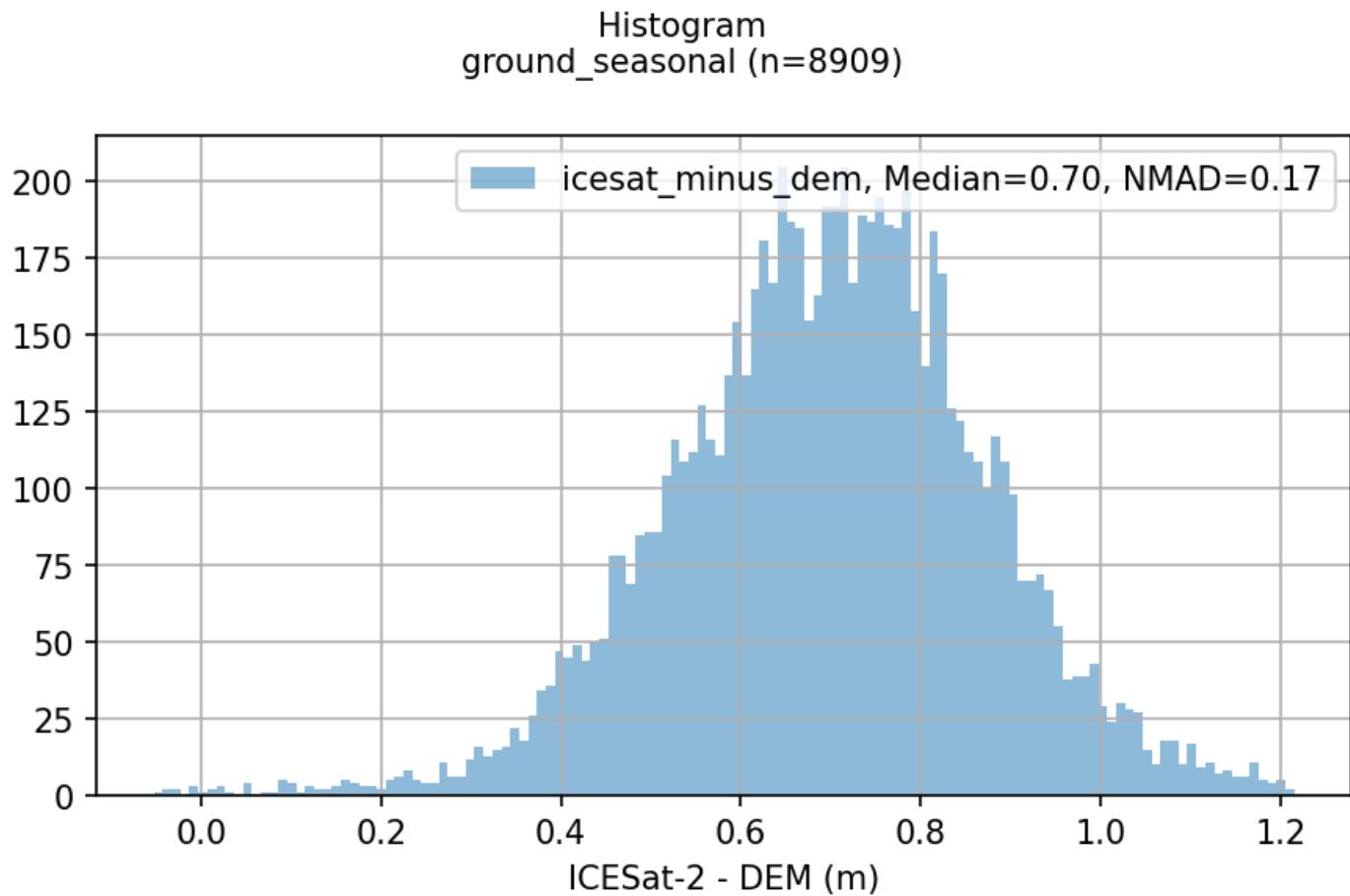


Figure 10: Distribution of elevation differences between ICESat-2 ATL06-SR (ground, seasonal) and ASP DEM.

## Bundle Adjust Residuals (Log Scale)

Bundle Adjust Initial and Final Residuals (Log Scale)

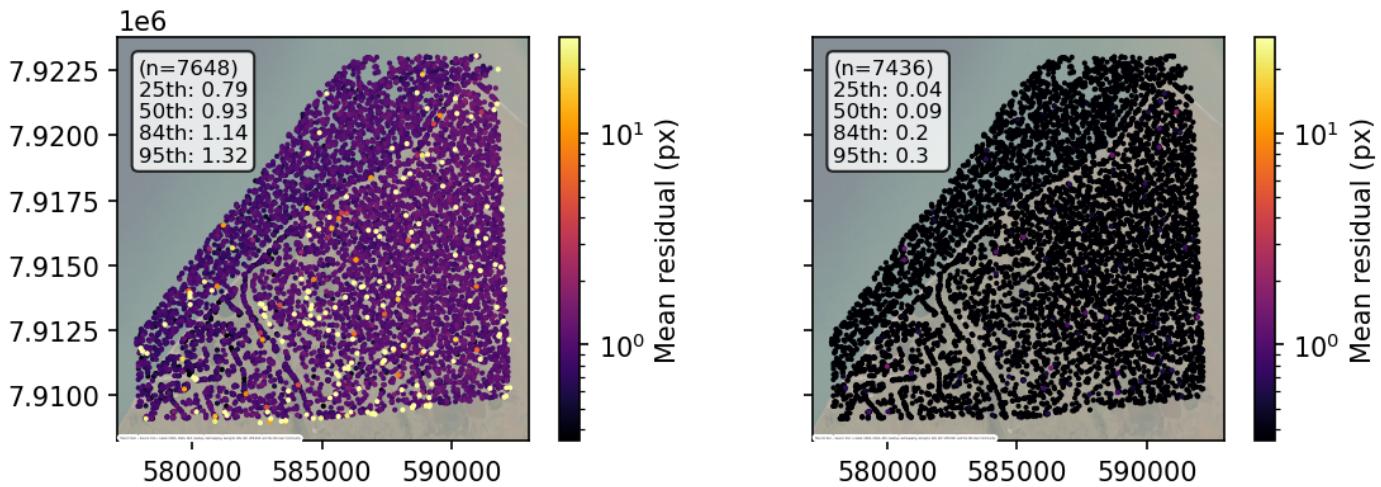


Figure 11: Initial and final bundle adjustment residuals on a logarithmic scale.

## Bundle Adjust Residuals (Linear Scale)

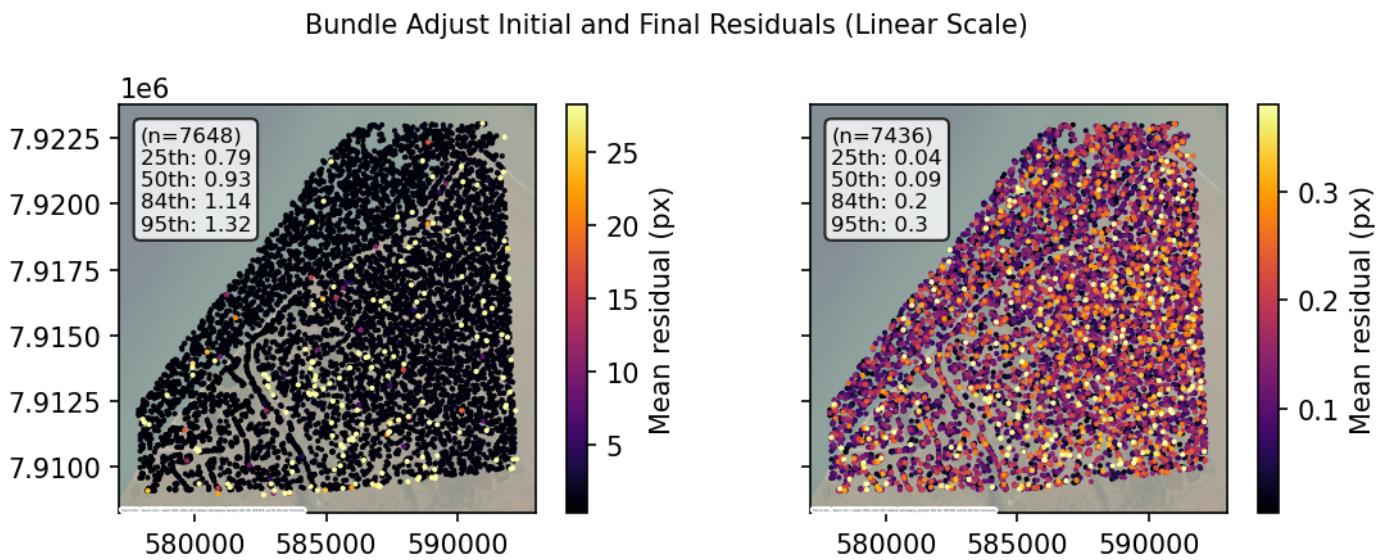


Figure 12: Initial and final bundle adjustment residuals on a linear scale.

## Map-Projected Residuals

Bundle Adjust Midpoint distance between  
final interest points projected onto reference DEM

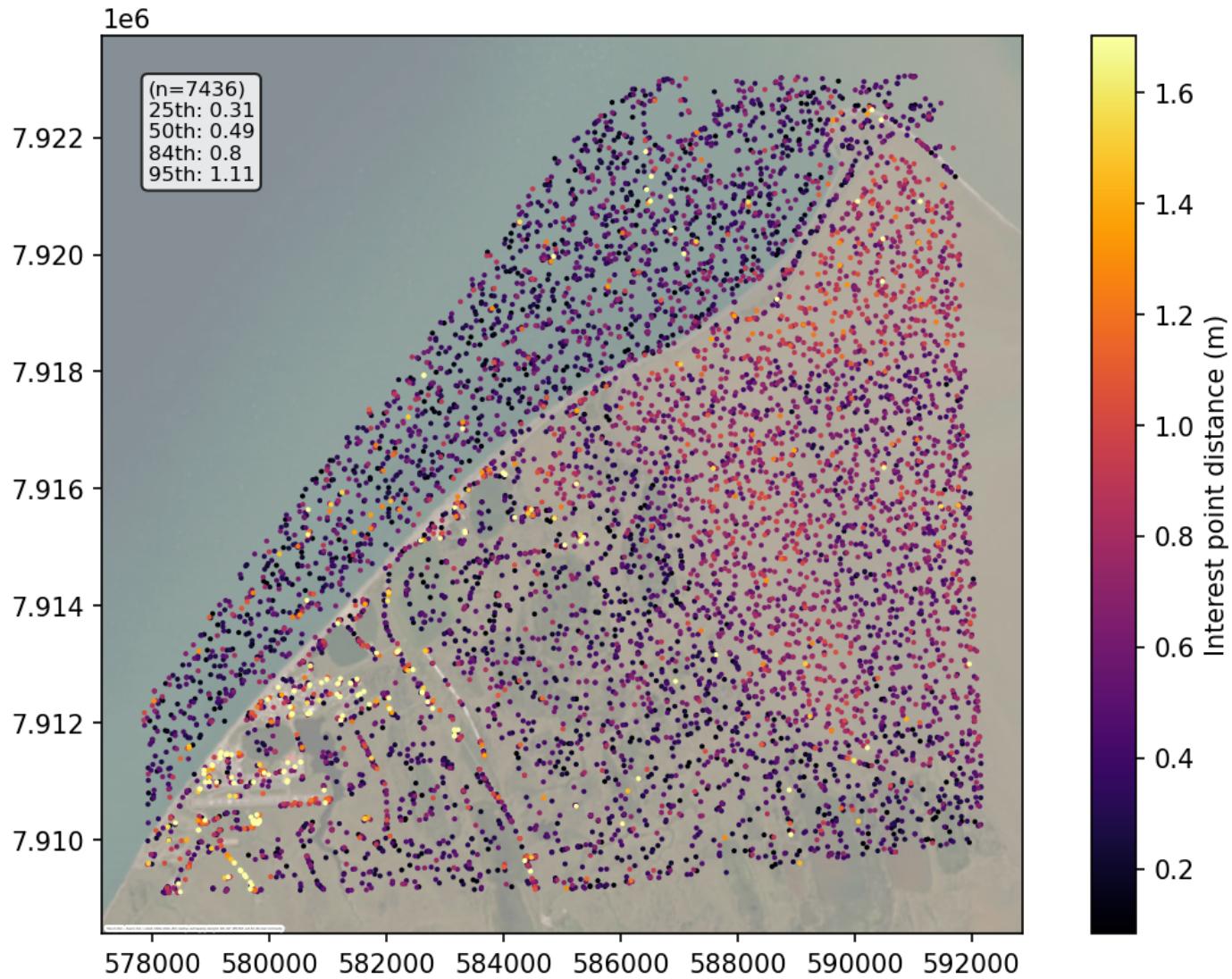


Figure 13: Midpoint distance between final interest points projected onto the reference DEM used in processing.

## Geodiff vs. Reference DEM

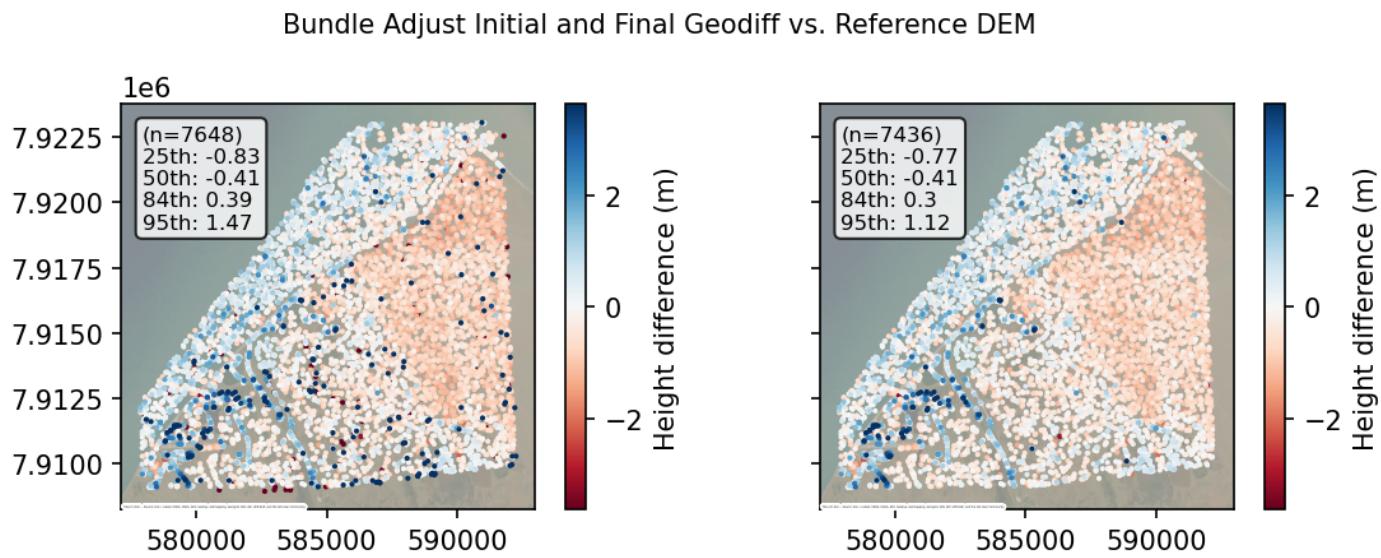


Figure 14: Initial and final geodiff height differences compared to the reference DEM used in processing.

# Processing Parameters

## Runtime Summary

Step	Runtime
Bundle Adjust	0 hours and 7 minutes
Stereo	3 hours and 41 minutes
point2dem	0 hours and 26 minutes

## Reference DEM:

/Users/ben/Dropbox/UW\_Shean/COP/COP30\_utqiagvik\_lzw-adj\_proj.tif

## Bundle Adjust Command:

```
bundle_adjust -t dg --weight-image
/nobackup/bpurint1/data/utqiagvik/WV/utqiagvik_wv_EE/2022/utqiagvik_10m_UTM4N_seaice_mask_0and1.tif --datum WGS84
--individually-normalize --normalize-ip-tiles --ip-per-tile 50 --matches-per-tile 10 --min-triangulation-angle 10
--mapproj-dem /Users/ben/Dropbox/UW_Shean/COP/COP30_utqiagvik_lzw-adj_proj.tif --propagate-errors --tri-weight 0.1
--tri-robust-threshold 0.1 --camera-weight 0 1040010074793300.r100.tif 1040010075633C00.r100.tif
1040010074793300.r100.xml 1040010075633C00.r100.xml -o ba/ba_50ips_10matches_dg_weight_image --threads 28
```

## Stereo Command:

```
stereo --stereo-algorithm asp_mgm --corr-kernel 7 7 --subpixel-kernel 15 15 --cost-mode 4 --subpixel-mode 9 --corr-max-levels 5 --filter-mode 1 --erode-max-size 0 --individually-normalize --corr-memory-limit-mb 5000 --sgm-collar-size 256
--corr-tile-size 1024 --alignment-method none --corr-seed-mode 1 --compute-point-cloud-center-only --threads 24
1040010074793300_ortho_0.35m.tif 1040010075633C00_ortho_0.35m.tif
ba/ba_50ips_10matches_dg_weight_image-1040010074793300.r100.adjusted_state.json
ba/ba_50ips_10matches_dg_weight_image-1040010075633C00.r100.adjusted_state.json stereo_ba_50ips_10matches_dg_weight_image
e_ortho_0.35m_mode_asp_mgm_spm_9_corr_7_rfne_15_cost_4_refdem_COP30/20220417_2252_1040010074793300_1040010075633C00
/Users/ben/Dropbox/UW_Shean/COP/COP30_utqiagvik_lzw-adj_proj.tif
```

## point2dem Command:

```
point2dem --nodata-value -9999 --t_srs EPSG:32604 --threads 24 --propagate-errors --remove-outliers --remove-outliers-params 75.0 3.0 --errorimage --tr 1 -o stereo_ba_50ips_10matches_dg_weight_image_ortho_0.35m_mode_asp_mgm_spm_9_corr_7_
rfne_15_cost_4_refdem_COP30/20220417_2252_1040010074793300_1040010075633C00_1m stereo_ba_50ips_10matches_dg_weight_image
_ortho_0.35m_mode_asp_mgm_spm_9_corr_7_rfne_15_cost_4_refdem_COP30/20220417_2252_1040010074793300_1040010075633C00-
PC.tif
```