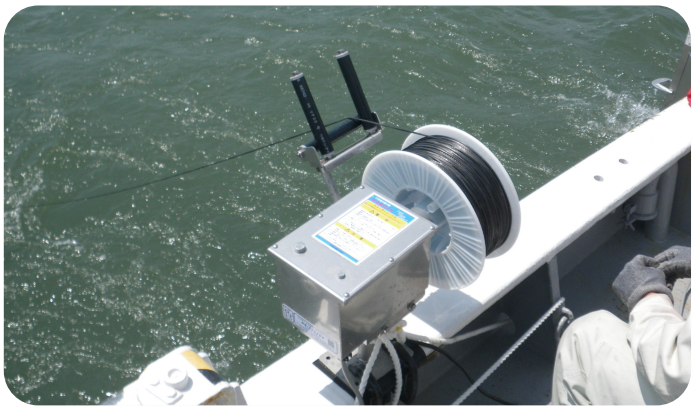
YODA Profiler

Operation Manual



1.Requirements before the observations

Measure the drop rate

The current depth of the sensor is estimated from the relationship of time and sinking velocity. Therefore, you must accurately measure the sinking velocity before observations, because the sinking velocity of the sensor varies sensitively depending on density conditions in observation areas and the condition of the brush

Timer and drop time-sheet

A timer (stop watch) and a drop time sheet are necessary to know the current depth of the probe. An example of a drop time-sheet is shown below. Make a drop time-sheet updated with the drop rate of your probe and target depth.

sink V	0.22
Depth	Time(s)
1.0 m	2
1.2 m	3
1.4 m	4
1.6 m	5
1.8 m	6
2.0 m	7
2.2 m	8
2.4 m	9
2.6 m	10
2.8 m	10
3.0 m	11
3.2 m	12
3.4 m	13
3.6 m	14
3.8 m	15
4.0 m	16
4.2 m	17
4.4 m	18
4.6 m	19
4.8 m	20
5.0 m	20
5.2 m	21
5.4 m	22
5.6 m	23
5.8 m	24
6.0 m	25
6.2 m	26

Depth	Time(s)
6.4 m	27
6.6 m	28
6.8 m	29
7.0 m	30
7.2 m	30
7.4 m	31
7.6 m	32
7.8 m	33
8.0 m	34
8.2 m	35
8.4 m	36
8.6 m	37
8.8 m	38
9.0 m	39
9.2 m	40
9.4 m	40
9.6 m	41
9.8 m	42
10.0 m	43
11.0 m	48
12.0 m	52
13.0 m	57
14.0 m	61
15.0 m	66
16.0 m	70
17.0 m	75
18.0 m	80

‘ Time ’ in the left sheet is calculated from

$$\frac{Depth - SensorDepth}{SinkingVelocity}$$

Sensor Depth is the initial depth of the sensor from the sea surface, 0.5m. In the example drop time-sheet, the sinking velocity is 0.22m/s, but it should be updated before observations.

Line

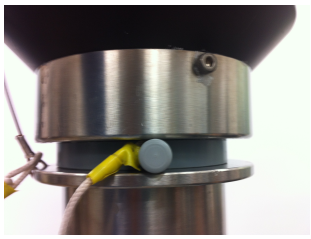
The line has to be wound on the reel tightly and evenly before observations, because a loosely wound line may cause the line to become tangled. Connect the line to the top of the brush securely using fittings and shackles, that are strong enough to withstand the strong drag.

Sensor setup

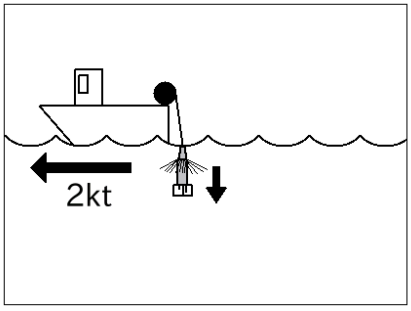
To measure high resolution data vertically, set the observation mode to ‘continuous mode’ and the data sampling interval to ‘0.1s’.

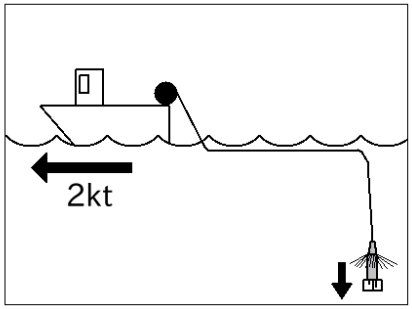
2. Operation

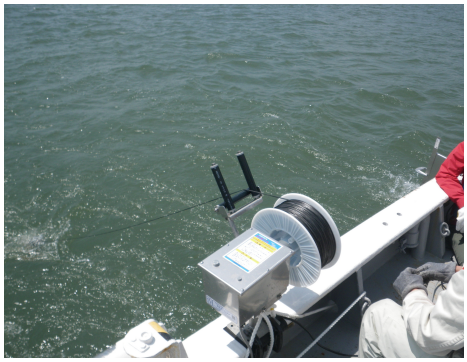
1st. Power on the sensor. Connect the brush to the sensor and the safety line to the brush. Mount the safety cover. Place the probe in the water.



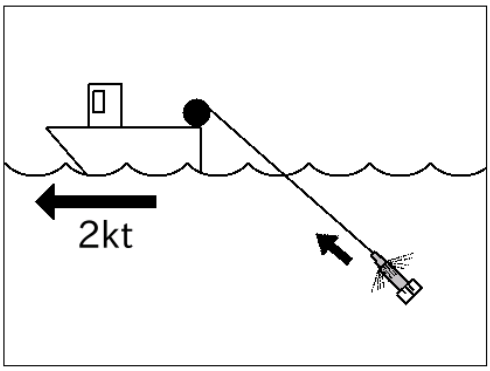
2nd. Disengage the clutch, release the sensor, and allow the winch to unspool freely. Start measuring the sinking time and record the location from GPS (Fig.4a). The current depth of the sensor is estimated from the relationship of time and sinking velocity. Don't touch the reel and line while the probe sinks freely in water columns; otherwise the drag on the line will disturb the stable free fall mode.



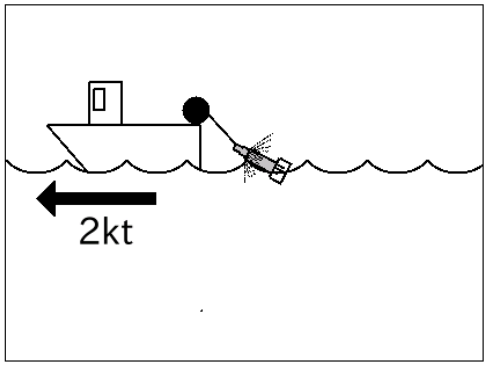




3rd. When the sensor reaches the target depth, lock the clutch, power on the winch and spool the line evenly (Fig.4c). Do not use the maximum power of the winch during To-Yo surveys, use ~70% of the power, because the maximum power causes the reel to break.



4th. When the sensor returns to the stern of the ship, repeat the previous steps until observations are completed (Fig.4d).



Lastly, after the observation, retrieve the sensor from the sea surface to the ship deck and turn off the switch. Download the data to a computer using the interface and the serial cable.

Flow chart of the operation