RV *Investigator*

ADCP Processing Report

Voyage #:	in2107_v01
Voyage title:	Interactions of the Totten Glacier with the Southern Ocean through multiple glacial cycles
Depart:	Hobart, 1800 Saturday, 14 January 2017
Return:	Hobart, 0900 Sunday, 5 March 2017
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Affiliation:	Macquarie University
Report compiled by:	Karl Malakoff

Contents

1 Summary

Data was collected during in2017_v01 for the entire duration of the voyage. Data was collected using UHDAS and post-processed using CODAS.

The os150(150kHz) ADCP suffered a failure in the last week of the cruise stopping data acquisition with this instrument. The os75(75kHz) was run for the entire cruise.

Both units were ran in narrow band mode for the entire cruise. The os75 was run in bb mode after leaving the continental shelf of Tasmania but was switched back to narrow band mode exclusively as per the advice of Jules Hummon on the 28th of January.

Internal triggering was used as external triggering was found to be unstable on previous voyages.

The drop keel was at 2m for the entire voyage.

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

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

2 Processing Background

The University of Hawaii's CODAS software was used for data post-processing. Revision 269:5bd8c22f6560 dated Oct 19 2016 was used.

3 Processing Notes

Overall data quality and coverage was good. There are some small gaps in data cause by a low percent good on ping returns. These gaps seem to coincide with periods of bad weather.

Some profiles were edited out, both manually and using CODAS's automatic processing. The dataset did not need rotating.

Significant ringing was found in both instruments. The top 2 -3 bins, or about 50m, had to be edited out for both instruments while the voyage was underway. This effect of this was minimal while on station. SIT has been made aware of this issue and will move to rectify it.

CTD wire interference can be seen in some bins while on station. This has been edited out. This can be prevented in future voyages by rotating the transducer units.

4 netCDF Data Headers

```
netcdf os75bb {
dimensions:
        time = 3837 ;
        depth_cell = 80 ;
variables:
        int trajectory ;
                trajectory:standard_name = "trajectory_id" ;
        double time(time) ;
                time:long_name = "Decimal day" ;
                time:units = "days since 2017-01-01 00:00:00" ;
                time:C_format = "%12.5f" ;
                time:standard_name = "time" ;
                time:data_min = 13.9272800925926 ;
                time:data_max = 27.246724537037 ;
        double lon(time) ;
                lon:missing_value = 1.e+38 ;
                lon:long_name = "Longitude" ;
                lon:units = "degrees_east" ;
                lon:C_format = "%9.4f" ;
                lon:standard_name = "longitude" ;
                lon:data_min = 114.109894444444 ;
                lon:data_max = 146.658922222222 ;
        double lat(time) ;
                lat:missing_value = 1.e+38 ;
                lat:long_name = "Latitude" ;
                lat:units = "degrees_north" ;
                lat:C_format = "%9.4f" ;
                lat:standard_name = "latitude" ;
                lat:data_min = -64.9586222222222 ;
                lat:data_max = -44.1163138888889 ;
        float depth(time, depth_cell) ;
                depth:missing_value = 1.e+38f ;
                depth:long_name = "Depth" ;
                depth:units = "meter" ;
                depth:C_format = "%8.2f" ;
                depth:positive = "down" ;
                depth:data_min = 22.36f ;
                depth:data_max = 654.79f ;
        float u(time, depth_cell) ;
                u:missing_value = 1.e+38f ;
                u:long_name = "Zonal velocity component" ;
                u:units = "meter second-1" ;
                u:C_format = "%7.2f" ;
                u:data_min = -0.463166f ;
                u:data_max = 0.6739626f ;
        float v(time, depth_cell) ;
                v:missing_value = 1.e+38f ;
                v:long_name = "Meridional velocity component" ;
                v:units = "meter second-1" ;
                v:C_format = "%7.2f" ;
                v:data_min = -0.6023183f ;
                v:data_max = 0.5327358f ;
        short amp(time, depth_cell) ;
                amp:missing_value = 32767s ;
                amp:long_name = "Received signal strength" ;
                amp:C_format = "%d" ;
                amp:data_min = 7s ;
                amp:data_max = 196s ;
        byte pg(time, depth_cell) ;
                pg:missing_value = -1b ;
                pg:long_name = "Percent good pings" ;
                pg:C_format = "%d" ;
                pg:data_min = 0b ;
                pg:data_max = 100b ;
```

```
        byte pflag(time, depth_cell) ;
                pflag:long_name = "Editing flags" ;
                pflag:C_format = "%d" ;
                pflag:data_min = 0b ;
                pflag:data_max = 7b ;
        float heading(time) ;
                heading:missing_value = 1.e+38f ;
                heading:long_name = "Ship heading" ;
                heading:units = "degrees" ;
                heading:C_format = "%6.1f" ;
                heading:data_min = -179.661f ;
                heading:data_max = 179.9264f ;
        float tr_temp(time) ;
                tr_temp:missing_value = 1.e+38f ;
                tr_temp:long_name = "ADCP transducer temperature" ;
                tr_temp:units = "Celsius" ;
                tr_temp:C_format = "%4.1f" ;
                tr_temp:data_min = -0.8009589f ;
                tr_temp:data_max = 15.69473f ;
        float uship(time) ;
                uship:missing_value = 1.e+38f ;
                uship:long_name = "Ship zonal velocity component" ;
                uship:units = "meter second-1" ;
                uship:C_format = "%9.4f" ;
                uship:data_min = -6.260727f ;
                uship:data_max = 6.308045f ;
        float vship(time) ;
                vship:missing_value = 1.e+38f ;
                vship:long_name = "Ship meridional velocity component" ;
                vship:units = "meter second-1" ;
                vship:C_format = "%9.4f" ;
                vship:data_min = -5.391261f ;
                vship:data_max = 4.567895f ;

// global attributes:
                :featureType = "trajectoryProfile" ;
                :history = "Created: 2017-03-27 21:54:27 UTC" ;
                :Conventions = "COARDS" ;
                :software = "pycurrents" ;
                :hg_changeset = "2320:184969c40ec8" ;
                :title = "Shipboard ADCP velocity profiles" ;
                :description = "Shipboard ADCP velocity profiles from in2017_v01 using instrument
os75_bb" ;
                :cruise_id = "in2017_v01" ;
                :sonar = "os75_bb" ;
}


netcdf os75nb {
dimensions:
        time = 14257 ;
        depth_cell = 60 ;
variables:
        int trajectory ;
                trajectory:standard_name = "trajectory_id" ;
        double time(time) ;
                time:long_name = "Decimal day" ;
                time:units = "days since 2017-01-01 00:00:00" ;
                time:C_format = "%12.5f" ;
                time:standard_name = "time" ;
                time:data_min = 13.3006828703704 ;
                time:data_max = 62.8844791666667 ;
        double lon(time) ;
                lon:missing_value = 1.e+38 ;
                lon:long_name = "Longitude" ;
                lon:units = "degrees_east" ;
                lon:C_format = "%9.4f" ;
                lon:standard_name = "longitude" ;
                lon:data_min = 113.785388888889 ;
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```
        lon:data_max = 147.511283333333 ;
double lat(time) ;
        lat:missing_value = 1.e+38 ;
        lat:long_name = "Latitude" ;
        lat:units = "degrees_north" ;
        lat:C_format = "%9.4f" ;
        lat:standard_name = "latitude" ;
        lat:data_min = -65.7754666666667 ;
        lat:data_max = -42.8901527777778 ;
float depth(time, depth_cell) ;
        depth:missing_value = 1.e+38f ;
        depth:long_name = "Depth" ;
        depth:units = "meter" ;
        depth:C_format = "%8.2f" ;
        depth:positive = "down" ;
        depth:data_min = 29.93f ;
        depth:data_max = 974.f ;
float u(time, depth_cell) ;
        u:missing_value = 1.e+38f ;
        u:long_name = "Zonal velocity component" ;
        u:units = "meter second-1" ;
        u:C_format = "%7.2f" ;
        u:data_min = -1.294304f ;
        u:data_max = 0.7622094f ;
float v(time, depth_cell) ;
        v:missing_value = 1.e+38f ;
        v:long_name = "Meridional velocity component" ;
        v:units = "meter second-1" ;
        v:C_format = "%7.2f" ;
        v:data_min = -1.217797f ;
        v:data_max = 1.353028f ;
short amp(time, depth_cell) ;
        amp:missing_value = 32767s ;
        amp:long_name = "Received signal strength" ;
        amp:C_format = "%d" ;
        amp:data_min = 6s ;
        amp:data_max = 218s ;
byte pg(time, depth_cell) ;
        pg:missing_value = -1b ;
        pg:long_name = "Percent good pings" ;
        pg:C_format = "%d" ;
        pg:data_min = 0b ;
        pg:data_max = 100b ;
byte pflag(time, depth_cell) ;
        pflag:long_name = "Editing flags" ;
        pflag:C_format = "%d" ;
        pflag:data_min = 0b ;
        pflag:data_max = 7b ;
float heading(time) ;
        heading:missing_value = 1.e+38f ;
        heading:long_name = "Ship heading" ;
        heading:units = "degrees" ;
        heading:C_format = "%6.1f" ;
        heading:data_min = -179.9683f ;
        heading:data_max = 179.9264f ;
float tr_temp(time) ;
        tr_temp:missing_value = 1.e+38f ;
        tr_temp:long_name = "ADCP transducer temperature" ;
        tr_temp:units = "Celsius" ;
        tr_temp:C_format = "%4.1f" ;
        tr_temp:data_min = -1.277176f ;
        tr_temp:data_max = 20.55138f ;
float uship(time) ;
        uship:missing_value = 1.e+38f ;
        uship:long_name = "Ship zonal velocity component" ;
        uship:units = "meter second-1" ;
        uship:C_format = "%9.4f" ;
        uship:data_min = -6.569055f ;
        uship:data_max = 6.473408f ;
```

```
        float vship(time) ;
                vship:missing_value = 1.e+38f ;
                vship:long_name = "Ship meridional velocity component" ;
                vship:units = "meter second-1" ;
                vship:C_format = "%9.4f" ;
                vship:data_min = -6.344096f ;
                vship:data_max = 6.448609f ;

// global attributes:
                :featureType = "trajectoryProfile" ;
                :history = "Created: 2017-03-27 04:47:52 UTC" ;
                :Conventions = "COARDS" ;
                :software = "pycurrents" ;
                :hg_changeset = "2320:184969c40ec8" ;
                :title = "Shipboard ADCP velocity profiles" ;
                :description = "Shipboard ADCP velocity profiles from in2017_v01 using instrument
os75_nb" ;
                :cruise_id = "in2017_v01" ;
                :sonar = "os75_nb" ;
}

netcdf os150nb {
dimensions:
        time = 14256 ;
        depth_cell = 60 ;
variables:
        int trajectory ;
                trajectory:standard_name = "trajectory_id" ;
        double time(time) ;
                time:long_name = "Decimal day" ;
                time:units = "days since 2017-01-01 00:00:00" ;
                time:C_format = "%12.5f" ;
                time:standard_name = "time" ;
                time:data_min = 13.3006597222222 ;
                time:data_max = 62.8810069444444 ;
        double lon(time) ;
                lon:missing_value = 1.e+38 ;
                lon:long_name = "Longitude" ;
                lon:units = "degrees_east" ;
                lon:C_format = "%9.4f" ;
                lon:standard_name = "longitude" ;
                lon:data_min = 113.785397222222 ;
                lon:data_max = 147.511291666667 ;
        double lat(time) ;
                lat:missing_value = 1.e+38 ;
                lat:long_name = "Latitude" ;
                lat:units = "degrees_north" ;
                lat:C_format = "%9.4f" ;
                lat:standard_name = "latitude" ;
                lat:data_min = -65.7768111111111 ;
                lat:data_max = -42.8901305555556 ;
        float depth(time, depth_cell) ;
                depth:missing_value = 1.e+38f ;
                depth:long_name = "Depth" ;
                depth:units = "meter" ;
                depth:C_format = "%8.2f" ;
                depth:positive = "down" ;
                depth:data_min = 17.93f ;
                depth:data_max = 490.f ;
        float u(time, depth_cell) ;
                u:missing_value = 1.e+38f ;
                u:long_name = "Zonal velocity component" ;
                u:units = "meter second-1" ;
                u:C_format = "%7.2f" ;
                u:data_min = -1.93054f ;
                u:data_max = 0.6031346f ;
        float v(time, depth_cell) ;
                v:missing_value = 1.e+38f ;
                v:long_name = "Meridional velocity component" ;
```

```
                v:units = "meter second-1" ;
                v:C_format = "%7.2f" ;
                v:data_min = -1.57712f ;
                v:data_max = 1.636437f ;
        short amp(time, depth_cell) ;
                amp:missing_value = 32767s ;
                amp:long_name = "Received signal strength" ;
                amp:C_format = "%d" ;
                amp:data_min = 18s ;
                amp:data_max = 227s ;
        byte pg(time, depth_cell) ;
                pg:missing_value = -1b ;
                pg:long_name = "Percent good pings" ;
                pg:C_format = "%d" ;
                pg:data_min = 0b ;
                pg:data_max = 100b ;
        byte pflag(time, depth_cell) ;
                pflag:long_name = "Editing flags" ;
                pflag:C_format = "%d" ;
                pflag:data_min = 0b ;
                pflag:data_max = 7b ;
        float heading(time) ;
                heading:missing_value = 1.e+38f ;
                heading:long_name = "Ship heading" ;
                heading:units = "degrees" ;
                heading:C_format = "%6.1f" ;
                heading:data_min = -179.9361f ;
                heading:data_max = 179.9698f ;
        float tr_temp(time) ;
                tr_temp:missing_value = 1.e+38f ;
                tr_temp:long_name = "ADCP transducer temperature" ;
                tr_temp:units = "Celsius" ;
                tr_temp:C_format = "%4.1f" ;
                tr_temp:data_min = -1.440924f ;
                tr_temp:data_max = 21.9525f ;
        float uship(time) ;
                uship:missing_value = 1.e+38f ;
                uship:long_name = "Ship zonal velocity component" ;
                uship:units = "meter second-1" ;
                uship:C_format = "%9.4f" ;
                uship:data_min = -6.583394f ;
                uship:data_max = 6.394789f ;
        float vship(time) ;
                vship:missing_value = 1.e+38f ;
                vship:long_name = "Ship meridional velocity component" ;
                vship:units = "meter second-1" ;
                vship:C_format = "%9.4f" ;
                vship:data_min = -6.347289f ;
                vship:data_max = 6.469637f ;

// global attributes:
                :featureType = "trajectoryProfile" ;
                :history = "Created: 2017-03-27 04:09:00 UTC" ;
                :Conventions = "COARDS" ;
                :software = "pycurrents" ;
                :hg_changeset = "2320:184969c40ec8" ;
                :title = "Shipboard ADCP velocity profiles" ;
                :description = "Shipboard ADCP velocity profiles from in2017_v01 using instrument
os150_nb" ;
                :cruise_id = "in2017_v01" ;
                :sonar = "os150_nb" ;
}
```