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1 Introduction

During Summer 2000, several MiniBAT cruises were performed, largely in an auxiliary role for other experiments, but also in order to test out some new observational techniques and to collect more data in order to help further test hypotheses developed during the Spring-Summer 1999 OSU-NOPP field campaign. The instrumentation, techniques (for the most part), field site, and personnel are essentially the same as the 1999 field program, and the interested reader is referred to the 1999 data report [Austin et al. 2000, which is available on-line] for most of these details. This report will only detail that which was new in the 2000 season.

2 The 2000 Season

The 2000 season consisted of only 6 cruises: two on June 3 and 4, concurrent with SeaSoar surveys done by the OSU GLOBEC (?) group, two on July 28 and 29, done in order to collect data at the same time as a float released by Eric D’asaro of the University of Washington’s Applied Physics Laboratory was estimated to be passing; and two more on August 4 and 9, once again in support of OSU-GLOBEC efforts and concurrent with SeaSoar surveys.

The basic technique for deployment, towing and recovery are identical to those detailed in the 1999 data report, but an new technique was added to three of these cruises; specifically, on the July 28 and 29 and August 4 cruises, the MiniBAT was towed horizontally over the shelf before the standard undulating tow. The combination of the horizontal tow and the undulating tow which follows immediately after yields both spatial and temporal data with regards to high-frequency variation on the shelf.

3 Horizontal Tows

On three occasions (July 28 and 29 and August 4) we attempted to tow the MiniBAT at a fixed depth level across the shelf, spanning the same longitudinal range as on of our standard undulating surveys. This is one area where a towed vehicle simply stands apart from a “casted” instrument, such as a CTD, in that towing the vehicle gives us insight into horizontal scales (at a fixed depth) down to approximately 1 m. In addition, by turning around and making a standard undulating survey, any errors in the horizontal tow data due to our inability to keep a fixed isobar can be corrected (for the purposes of this data report, however, they are not. Only the raw tow data is displayed). The ability to correct for this type of error is important since vertical
property gradients tend to be, in general, stronger than horizontal ones. Overall we were able to keep the vehicle within 1 m of the target depth (34 m) for most of the transect. It is worth noting that this was most difficult when the instrument was passing through a region of high internal wave energy. Only the corrected data will be presented. The astute reader will also notice that our depth-keeping skills improved dramatically between the first and second cruises. Horizontal tows were all performed with a scope (line out:depth) of approximately 3:1.

4 Cruises

A short summary of each cruise is presented.

4.1 June 3, 2000

Participating: Austin and Andy Dale. Some swll, fog. Made it inside of reef to 10 m isobath.

4.2 June 4, 2000

Participating: Andy Dale (in charge) and Jay Austin. No notes on condition. Many birds spotted inshore of 124°05.85'.

4.3 July 28, 2000

Participating: Austin and Daniel Palacios. Attempted level tow on the way to NH-3 on the NH line. Got caught up on a crabpot, cleared without incident. On the tow back, another crabpot, again cleared successfully.

4.4 July 29, 2000

Participating: Austin and Malevalar. Steamed directly to NH-3, started level tow. Successful level tow. On return (undulating) survey, battery ran out. Instrument recovered and survey continued. Two crabpots caught in remainder of cruise, both released successfully.
4.5 August 4, 2000

participating: Austin and Sean Herring. Cruised directly to NH-3. MiniBAT computed experienced glitch during cruise and shut itself down. System was restarted without stopping cruise. One crabpot snagged on the undulating portion of cruise. After undulating cruise was done we ran offshore to exchange gear with the R/V New Horizon and with the R/V Wecoma as well as picking up three personnel.

4.6 August 9, 2000

participating: Austin and Gillien Duvall. Sea state was quite rough and we decided not to do the horizontal tow. The undulating tow was without incident.

5 Data Presentation

The following is displayed for each section:

- The vehicle path: This shows the depth as a function of cross-shelf distance of the MiniBAT.

- The ship path shows the plan-view path of the cruise relative to bathymetry and to the OSU-NOPP mid- and inner shelf moorings of Levine et al. [2000], which are marked with stars.

- The winds for the four days previous to the cruise from NOAA NDBC buoy 46050, 37 km offshore. The time of the cruise is marked with a red bar.

- Temperature: Cross-shelf section. Two contour intervals are used: 0.2 C from 6-9 C, and 1 C from 9-15 C.

- Salinity: Cross-shelf section. Contour interval 0.2 PSU.

- Potential density anomaly : Cross-shelf section, computed from salinity and temperature, contour interval 0.2 kg m^{-3}.

- Transmissivity: Percent of light that traverses the 25-cm path length of the instrument. Contour interval 3%.

- Fluorometer voltage: Since the relationship between fluorometer voltage and actual chlorophyll concentration is approximate at best, and depends on many parameters which we do not measure, we only display the voltage. Higher
voltages generally correspond to higher concentrations of chlorophyll. Contour interval 1 volt.

- for the July 28, 29 and August 4 cruises, the horizontal distribution of properties along a roughly horizontal tow path, displayed in the first panel.

6 Acknowledgements

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7 Bibliography

Austin, J.A., J. A. Barth, S. D. Pierce, Small-Boat Hydrographic Surveys of the Oregon Mid- to Inner Shelf, May-September 1999. Oregon State University, College of Oceanic and Atmospheric Sciences Data report, Ref #00-2, data report #178, April 2000.
Temperature, $\Delta T = 0.2 \degree C$ (6–9)

Temperature, $\Delta T = 1 \degree C$ (9–15)

Salinity $\Delta S = 0.2$ PSU

Potential density $\Delta \sigma = 0.2$ kg m$^{-3}$
06/03/2000
Transmission
$\Delta T_r = 3\%$

06/03/2000
Fluorometer Voltage
$\Delta F = 0.5 \text{ V}$

Longitude, °E (44.65°N Latitude)
06/04/2000
Temperature,
\[ \Delta T = 0.2 \, ^\circ{C} \ (6-9) \]
\[ \Delta T = 1 \, ^\circ{C} \ (9-15) \]

06/04/2000
Salinity
\[ \Delta S = 0.2 \, \text{PSU} \]

06/04/2000
Potential density
\[ \Delta \sigma_t = 0.2 \, \text{kg m}^{-3} \]
07/28/2000
Temperature,
\(\Delta T = 0.2 \, ^\circ C \) (6−9)
\(\Delta T = 1 \, ^\circ C \) (9−15)

07/28/2000
Salinity
\(\Delta S = 0.2 \, \text{PSU}\)

07/28/2000
Potential density
\(\Delta \sigma_t = 0.2 \, \text{kg m}^{-3}\)

Longitude, ° E (44.65° N Latitude)
07/28/2000
Transmission
Δ Tr = 3%

07/28/2000
Fluorometer Voltage
Δ F = 0.5 V

Longitude, ° E (44.65° N Latitude)
Raw Horizontal Tow data from 28–Jul–2000

- Depth, m
- Temp., °C
- Salinity, PSU
- Trans., %
- Fluoro., V
07/29/2000
Temperature,
\( \Delta T = 0.2 \, ^\circ C \) (6−9)
\( \Delta T = 1 \, ^\circ C \) (9−15)

07/29/2000
Salinity
\( \Delta S = 0.2 \, \text{PSU} \)

07/29/2000
Potential density
\( \Delta \sigma_t = 0.2 \, \text{kg m}^{-3} \)
07/29/2000
Transmission
Δ Tr = 3%

07/29/2000
Fluorometer Voltage
Δ F = 0.5 V

Longitude, ° E (44.65° N Latitude)
08/04/2000
Temperature,
$\Delta T = 0.2 \ ^\circ \text{C} \ (6-9)$
$\Delta T = 1 \ ^\circ \text{C} \ (9-15)$

08/04/2000
Salinity
$\Delta S = 0.2 \ \text{PSU}$

08/04/2000
Potential density
$\Delta \sigma_t = 0.2 \ \text{kg m}^{-3}$
Raw Horizontal Tow data from 04–Aug–2000

- Depth, m
- Temp., °C
- Salinity, PSU
- Trans., %
- Fluoro., V
08/09/2000
Temperature,
$\Delta T = 0.2^\circ C$ (6–9)
$\Delta T = 1^\circ C$ (9–15)

08/09/2000
Salinity
$\Delta S = 0.2$ PSU

08/09/2000
Potential density
$\Delta \sigma_t = 0.2$ kg m$^{-3}$