RV *Investigator*

ADCP Processing Report

Voyage #:	in2015_v02
Voyage title:	Sustained monitoring of the East Australian Current: Mass, heat and freshwater transports
Depart:	2000, Sydney, Friday, 15 May 2015
Return:	1300, Brisbane, Tuesday, 26 May 2015
Chief Scientist:	Bernadette Sloyan
Affiliation:	CSIRO O&A
Report compiled by:	Hugh Barker
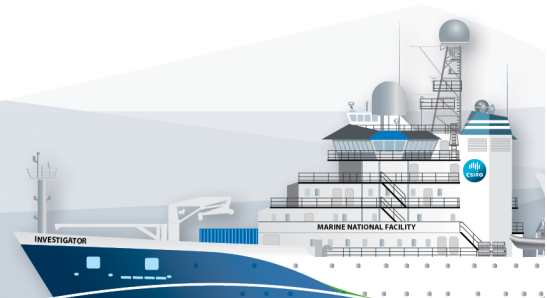
Contents

1 Summary

Data was collected during in2015_v02 for the duration of the voyage. Data was collected using VMDAS and post-processed using CODAS.

Both the OS75 and the OS150 ADCPs were operated for the duration of the voyage.

Due to issues with VMDAS acquiring serial data, all navigation data was regenerated from Techsas acquired NMEA strings.

Significant work was conducted by the science party to investigate the correct ADCP settings, which involved various permutations of broadband vs narrowband modes, and different keel depths. The findings are summarised in the report 'ADCP_Report_INV2015_V02_Wijffels_final.pdf, supplied as part of the processed dataset. Additional documentation is in the 'docs_from_voyage' folder. The summary from that report is as follows:

- both ADCP Ocean Surveyors had transducer alignment errors. The current estimate of the angles to put into VMDAS are: OS150 = 44.35 (EA= 4435 in config file); OS75 = 52.44 (EA=5244 in config file)
- Both OS's were losing comms every 20 mins to 3 hours, then autostarting Sometimes the loss of comms would permanently stop acquisition (not auto restart). Changing out the Serial-USB comms cable might have fixed this.
- the OS150 has several issues in BroadBand Mode which degrades the data
1. It is badly affected by bubbles flowing under the ship. This is lessened with reduced ship-speed and lowering the drop keep. It never really disappears unless the ship is stopped. The first 1-5 bins need to be carefully screened for unrealistic shears. This affect is reduced in Narrow Band mode.
2. It suffers from strong interference from the OS75 and the EK60.
- The OS75 suffers much less from bubble problems. It does however suffer from interference from both the OS150 and more weakly the EK60 (needs checking).
- It is clear from the echograms that the sADCP's interfere with the EK60. This would have to either be edited out or prevented for **quantitative use** of the EK60 output.

Each permutation of settings used was processed separately, and the files concatenated together post processing. Please see 'ADCP_Report_INV2015_V02_Wijffels_final.pdf' for details of different settings used.

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

Some editing was required, especially the top bins of the OS150. Data quality was generally acceptable, more so with the OS75. Some intereference and data gaps are present due to different triggering settings and so on.

4 netCDF Data Headers

```
netcdf in2015_v02_os75nb {
dimensions:
        time = UNLIMITED ; // (2918 currently)
        depth_cell = 50 ;
variables:
        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 = 218s ;
        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 = 31.64f ;
                depth:data_max = 815.7f ;
        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 = -179.9142f ;
                heading:data_max = 179.9459f ;
        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 = -33.7725944444444 ;
                lat:data_max = -26.7439611111111 ;
        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 = 151.443083333333 ;
                lon:data_max = 155.408441666667 ;
        byte pflag(time, depth_cell) ;
                pflag:long_name = "Editing flags" ;
                pflag:C_format = "%d" ;
                pflag:data_min = 0b ;
                pflag:data_max = 7b ;
        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 ;
        double time(time) ;
                time:long_name = "Decimal day" ;
                time:units = "days since 2015-01-01 00:00:00" ;
                time:C_format = "%12.5f" ;
                time:standard_name = "time" ;
                time:data_min = 134.507592592593 ;
                time:data_max = 144.918900462963 ;
        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 = 20.40353f ;
```

```
        tr_temp:data_max = 25.59837f ;
    int trajectory ;
            trajectory:standard_name = "trajectory_id" ;
    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 = -0.6167195f ;
            u:data_max = 3.624075f ;
    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 = -5.693887f ;
            uship:data_max = 5.749842f ;
    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 = -1.08189f ;
            v:data_max = 2.478497f ;
    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 = -5.802409f ;
            vship:data_max = 6.321739f ;

// global attributes:
            :featureType = "trajectoryProfile" ;
            :history = "Tue May  1 15:02:46 2018: ncrcat
in2015_v02_os75nb_keel_flush_with_gondola_time.nc in2015_v02_os75nb_keel_full_extension_time.nc
in2015_v02_os75nb_keel_mid_extension_time.nc in2015_v02_os75nb.nc\n",
                "Tue May  1 15:02:08 2018: ncks --mk_rec_dmn time
in2015_v02_os75nb_keel_flush_with_gondola.nc in2015_v02_os75nb_keel_flush_with_gondola_time.nc\n",
                "Created: 2018-05-01 04:48:35 UTC" ;
            :Conventions = "COARDS" ;
            :software = "pycurrents" ;
            :hg_changeset = "2320:184969c40ec8" ;
            :title = "Shipboard ADCP velocity profiles" ;
            :description = "Shipboard ADCP velocity profiles from in2015_v02 using instrument
os75nb" ;
            :cruise_id = "in2015_v02" ;
            :sonar = "os75nb" ;
            :NCO = "\"4.5.4\"" ;
            :nco_openmp_thread_number = 1 ;
}
```