

Yellowstone Lake magnetic dataset

Content of this archive

Trackline data are provided both in longitude and latitude (WGS4) and in UTM12N WGS84 whereas grid coordinates are provided in UTM12N WGS84. Time is provided in UTC. Magnetic anomalies were computed from magnetic field intensity after correcting for diurnal variations using the average of recordings at the NEWPORT and BOULDER observatory (www.intermagnet.org) and for the International Geomagnetic Reference Field (IGRF) magnetic field intensity (Thébault et al., 2015). Trackline data are provided in ascii format (CSV) while grids are both provided in GMT-compatible netCDF grid (GRD) and in uncompressed Geosoft Grid eXchange Format (GXF), a standard ascii format for exchanging gridded data among different software systems (description of the format is available at <http://www.geosoft.com>).

A detailed description of the data processing is provided in the following reference:

Bouligand, C., M. A. Tivey, C. A. Finn, L. A. Morgan, W. C. P. Shanks III, R. A. Sohn. Geological and thermal control of the hydrothermal system in northern Yellowstone Lake: inferences from high resolution magnetic surveys, submitted to *Journal of Geophysical Research*.

Lake surface data

- **Trackline data** (lake_surface_trackline_data.csv): longitude, latitude, x (m), y(m), elevation MSL(m), raw magnetic field intensity (nT), magnetic anomaly (nT).
- **Grids** (draped over topography and lake surface, grid spacing of 25 m)
 - **Magnetic anomaly** (merged_anomaly_grid_25m.grd/gxf)
 - **Grid elevation MSL** (merged_anomaly_grid_25m_elev.grd/gxf)

Autonomous Underwater Vehicle (AUV) data

▪ Raw trackline data

- YL16A03_YL16A06_pkcoeffs_cor.dat
- YL16A04_YL16A06_pkcoeffs_cor.dat
- YL16A05_YL16A06_pkcoeffs_cor.dat
- YL16A06_pkcoeffs_cor.dat

- **Processed trackline data.** In addition to computation of magnetic anomaly, the process included masking of maneuvers and of jumps in the data, correction of a heading effect and separation of data acquired at a 15-m height from a 7-m height. Data provided in these files are: longitude, latitude, x (m), y(m), depth(m), height above lake floor (m), magnetic anomaly (nT).

- **Data acquired at ~15 m height above lake floor** (auv_trackline_data_h15m.csv)
- **data acquired at ~7 m height above lake floor over Deep Hole vent site** (auv_trackline_data_h7m.csv)

- **Grids from data acquired at ~15 m height above lake floor** (grid spacing of 50 m)

- **Magnetic anomaly** (auv_anomaly_grid_h15m_50m.grd/gxf)
- **Data depth** (auv_anomaly_grid_h15m_50m_depth.grd/gxf)
- **Data height above lake floor** (auv_anomaly_grid_h15m_50m_height.grd/gxf)

- **Grids from data acquired at ~7 m height above lake floor over the Deep Hole vent site** (grid spacing of 10 m, the grid was obtained from data acquired at a 7m complemented from the 15 m grid downward continued to a 7 m height in areas outside the 7 m survey area)

- **Magnetic anomaly** (auv_anomaly_grid_h7m_10m.grd/gxf)
- **Data depth** (auv_anomaly_grid_h7m_10m_depth.grd/gxf)
- **Data height above lake floor** (auv_anomaly_grid_h7m_10m_height.grd/gxf)

References

Thébault, E., Finlay, C. C., Beggan, C. D., Alken, P., Aubert, J., Barrois, O., ... & Canet, E. (2015). International geomagnetic reference field: the 12th generation. *Earth, Planets and Space*, 67(1), 79.

FILELIST

YL16A03_YL16A06_pkcoeffs_cor.dat
YL16A04_YL16A06_pkcoeffs_cor.dat
YL16A05_YL16A06_pkcoeffs_cor.dat
YL16A06_pkcoeffs_cor.dat
auv_anomaly_grid_h15m_50m.grd
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