



ARK-XXII/1 processing log **Navigation data**

a) Original data

The navigation data was extracted from the DSHIP data base PODAS on board of R/V "Polarstern". The original data is held on magnetic tapes as a backup of the DSHIP database. The data set contains 114 data files (57 with 1-second-interval data, 57 with 10-second-interval data), each with the navigation of one day.

The Raw data are:

- GPS position from TRIMBLE MS750 GPS
- Speed from MINS ringlaser gyro
- Heading from MINS ringlaser gyro
- Depth from multibeam sonar system Atlas Hydrosweep DS2

b) Processing

I. Processing steps:

1. Extraction of source data from DSHIP data base
2. Centering of the position of the GPS Antenna to the ships reference point
3. Automatic filtering of erroneous positions by comparing the positions of the two GPS Antennas
4. Visual control and editing of navigation data

II. Processed data:

Result of the processing is the verified navigation, held in ASCII table (tab delimited) with the following format:

- Column 1: Latitude [decimal degree]
- Column 2: Longitude [decimal degree]
- Column 3: Date [Format: DD.MM.YYYY HH:MM:SS]
- Column 4: Flag
- Column 5: Speed [knots]
- Column 6: Heading [degree]
- Column 7: Depth [metres]

The flag string consists of four digits with the following meaning:

Digit 1:

- [0]: No position available
- [1]: Position based on sensor TRIMBLE 1
- [2]: Position based on sensor TRIMBLE 2

Digit 2:

- [0]: Position is not pitch corrected
- [1]: Position is pitch corrected

Digit 3:

- [0]: Position is not roll corrected
- [1]: Position is roll corrected

Digit 4:

- [0]: Centering is based on heading from GPS data (less accurate)
- [1]: Centering is based on heading from Motion-Reference-Unit

III. Statistic

Data volume 1-second-interval data:	308 MB
Data volume 10-second-interval data:	31 MB
First data:	29.05.2007 12:00:00
Last data:	25.07.2007 07:20:00
Total number of positions after processing:	4691732
Total number of TRIMBLE 2 positions (Digit 1 = 2):	8632 (0.18 percent)
Total number of positions without pitch correction:	7775 (0.17 percent)



Total number of positions without roll correction:

7775 (0.17 percent)

Total number of positions with GPS heading correction:

7775 (0.17 percent)

Total number of invalid GPS data

0 (0 percent)



ARK-XXII/1 processing log **Multibeam echosounder data**

a) Original data

The original data is held on hard drive on the data recording computer on board of R/V "Polarstern". The data was recorded using the Atlas Hydromap Online software, the time period of each raw data file depends on water depth and varies between 0.5 h and 10 h.

Data from the following sensors are included in the multibeam raw data:

Bathymetry data: Atlas Hydrosweep DS-2
Position (GGA): Trimble MS750 GPS
Heading: MINS ringlaser gyro
Speed: MINS ringlaser gyro
Heave: TSS HS-50 heave sensor
Pitch/Roll: MINS ringlaser gyro
Sound velocity water column: CTD profile or automatic cross-fan calibration
Sound velocity at transducer: sound velocity sensor

The data set contains 146 raw data files of the sonar system Atlas Hydrosweep DS-2 (approx. 3.6 GB), a total time period of approx. 814 hours and a total track length of approx. 12900 nm. Compressing the data reduces the data volume approx. to one third of the size. Several data gaps are caused by echosounder shutdowns during acoustic underwater positioning work with the Posidonia USBL system (e. g. for ROV dives or gravity cores) and stationary work, while the ship is not moving or turning for hours.

b) Processing

The data set contains unprocessed raw data.

c) Data visualization

The GMT (Generic Mapping Tool) program version 4.1.4 was used to automatically create maps of the multibeam data. The multibeam data was not arranged to sets but every single data file was mapped separately. The format of the maps is PNG (Portable Network Graphic) format, see one example in Fig. 1. For naming the maps the same name as the raw data was used but with a different file name extension. The map was created out of blunder eliminated data to get a better overview of the bathymetry, not disturbed by rude erroneous data.

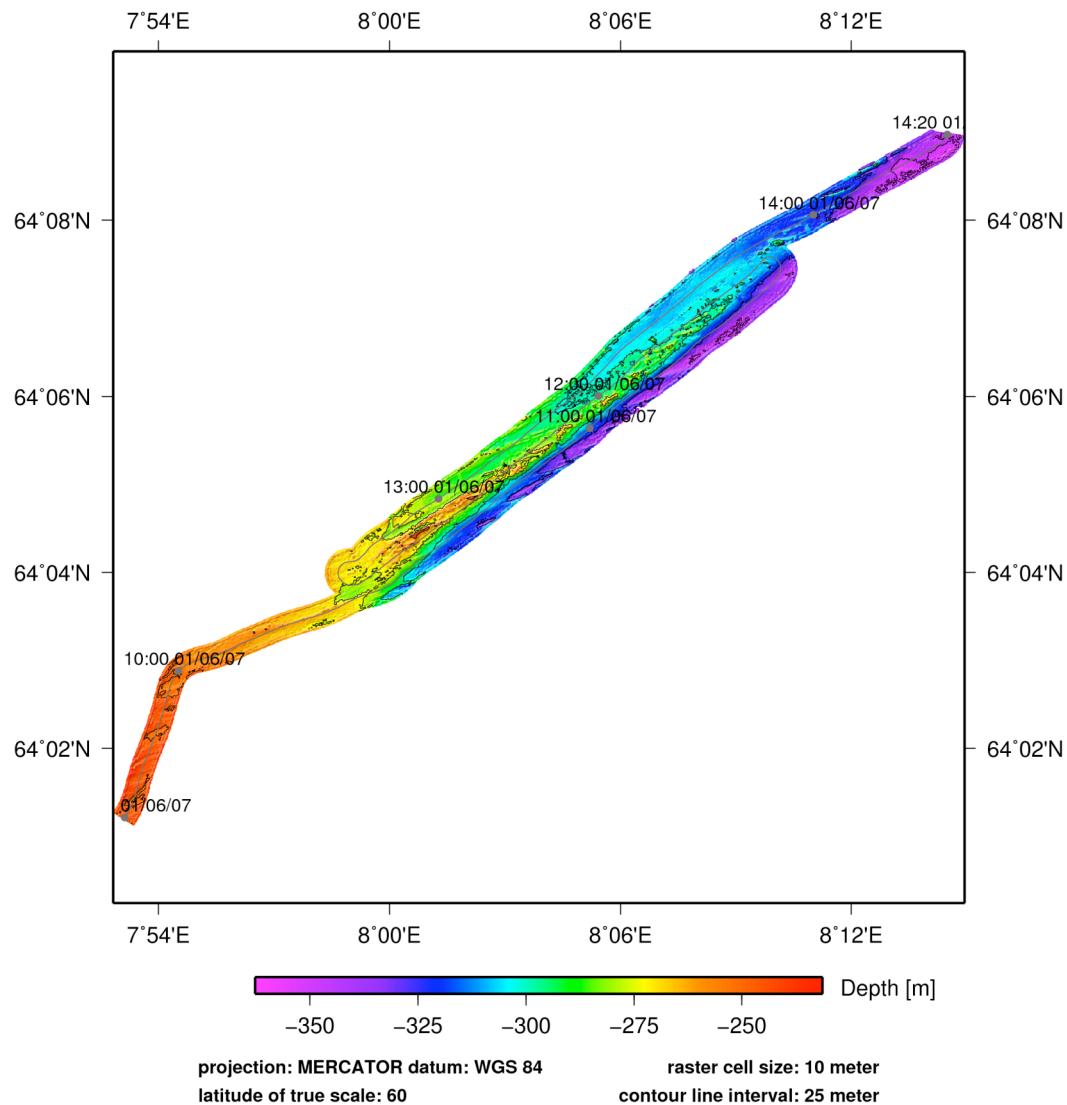


Swath Sonar Bathymetry Map – Cruise ARK–XXII/1 –

Alfred Wegener Institute for Polar and Marine Research (Bremerhaven, Germany) in 08/2007

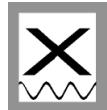
data sources

survey platform: **R. V. POLARSTERN**
sonar system: **Atlas Hydrographics Hydrosweep DS2**
data set name: **152_ark22-1_60F30706010940.xyz**
data set info: **length: 25.3 nm, time: 4.7 h, speed: 5.4 kn**



This map was automatically generated using the generic mapping tool GMT
Be aware that the shown data set may contain outliers and navigation errors

Figure 1: Example of a map of a multibeam raw data file.



ARK-XXII/1 processing log ***Sediment echosounder data (Atlas Parasound)***

a) Original data

The original Atlas Parasound data (ASD-files) was held on LTO tape. Only the SLF (secondary low frequency) data was used for processing.

b) Navigation

The file headers of Atlas Parasound PS3-files contain the original navigation recorded at expedition time. No further processing was made. The data source of the navigation data is the TRIMBLE MS750 GPS system (position) and the MINS ringlaser gyro (speed, heading).

c) Processing

Using the software Atlas Parastore the original ASD-files were converted to the formats PS3 and SGY. The PS3- and SGY-files were assigned to five individual surveys and sorted to accordant directories. The PS3- and SGY-files are published as TAR archives of each survey.

d) Data visualization with SeNT

The SeNT (Se suite for Windows NT) program (Universität Bremen, Hanno Keil) was used to create plots of the Parasound data in PS3-Format. The SeNT program executable version used is 2.02 of 21/09/2005.

The Atlas Parasound data of each profile was plotted by distance. These plots were saved as GIF image files. If a track profile is too long the plot is divided into several GIF files.