

Guide: Requesting New DEMs

URL: <https://www.pgc.umn.edu/guides/stereo-derived-elevation-models/requesting-new-dems/>

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Detailed workflow for searching for stereo satellite imagery and requesting a custom-created DEM from PGC.

Eligibility

PGC core users are eligible to request new, PGC-created DEMs from Maxar imagery for their research projects.

To receive PGC support for creating new stereo-derived elevation models, all users must be either:

1. Participate on an active research award in the United States through the NSF Office of Polar Program.
2. Working to support a federal mission or initiative in the polar regions in affiliation with the NSF Office of Polar Programs.

Requests to the PGC

DEM extraction is computationally expensive, regardless of the algorithm.

Running a single strip to 2 meter resolution can take more than 48 hours on PGC's compute cluster. If PGC has not yet derived DEMs for your area of interest, please keep requests to a reasonable size.

Turnaround time for requests of 8-10 strips will be minimally a week. Requests of 30-40 DEMs can take a month or more.

Larger requests cannot be supported on our limited compute infrastructure. However, PGC is happy to collaborate with projects having external compute resources, such as an NSF XSEDE award.

If PGC has already derived DEMs for your area of interest, there is no limit on the number of strips you may request.

Additionally, if your project does not require 2 meter resolution, PGC, can accommodate a higher volume of lower-resolution DEM extraction tasks (e.g. 8 meters).

DEM Processing

In addition to user and project funding information, PGC requires the following information with a new DEM creation request.

Output Projection

PGC uses the following projections in polar regions. All standard projections, however, are supported.

Keep in mind that no map projection is perfect and that there will always be some level of distortion.

Read more about map projections.

EPSG Code	Name	Area of Use	Vertical Datum
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3031	Antarctic Polar Stereographic	Antarctica	WGS84
3413	NSIDC Sea Ice Polar Stereographic North	Greenland	WGS84
3338	Alaska Albers Equal Area Conic	Alaska	NAD83
Varies	UTM Zones 3-21 N	Alaska and Canada	NAD83
Varies	UTM zones 1-59 N/S	Worldwide	WGS84

Output Resolution

Default: 2 meter

Because DEM extraction is compute-intensive, PGC can accommodate a larger request if they have a lower target resolution.

Keep in mind also that full resolution DEMs also require more disk storage and management.

DEM Extraction Algorithm

Default: Ames Stereo Pipeline (ASP)

PGC offers DEM extraction with both ASP and SETSM. Given that SETSM is still in active development, PGC will default to ASP unless the user specifies otherwise.

The resulting DEM strips are provided with limited post processing. Regions where the elevation extraction algorithm failed due to poor image matching (e.g. cloud cover, overexposure, low contrast) may show no data gaps or erroneous data.

Additionally, the DEM extraction techniques have up to a 4-meter horizontal and vertical bias. Except in the case of ArcticDEM or REMA products, no co-registration with reference elevation has been performed.

PGC can create a DEM mosaic for a limited number of source DEM strips. The strips are co-registered and the edges are blended to remove large elevation discontinuities between source DEMs.

If adequate reference elevation data exist in the region of interest, the final mosaic may also be registered to ground control points, reducing the absolute error to a sub-meter level.

DEM Delivery

Like optical imagery delivery, PGC will generally deliver via FTP or a hard drive.

FTP is used for deliveries under 200 GB or when requested by the user. Requests that are too large for effective network transfer are delivered on a hard drive supplied by the user. PGC will cover return shipping cost.

DEM deliveries are accompanied by a shapefile index showing the DEM extents and a set of documents with info and frequently asked questions.

Summary

In this Guide, we've covered:

- Funding required for PGC to create custom DEMs
- Constraints with DEM processing time
- DEM generation outputs and defaults
- DEM delivery via FTP or hard drive