Brief report for post-processing on data from subsurface mooring at (5S, 78E) during CINDY/DYNAMO special observation period (SOP)

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1. Introduction

As a component of CINDY/DYNAMO field campaign, we JAMSTEC deployed subsurface mooring at (5S, 78E). This report briefly describes the status of data and post-processing.

2. Observations

Details are described in the Cruise Report of R/V Mirai for MR11-07.

(1) Period

Deployment

location: 05° 05.39' S, 078° 05.56' E
deployed: Sep.29, 2011
recovered: Nov.29, 2011

Valid data

from: 0745UTC on Sep.29, 2011
until: 0145UTC on Nov.29, 2011

(2) Sensors, setting and status of original data

a) ADCP

Vertical resolution: 8 m
Temporal interval: 1800 sec (obtain data at hh:15 and hh:45 of every hour)
Original data: converted by software "BBLIST.EXE" provided by manufacturer

b) CTD

Temporal interval: Same as ADCP (1800sec, at hh:15 and hh:45 of every hour)
Original data: converted by software "DATCNV" provided by manufacturer

c) PAL

Unfortunately the data is not available for entire period.

3. Processes on ADCP data

(1) Correction of azimuth

The original data utilized magnetic compass inside the sensor unit. The true azimuth is obtained by correcting magnetic declination. The adopted declination is -5.68 degree, at the mooring site, on the mid-day of the mooring period.

(2) Correction of depth

The depth of the ADCP sensor is obtained by applying data from CTD sensor beside the ADCP sensor. The depth of each data bin was also corrected by utilizing the depth of ADCP sensor.

(3) Correction of the errors on depth and current velocity induced by sound velocity

The sound velocity was obtained by the following equations:

$$C = 1449.2 + 4.6T - 0.055T^2 + 0.00029T^3 + (1.34 - 0.01T)(S - 35) + 0.016D$$

C: sound velocity

T: temperature

S: salinity

D: depth

In the original data, T, S and D are assumed as a fix value. The correction was applied by utilizing measured T, S and D by CTD sensor beside the ADCP sensor (exactly 1.5 m deeper than the ADCP sensor).

The obtained C differ less than 1 m/s from the that by Chen and Millero (1977), adopted in "Algorithms for computation of fundamental properties of seawater (UNESCO, 1983)".

(4) Exception of data near sea surface

The data near surface, contaminated by the surface reflection of the sidelobe signals, was removed. The shallowest depth of the valid data is obtained by

$$D(1-\cos\theta)$$

D: depth of ADCP sensor

θ: zenith angle of the main lobe

(5) Interpolation onto specific depths

The corrected dataset is interpolated (linearly) onto every 10-m in depth from surface. The interpolated data is obtained only when the data bins at both (upper and lower) nearest neighbors have valid data. Otherwise, the missing value was given.

4. Data Format

(1) ADCP

ASCII format. Repeating the data for vertical profiles. One profile consists of one line with timestamp is followed by multiple lines for vertical profile at the time, as follows:

```
2011 09 29 07 45          // Line-(t*l), for timestamp for profile #t
 9999.9 9999.9 9999.9     // Line-(t*l+1), for current at layer #1 for profile #t
 9999.9 9999.9 9999.9     // Line-(t*l+2), for current at layer #2 for profile #t
  -26.2   -11.6    0.7    // Line-(t*l+3), for current at layer #3 for profile #t
  -25.8   -13.6    0.0    // Line-(t*l+4), for current at layer #4 for profile #t
.....
9999.9 9999.9 9999.9      // Line-(t*l+36), for current at layer #36 for profile #t
2011 09 29 08 15          // Line-((t+1)*l), for timestamp of profile #(t+1)
```

9999.9 9999.9 9999.9 // Line-((t+1)*l+1), for current at layer #1 for profile #(t+1)

…..

Layer #n indicate the depth at n*10[m].

Each line consists of:

Line for timestamp:	YYYY MM DD hh mm
	(year, month(1-12), day, hour, minute)
Line for current:	UUUU.U VVVV.V WWWW.W
	(zonal, meridional and vertical component, in [cm/s])

(2) CTD

ASCII format. Repeating the time series. One snapshot consists of one line timestamp and observed values, as follows:

1109290745	203.0830	13.3847	34.9213	13.3562	26.2604
1109290815	202.4110	13.2988	34.9568	13.2705	26.3054
1109290845	202.6800	13.2710	34.9584	13.2427	26.3123
…					

Each line consists of:

Timestamp	Depth	Temperature	Salinity	Conductivity	Density(σθ)
YYMMDDhhmm	[m]	[deg.C]	[PSU]	[S/m]	[kg/m^3]

5. Remarks

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