CHALLENGER 72/90 LEG 3
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Roy Lowry

"Cruise report" for CH72c

Mooring 'C' was moved to position 'E' on 1st October. Mooring 'A' was lifted + redeployed on Oct 8th. (at same site)

P.T.O.

and PSW.

Summary of Operations

The cruise was largely successful in relation to the above goals. We were favoured with weather conditions which, while not always clement, were near-ideal for the scientific purposes of the cruise and never so severe that we had to give up working for more than a few hours.
The anticipated contrast in the intensity of stirring between the first (post-springs survey) on the 9-10/10 and the second (post neaps) was enhanced by strong winds 20-35 knots from the westerly quarters for the first five days. After that the winds were generally lighter with rather little wind and wave mixing operating at the time of neaps.
We started our programme by sampling the chemical composition of the Rhine in the Rotterdam Waterway over a tidal cycle. The location for this was less than ideal, being upstream from the confluence with the Oude Maas but it was the best available in the tightly controlled conditions of the Waterway where we had access to very few berths below Rotterdam.
For the surveys we chose to follow the established grid used by our Dutch colleagues on the Holland. We covered this grid and an extension south as far as Walcheren in just over two days.
We found almost complete vertical mixing over the whole area with strong horizontal gradients in the cross-shore direction to the North

of the Rhine entrance.
For the next three days(11-13 /10) we undertook three 25 hour time series of observations within the mooring array, with CTD profiles at 30 minute intervals, and a series of circuits of the main mooring triangle to determine the spatial structure of the flow (using ADCP) with a view to measuring the fluxes of water properties.
Some difficulty was experienced with the ADCP system which periodically lost bottom track apparently because of a fault in the new control software. After consultations with RVS Barry, we were able to avoid the worst of the problem but clearly the offending firmware needs to be changed.
One day (14/10) was dedicated to retrieving POL moorings at positions G and H some 9 hours steaming to the north of our working area.
Both moorings were successfully recovered along with two pressure recorders deployed on the second leg of CH72 as part of an experiment to determine the influence of seabed topography on frictional drag.
The second (post neaps) regional survey was conducted on the 15-16/10 without difficulty except for a short breakdown on the CTD which was occasioned by the leakage of the main sea-unit junction box.
Although all the main components of the CTD system are duplicated,no spare is carried for this junction box and it is fortunate that we were able to repair it without undue delay.
Apart from this problem the CTD and all the auxilliary sensors functioned reliably throughout the period although there are some doubts about the quality of the dissolved oxygen data for part of the first survey.
In all we completed more than 220 CTD dips with a correspondingly large number of samples from the rosette system. These samples allowed the mapping of nutrients(D.Hydes),chlorophyll(Mills and Walne) heavy metals (Althaus and Hall) and fine sediments(Jago and Moffat). Samples were also analysed for halocarbons(Kryscll).
The final two days of the cruise were dedicated to the recovery of our mooring array and the servicing of a POL-Bangor mooring in the Straits of Dover. During the recovery of the main array we experienced a winch failure while lifting the last M mooring at the central position E. The fault(a burned-out rectifier) was rapidly diagnosed and a replacement fitted.
Otherwise the recovery proceeded without difficulaty. All the moorings of the MAST experiment were recovered intact except for the loss of a single surface current meter. A POL mooring (the ETA rig) could not be traced and is presumed to have broken adrift early in the experiment since it was not seen by the Dutch vessel Rotterdam which moved our C mooring to position E on 1/10.

Equipment performance

With the exception of the items noted above the performance of the ship's equipment was generally very satisfactory. Concern about the CTD winch, following the loss of the sea unit on the first leg, led to extra vigilance in order to ensure that no loose turns developed: the standard of winch driving was judged to be much improved after the training of previously inexperienced staff.

Conclusion

Overall we were very well pleased with the outcome of this cruise which has provided us with a data set which will contribute greatly to understanding the Rhine outflow system and to the development and testing of models to predict the behaviour of such systems. We were particularly fortunate to observe such a clear example of restratification which followed the change in mixing conditions half way through the cruise. The good weather also allowed us to obtain several clear images from AVHRR which were efficiently processed and relayed to us by Steve Groom of the NERC unit at Polytechnic South-west.

Throughout the cruise we enjoyed the most cordial of relations with the Captain and crew of the Challenger and, as usual, were impressed by their cheerful and thoroughly professional approach.

I look forward to sailing with the ship again next month.

18th October 1990 J.H.Simpson

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Items for RVS action

1) ADCP firmware to be replaced with current version and tested.

2) ADCP gyro input needs to be checked; intermittent operation observed early in the cruise.

3) CTD sea unit junction box to be replaced and a spare unit made available on Challenger.

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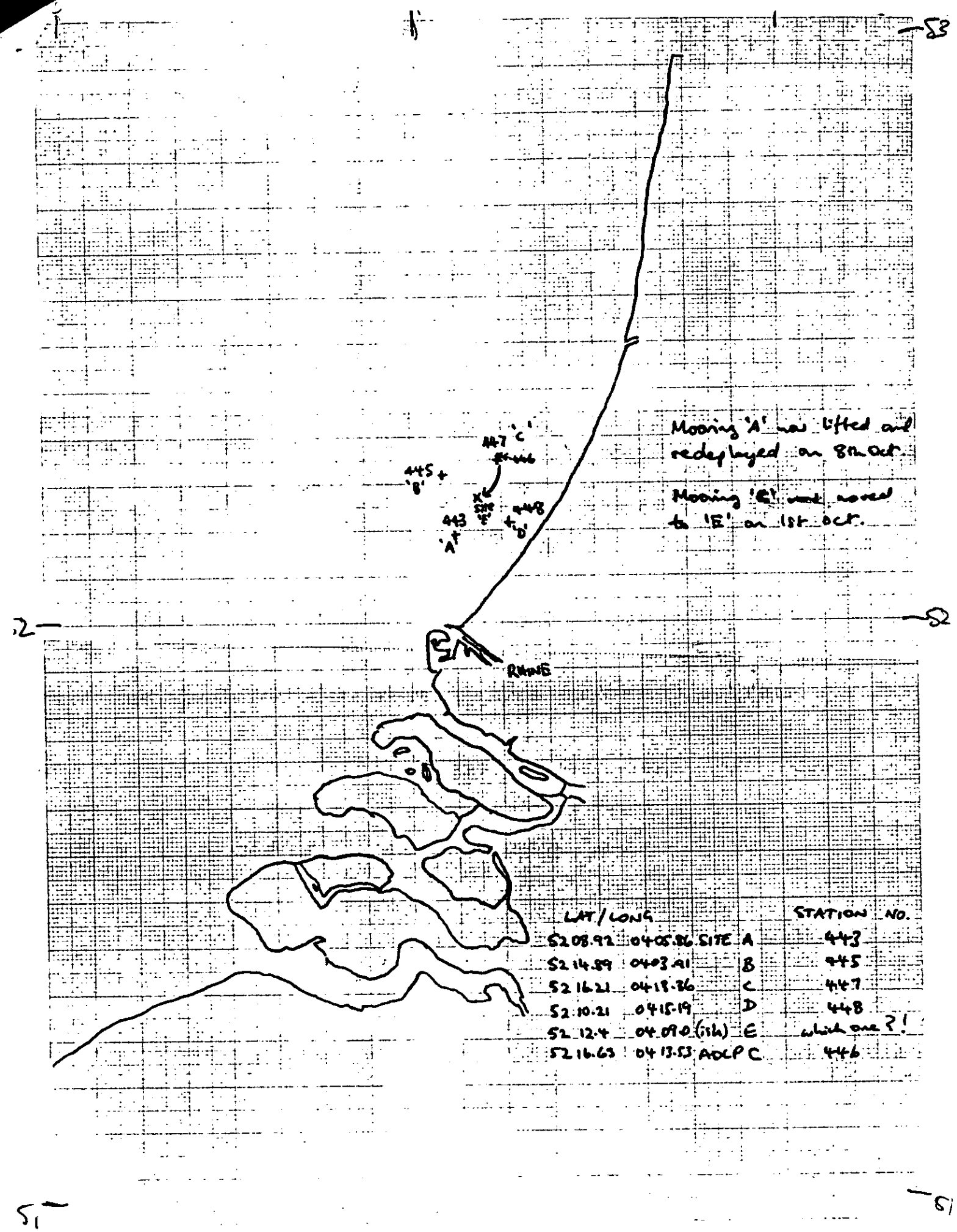
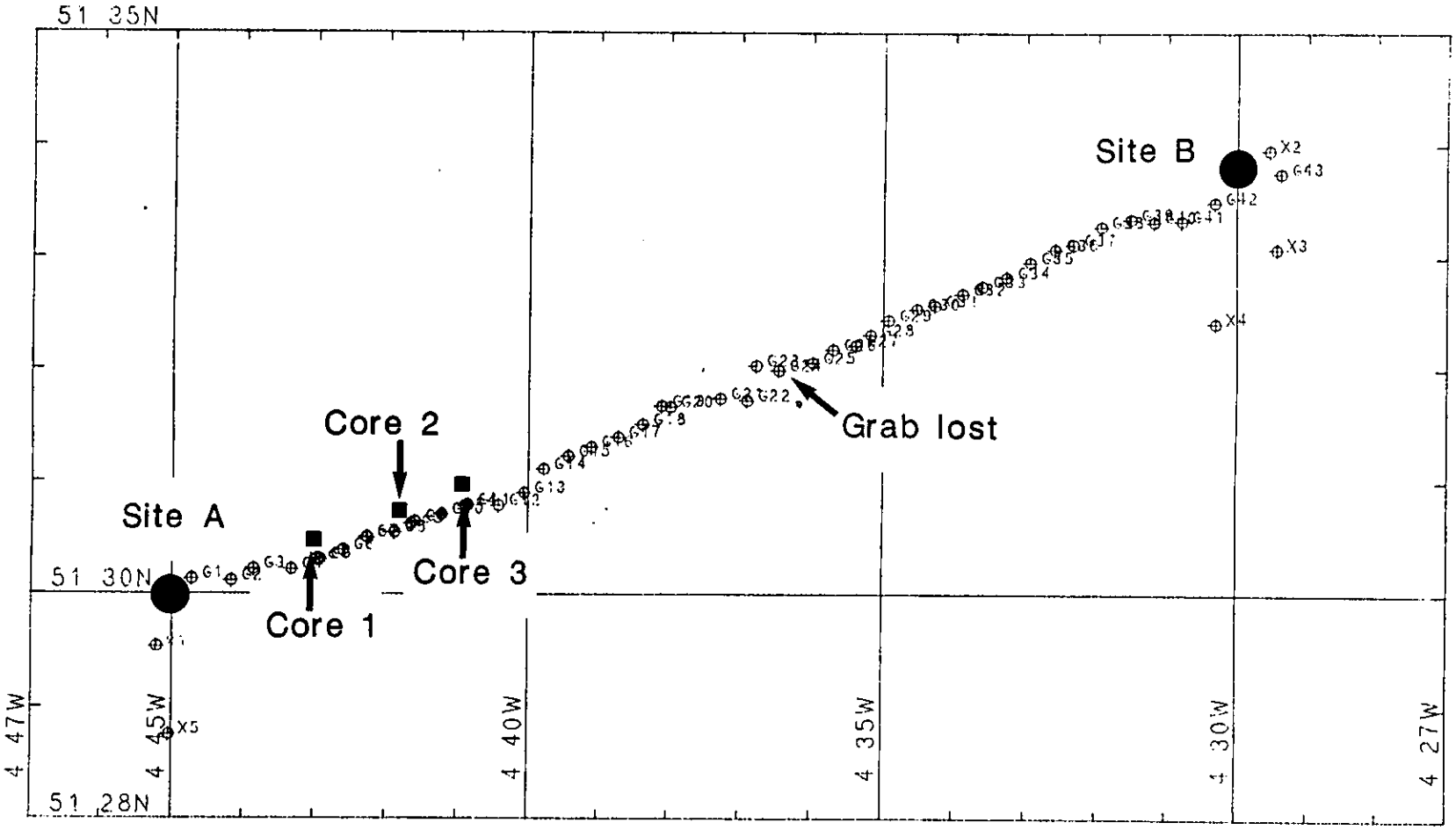


LAT / LONG			STATION NO.
52 08.92	04 05.86	SITE A	443
52 14.89	04 03.41	B	445
52 16.21	04 18.36	C	447
52 10.21	04 15.19	D	448
52 12.4	04 09.0 (ish)	E	which one?!
52 16.63	04 13.53	ADCP C	446



RRS Challenger 72b Grab Sample Survey, Line A to B

scale 1:150000

Figure 5