

# Documentation for the digital terrain model and orthophoto from Zackenberg

*The products described in the following document are available for research use and can be downloaded or requested at the homepage:*

[http://www.dmu.dk/1\\_Om\\_DMU/2\\_afdelinger/3\\_am/4\\_Expertise/5\\_Research/6\\_Climatechange/HyperZack\\_data.asp](http://www.dmu.dk/1_Om_DMU/2_afdelinger/3_am/4_Expertise/5_Research/6_Climatechange/HyperZack_data.asp)

*All use of data should acknowledge: Danish National Environmental Research Institute, dep. for Arctic Environment, Institute of Geography at University of Copenhagen and Danish Research Academy.*

## Data

### Aerial photos

The digital terrain model and orthophotos are based on the aerial imagery that was acquired on 7. august 2000 during the hyperspectral campaign in NE-Greenland. A Zeiss-RMK A 15/23 aerial camera was used for the recording of the images and was set up with the following specifications:

- Zeiss AS 2 suspension mount, remotely controlled drift and pitch compensation
- Lens type: Pleogon A
- Focal length: 153 mm
- Aperture: f/4,0 to f/11
- Angular field: 93° diagonal, 74° lateral
- Nom. distortion: 2 micrometer
- Shutter speeds: 1/100 s to 1/1000 s cont.
- Number of fiducial marks: 4
- Frame size: 230 mm x 230 mm
- Minimum exposure cycle time: 2 s
- Film magazine: type Zeiss CC 24, forward motion compensation.

Calibration report and other RMK mission documents are available by request at NERI ([mpt@dmu.dk](mailto:mpt@dmu.dk)).

A total of 323 photos was shot during the campaign over Zackenberg and scanned in 14 micron resolution for use in the aerotriangulation.

### Ground control points

GCP's were collected throughout the Zackenberg Valley with a hand-held GPS unit. The error of each position is estimated to be within +/- 10 metres. A total of 20 points of this type was collected.

A fixpoints in Zackenberg is placed and measured by the Danish Survey and Cadastre (KMS) and the ZERO station mapped. This mapping has also been used as high precision GCP's for the digital terrain model.

## **Aerotriangulation**

The aerotriangulation was carried out by Kampsax, a Danish company with expertise in aerial photography and mapping. The process was performed and controlled by the software BINGO-F produced by GIP mbH of Aalen, Germany. The software delivers a report on the smoothing during the aerotriangulation. This report can be requested from NERI.

Overall accuracy based on object and control points indicates an accuracy around 3-5 meters in both X, Y and Z. It should however be stressed that the number of control points were limited and larger errors therefore may occur throughout the model.

## **Digital Terrain Model**

Two DTM's were made from the aerotriangulation: a 4 m resolution and a 2 m resolution. The DTM were edited and initial errors removed before release of the DTM. The original DTM's were delivered as ASCII-grid files for ArcInfo and covered all models used.

The ASCII grid was imported into ENVI-format and cut to the following area (UTM 27, WGS84):

	UTM-X	UTM-Y
Upper left:	506581	8273752
Lower right:	524283	8259350

that covers 260 km<sup>2</sup> of Zackenberg Valley and the surrounding hillsides.

## **Orthophoto**

The scanned aerial photos are geocorrected after the digital terrain model and the resulting orthophotos made available as:

- Separate geocoded tiff-files named xxx\_yyyy  
(where xxx is the UTM easting coordinate/1000 and yyyy the corresponding northing)
- ECW-mosaic covering the entire area of the digital terrain model

The orthophotos are in a 20 cm resolution and stretching is performed on each photo in order for the borders to be as invisible as possible. Software patches for reading the ECW-format can be downloaded from <http://www.ermapper.com>.