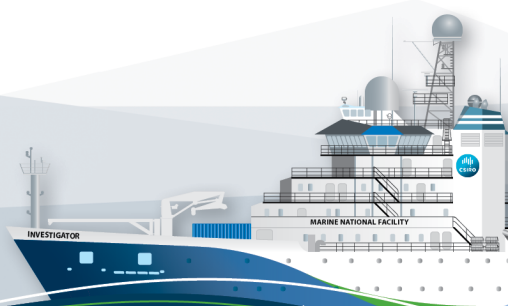
RV *Investigator*

ADCP Processing Report

Voyage #:	in2106_v01
Voyage title:	Heard/McDonald Islands Submarine Volcanism/ Hydrothermalism and Biospheric Impacts
Depart:	Fremantle, 1300, 8 Jan 2016
Return:	Hobart, 27 Feb 2016
Chief Scientist:	Mike Coffin
Affiliation:	IMAS
Report compiled by:	Hugh Barker



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1 Summary

Data was collected during in2016_v01, primarily around the Heard and McDonald islands.

Only os150 (150kHz) data is available, as the os75 was out of commission due to a faulty cable.

Initially external triggering was used, however this caused several outages due to issues with the K-Sync unit, as well as data quality issues due to the irregular ping rate.

After 2016/01/28 10:59:30 internal triggering was used. This led to a noticeable increase in data quality.

The drop keel was raised flush with the hull for several days due to a medevac – this necessitated processing the voyage as several datasets and concatenating the results. The drop keel was raised between Sat, 13 Feb 2016 03:59:04 and Tue, 16 Feb 2016 04:37:23 UTC.

The following command was used to concatenate the files:

```
ncks -O --mk_rec_dmn time os150nb_flush_with_gondola_to_13Feb/os150nb_flush_with_gondola_to_13Feb.nc
1.nc

(run same command on other .nc files, outputting to 2 and 3 .nc)

ncrcat -O 1.nc 2.nc 3.nc os150nb.nc
```

See the voyage computing and electronics reports for more details regarding data acquisition.

The ADCP was operated in narrowband mode with 8m bins for the duration of the voyage.

The draft at the start of the voyage was 6.55m forward, 5.85m aft. At the end of the voyage the draft was 6.15m forward, 5.8m aft

2 Processing Background

The University of Hawaii's CODAS software system was used for data processing. Revision 262:6e156571631e, dated May 27 2015, was used.

See their website, http://currents.soest.hawaii.edu/docs/doc/codas_doc/index.html, for further details.

Data was processed using raw single ping (*.ENR files), along with Seapath (position, attitude) and gyro devices for position information.

3 Processing Notes

Overall data quality was good, although there were several periods of no data coverage due to issues with the K-Sync triggering unit. Some profiles were edited out, both manually and using CODAS's automatic processing. The dataset did not need rotating, and no significant issues were encountered when processing.

4 netCDF Data Header

```
netcdf os150nb {
dimensions:
        time = UNLIMITED ; // (13249 currently)
        depth_cell = 50 ;
variables:
        short amp(time, depth_cell) ;
                amp:long_name = "Received signal strength" ;
                amp:missing_value = 32767s ;
                amp:data_min = 18s ;
                amp:data_max = 227s ;
                amp:C_format = "%d" ;
        float depth(time, depth_cell) ;
                depth:C_format = "%8.2f" ;
                depth:positive = "down" ;
                depth:long_name = "Depth" ;
                depth:data_min = 23.63f ;
                depth:units = "meter" ;
                depth:missing_value = 1.e+38f ;
                depth:data_max = 415.69f ;
        float heading(time) ;
                heading:data_max = 179.8442f ;
                heading:long_name = "Ship heading" ;
                heading:C_format = "%6.1f" ;
                heading:data_min = -179.9918f ;
                heading:units = "degrees" ;
                heading:missing_value = 1.e+38f ;
        double lat(time) ;
                lat:C_format = "%9.4f" ;
                lat:long_name = "Latitude" ;
                lat:standard_name = "latitude" ;
                lat:data_min = -54.1775194444444 ;
                lat:units = "degrees_north" ;
                lat:missing_value = 1.e+38 ;
                lat:data_max = -31.9559472222222 ;
        double lon(time) ;
                lon:C_format = "%9.4f" ;
                lon:long_name = "Longitude" ;
                lon:standard_name = "longitude" ;
                lon:data_min = 71.3348388888889 ;
                lon:units = "degrees_east" ;
                lon:missing_value = 1.e+38 ;
                lon:data_max = 115.672672222222 ;
        byte pflag(time, depth_cell) ;
                pflag:long_name = "Editing flags" ;
                pflag:missing_value = -1b ;
                pflag:data_min = 0b ;
                pflag:data_max = 7b ;
                pflag:C_format = "%d" ;
        byte pg(time, depth_cell) ;
                pg:long_name = "Percent good pings" ;
                pg:missing_value = -1b ;
                pg:data_min = 0b ;
                pg:data_max = 100b ;
                pg:C_format = "%d" ;
        double time(time) ;
                time:C_format = "%12.5f" ;
                time:long_name = "Decimal day" ;
                time:standard_name = "time" ;
                time:data_min = 7.31556712962963 ;
                time:units = "days since 2016-01-01 00:00:00" ;
                time:data_max = 43.1640509259259 ;
        float tr_temp(time) ;
                tr_temp:data_max = 83.11782f ;
                tr_temp:long_name = "ADCP transducer temperature" ;
                tr_temp:C_format = "%4.1f" ;
                tr_temp:data_min = 2.6286f ;
                tr_temp:units = "Celsius" ;
                tr_temp:missing_value = 1.e+38f ;
        int trajectory ;
                trajectory:standard_name = "trajectory_id" ;
        float u(time, depth_cell) ;
```

```
                u:data_max = 1.247766f ;
                u:long_name = "Zonal velocity component" ;
                u:C_format = "%7.2f" ;
                u:data_min = -2.708257f ;
                u:units = "meter second-1" ;
                u:missing_value = 1.e+38f ;
        float uship(time) ;
                uship:data_max = 5.95756f ;
                uship:long_name = "Ship zonal velocity component" ;
                uship:C_format = "%9.4f" ;
                uship:data_min = -5.975747f ;
                uship:units = "meter second-1" ;
                uship:missing_value = 1.e+38f ;
        float v(time, depth_cell) ;
                v:data_max = 2.226346f ;
                v:long_name = "Meridional velocity component" ;
                v:C_format = "%7.2f" ;
                v:data_min = -2.089782f ;
                v:units = "meter second-1" ;
                v:missing_value = 1.e+38f ;
        float vship(time) ;
                vship:data_max = 4.624926f ;
                vship:long_name = "Ship meridional velocity component" ;
                vship:C_format = "%9.4f" ;
                vship:data_min = -5.052294f ;
                vship:units = "meter second-1" ;
                vship:missing_value = 1.e+38f ;

// global attributes:
                :featureType = "trajectoryProfile" ;
                :description = "Shipboard ADCP velocity profiles from in2016_v01 using instrument
os150nb" ;
                :title = "Shipboard ADCP velocity profiles" ;
                :cruise_id = "in2016_v01" ;
                :Conventions = "COARDS" ;
                :sonar = "os150nb" ;
                :history = "Wed May 11 15:25:18 2016: ncrcat -O 1.nc 2.nc 3.nc os150nb.nc\n",
                        "Wed May 11 15:14:11 2016: ncks -O --mk_rec_dmn time
os150nb_flush_with_gondola_to_13Feb/os150nb_flush_with_gondola_to_13Feb.nc 1.nc\n",
                        "Created: 2016-05-11 14:42:56" ;
                :software = "pycurrents" ;
                :NCO = "4.4.2" ;
                :nco_openmp_thread_number = 1 ;
}
```