

Navigation, gravity, bathymetry and magnetic data collected in 82 cruises of Hakurei-maru, which were carried out from 1974 to 1999. Three kinds of data files sorted by cruises are contained in three separate folders. Please refer Table 1 for cruise names.

1) Master data files with an extension wnav in wnav\_files data folder

Each file contains navigation data corrected and transformed to WGS84 world geodetic system and gravity, magnetic and water depth observed values. Water depth values are based on an assumed sounding velocity of 1500 m/s. Gravity readings have a time delay of 3 (or 5) minutes.

Data format: date (yyyymmdd), time (hhmmss), latitude (degrees, + for northern latitude), longitude (degrees, + for eastern longitude), ship's speed (knots), heading (degrees clockwise from north), water depth (m), magnetic total intensity (nT), gravity reading

Example:

```
19850801 062100 30.80826 139.69702 4.03 322.70 0 0 10418.3
19850801 062200 30.80917 139.69620 4.11 323.80 2231 0 10418.4
19850801 062300 30.81011 139.69541 4.87 324.00 2231 43249 10418.3
19850801 062400 30.81149 139.69425 8.00 324.70 2230 43253 10418.3
19850801 062500 30.81352 139.69266 9.57 327.30 2230 43257 10421.3
19850801 062600 30.81580 139.69089 9.93 324.70 2230 43261 10426.1
19850801 062700 30.81799 139.68900 9.46 313.00 2231 43271 10430.6
19850801 062800 30.81919 139.68637 9.42 276.60 2230 43273 10435.9
19850801 062900 30.81906 139.68329 9.75 256.20 2230 43281 10446.5
19850801 063000 30.81791 139.68051 9.21 217.90 2229 43285 10455.9
19850801 063100 30.81557 139.67969 8.73 175.40 2229 43291 10461.2
19850801 063200 30.81308 139.68015 9.63 171.00 2228 43283 10452.7
19850801 063300 30.81041 139.68039 9.58 180.90 2228 43277 10432.2
19850801 063400 30.80773 139.68039 9.68 179.10 2228 43271 10415.9
19850801 063500 30.80501 139.68039 9.90 180.70 2227 43269 10407.1
19850801 063600 30.80225 139.68039 9.87 178.80 2226 43265 10403.5
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2) Gravity and water depth data files with an extension wdgl in wdgl\_files folder

Data format: date (yyyymmdd), time (hhmmss), latitude (degrees, + for northern latitude), longitude (degrees, + for eastern longitude), observed water depth (m), corrected water depth (m), number of echo-sounding correction table, magnetic total intensity (nT), gravity reading, gravity value (mGal), Eötvös correction (mGal), free-air anomaly (mGal), corrected free-air anomaly (mGal), distance (km). In cruises for marine geological mapping, line names used in 3.5 kHz SBP database are added as the last item.

Example:

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19760418 213500 35.34032 142.60398 6460 6527 80 10617.4 979721.1 -67.9 -108.7 -104.07 582.290 762-56-2
19760418 213600 35.34027 142.60037 0 0 0 10616.2 979719.9 -67.9 -109.8 -105.14 582.618 762-56-2
19760418 213700 35.34019 142.59666 0 0 0 10615.4 979719.1 -67.9 -110.6 -105.92 582.955 762-56-2
19760418 213800 35.34010 142.59293 0 0 0 10614.7 979718.4 -67.9 -111.4 -106.72 583.293 762-56-2
19760418 213900 35.34005 142.58917 0 0 0 10613.7 979717.4 -68.0 -112.4 -107.83 583.634 762-56-2
19760418 214000 35.34000 142.58541 6850 6936 80 10612.7 979716.4 -68.1 -113.5 -108.94 583.975 762-56-2
19760418 214100 35.33990 142.58170 0 0 0 10611.5 979715.2 -68.2 -114.8 -110.01 584.312 762-56-2
19760418 214200 35.33979 142.57799 0 0 0 10610.1 979713.8 -68.4 -116.3 -111.31 584.649 762-56-2
19760418 214300 35.33974 142.57420 0 0 0 10608.8 979712.5 -68.5 -117.8 -112.65 584.992 762-56-2
19760418 214400 35.33967 142.57040 0 0 0 10607.6 979711.3 -68.5 -119.0 -113.72 585.337 762-56-2
19760418 214500 35.33960 142.56659 6880 6967 80 10606.3 979710.0 -68.5 -120.3 -114.91 585.683 762-56-2
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### 3) Magnetic datafiles with an extension wmag in wmag\_files folder

Data format: date (yyyymmdd), time (hhmmss), latitude (degrees, + for northern latitude), longitude (degrees, + for eastern longitude), magnetic anomaly (nT), observed magnetic total intensity (nT), CM4 core field model (nT), external field model (nT), corrected magnetic anomaly (nT), distance (km)

Example:

19780422 010630	35.99122	134.09029	131.5 47749.7	47650.2	-32.0	145.94	2016.269
19780422 010700	35.99243	134.08931	127.9 47747.0	47651.2	-32.1	142.41	2016.430
19780422 010730	35.99364	134.08832	126.3 47746.4	47652.2	-32.1	140.89	2016.591
19780422 010800	35.99485	134.08734	124.9 47745.9	47653.1	-32.2	139.56	2016.752
19780422 010830	35.99611	134.08637	122.7 47744.6	47654.1	-32.2	137.43	2016.917
19780422 010900	35.99732	134.08545	121.0 47743.8	47655.1	-32.2	135.81	2017.075
19780422 010930	35.99845	134.08457	121.5 47745.2	47656.0	-32.3	136.38	2017.224
19780422 011000	35.99960	134.08364	117.3 47741.9	47656.9	-32.3	132.25	2017.376
19780422 011100	36.00198	134.08180	113.1 47739.5	47658.8	-32.4	128.19	2017.688
19780422 011200	36.00437	134.07982	109.4 47737.6	47660.7	-32.5	124.63	2018.009
19780422 011230	36.00556	134.07892	105.5 47734.6	47661.6	-32.5	120.80	2018.164
19780422 011300	36.00674	134.07801	103.6 47733.6	47662.6	-32.6	118.91	2018.319
19780422 011330	36.00792	134.07704	101.2 47732.1	47663.5	-32.6	116.58	2018.476

Time is in UTC in all files. The distances in gravity and water depth files and magnetic data files are from the beginning of each cruise. The latitude and longitude in magnetic data file are moved to the location shifted 200 m backward along the track line. The corrected magnetic anomalies are after leveling correction, while the corrected free-air anomalies are after altimetric and leveling corrections. Water depth data are corrected using Carter's Table (Carter, 1980). No data are expressed as 0 for observed and corrected water depths, number of echo-sounding correction table, total magnetic intensity, gravity reading and gravity values, while 9999.9 for Eötvös correction, free-air anomaly, corrected free-air anomaly, and 99.99999, 999.99999, 99.99 and 999.99 for altitude, longitude, ship's speed and heading, respectively. A gravity and water depth data file includes records without observed data, whereas a magnetic data file only include records with observed magnetic data.

#### Reference

Carter, D.J.T. (1980) Echo-Sounding correction tables, formerly Mathews' tables, third edition, NP 139, 150 pp, Hydrographic Department, Ministry of Defence.