

# AFI 3/16 mooring cruise report *JR 87*

Peter Enderlein, Andrew Brierley and Ryan Saunders

## recovery and redeployment:

The shallow water mooring recovery started in the early morning of April 28. Near station a CTD to 200m was done, followed directly on station by ½ hour of EK60 data sampling for cross-references with the instruments on the mooring. The weather was good (force 4), calm sea, and good visibility. After sending the acoustic command to the first acoustic release (old one) and receiving a positive response: “hook released”, nothing happened, so the second one was released, again provoking a positive answer, again nothing happened. After trying it again several times and waiting for over an hour the decision was made to try to find the mooring on the ecosounder because the release electronics told us it was only 408 m away. So we ran over it, observing with the EK 60 and the mooring appeared very nicely on the screen, the main buoy, the trimsim buoys below and even the acoustic releases near the bottom. At that time we realized that the rope left behind during the last deployment was probably still holding the mooring in place. At a second briefing with the officers and deck engineers the decision was made to try and recover the mooring with a U shaped dragging steel rope. We tried to locate the mooring on the EK 60 as accurately as possible by steaming back and forth across it in a number of different directions, ending up with a ~25 x 25 m area where the mooring should be. After getting the dragging rig ready it was lowered to 250 meters and the ship then steamed sideways over the position of the mooring. After ~ 30 minutes of dragging the mooring appeared at the surface. After getting the dragging gear back in we caught the mooring with a hook and finally got in on the deck. At that time it was 16:00. We were so lucky, that the whole rig was absolutely OK (with the exception of a broken glass buoyancy sphere) that we then decided to redeploy both moorings. To save time we steamed to the deep site and deployed the deep mooring nice and safe **on 29.04.03, 0002 GMT in 1336m (EA 500) at 53° 30'625S & 37° 50'752W**. On the way back to the shallow site we discovered that the WCP had NOT sampled a single ping!!!! and one of the pins of the connector broke, which now has to be replaced. But after a successful test, the WCP went in back again (see more below on findings on WCP)! All instruments were set up again and we redeployed the shallow mooring, after waiting for half an hour until a fishing vessel in that area finally passed us, **on 29.04.03, 0348 GMT in 309m (EA 500) at 53° 47'423S & 37° 56'256W**. Just before midnight ship time the shallow water mooring was successfully recovered, the deep mooring deployed and the shallow one redeployed both with all instruments.

## changes in deployment procedures:

the deployment took place exactly as described in the first mooring deployment report (14.10.02) except of the ballast weight. This time the weight was attached to the ships starboard Effer crane with a sacrificial rope. The ballast weight was then lifted and swung out over the stern to the starboard corner of the bulwark. At the release point the sacrificial rope was then cut with a knife. This was a quick and effective method which should be used in the future as long as weather conditions allow a safe use of the Effer crane with the ballast weight attached to it.

## **findings on WCP:**

### **old battery pack:**

When we took off the wrapping everything on the surface of the pack seemed to be ok, but when we looked inside the first of the sub-components the problem was obvious. The insulation of the main black cable coming out of the pack was heavily damaged and the bare wires clearly visible. After that we investigated the other component battery packs and all showed more or less the same damage, with insulation stripped, which left us with the question "what caused all the damage?" From our investigation we believe it must have been the plastic tubes in the battery packs which were put in, I believe, to protect the battery pack from damage. Sadly here they are the reason for the damage. In one pack the tube caused no damage on the cable, because it didn't reach it, but in the next one the damage was obvious, although luckily here the tube covered the bare cable. When we turned the pack upside down we found that the metal insulation casing of some batteries was damaged as well, clearly caused again by the tubes. The next question this raises is, "when does actually the damage happen?", a) when the plastic tubes are put in the packs, b) when the pack is put in the housing, or c) during the deployment? During the deployment seems for me relatively unlikely because at that time the whole pack is screwed down which allows minimal movement and the packs are wrapped together. Getting the pack in and out through the tubes with the cables not protected is more likely, but I think it must be the plastic tubes that cause the damage. They have sharp edges, and it looks like that they were pushed in with quite a bit of force. This could also explain the damage on the other side of the batteries. My suggestions of our findings is that for the next battery packs the cable wiring has to be changed to avoid any damage by the tubes... So it looks like that the bare wires have caused a short in the whole system, which drained the clock + main battery packs [(-8.7, +13.1), Sounder +15.8] and caused all the corrosion on the transducer head.

### **malfunction of WCP 005:**

Regarding the malfunction of the WCP over the last deployment period we haven't got a clue. When we recovered it and connected it to the PC, we had no communications problems and the WCP responded fine. After discovering that there was no sampling file on the machine we tested the clock and it showed only a 4 minutes drift, so we believe that the clock was working. Our test immediately afterwards was successful and the WCP did exactly what it was told. Because of the lack of time we could not do any further test so it went in with new settings and the hope that it will gather data this time!

## **work carried out:**

### **WCP battery packs**

replaced battery pack of damaged WCP (=WCP004) (24.04.03):

- shaft taken out of the housing
- shaft covered with heat shrink instead of silicone sheath
- Battery packs put on individually (outside housing)
- Battery packs wrapped together
- Battery pack lowered in housing and screwed down

capacity old: -8.7, +13.1, +15.8 (Sounder)

capacity new: -12.8, +15.9, +15.9

### **NOVATEC beacons**

new shallow one: R09-020, Ch. B, 159.48 MHz

new deep one: R09-021, Ch. C, 160.725 MHz

### **ARGOS beacons**

new shallow one: SN 250, ID 35519

new deep one: SN 251, ID 35520

### **Releases**

New batteries in deep water release 290 on 23.04.03

new batteries in shallow water release 092 on 28.04.03

### **Recommendations**

- all instruments need new batteries
- ADCP: buy 64 MB flash cards. increased Memory capacity would enable us to go for a ping interval of 3.5 or 4 min. instead of 6 min.
- WCP: new battery packs with adjusted capacity and if possible new smaller housings.
- WCP: increased memory on circuit board
- WCP: build ping receiver for WCP!!
- WCP: pin of connector broken, has to be replaced!!
- WCP: new sacrificial anodes needed for both WCP
- CTD: on shallow water mooring mounting not replaced, it was to tied on the metal frame, but edges were broken
- all O – rings should be replaced next time

## Instrument settings (general):

### **CTD**

*shallow:*

start time: 28.04.03 sample interval: 240 sec.

*deep:*

start time: 27.04.03

sample interval: 240 sec.

### **WCP**

*shallow:*

start time: 29.04.03

stop time: 19.11.03

sample interval: 3 min:28 sec

bin size: 32

gain: 4

*deep:*

start time: 28.04.03

stop time: 18.11.03

sample interval: 3 min:28 sec

bin size: 32

gain: 4

calc. resources: 63.24 MB

### **ADCP**

*shallow:*

start time: 29.04.03

duration: 210 days

sample interval: 6 min

pings in interval: 7

*deep:*

start time: 28:04.03

duration: 210 days

sample interval: 6 min

pings in interval: 7