

| 1. RECRAT NUMBER       1. GOVY ACCESSION NO. 5. RECIRGINTS CATALOG HUMBER         MHQI-R1-92       AD-ALOS 82-3         AD-ALOS 82-3       5. TYPE OF REPORT & FEMOD CO         DRIFTING VERTICAL CURRENT METER, MOORED AANDERAA       5. TYPE OF REPORT & FEMOD CO         THERMISTOR CHAIN, AND XBT DATA - JASIN 1978       5. GOUTRACT OR GRANT HUMBER         ATLANTIS-II CRUISE (102)       6. GOUTRACT OR GRANT HUMBER         Nancy J. Pennington and Robert A. Weller       NO0014-76-C-0197; NR (<br>400014-76-C-0197; NR (<br>4000         S. PERFORMING ORGANIZATION NAME AND ADDRESS       NO005 HOL2, MASS achusetts 02543         Woods Hole Oceanographic Institution       *NR 083-400         Woods Hole, Massachusetts 02543       *NR 083-400         *I. REPORT DATE       *NR 083-400         Bay St. Louis, MS 39529       13. NUMBER OF PAGES<br>132         *I. NONITORING AGENCY NAME & ADDRESS       *NR 083-400         *UNCLASSIFIED       13. SECURITY CLASS. (of Microphyloging Office)         Bay St. Louis, MS 39529       13. NUMBER OF PAGES<br>132         *I. NONITORING AGENCY NAME & ADDRESS/// different from Conforming Office)       *NR 083-400         *I. DISTRIBUTION STATEMENT (of Mic Report)       13. NUMBER OF PAGES<br>132         *I. NONITORING AGENCY NAME & ADDRESS/// different from Conforming Office)       *NR 083-400         *I. DISTRIBUTION STATEMENT (of Mic Report)       13.  | REPORT DOCUMENTATION PAGE   | READ INSTRUCTIONS<br>BEFORE COMPLETING FO   |
|--|---|---|
|  | 1. REPORT NUMBER 2. GOVT ACCESSION NO.  | 3. RECIPIENT'S CATALOG NUMBER   |
| <ul> <li>TTLE Zerd Sublino,<br/>DRIFTING VERTICAL CURRENT METER, MOORED AANDERAA<br/>THERMISTOR CHAIN, AND XBT DATA - JASIN 1978</li> <li>TYPE of REPORT MUSC<br/>ATLANTIS-II CUISE (102)</li> <li>TAUTHOR(*)<br/>Nancy J. Pennington and Robert A. Weller</li> <li>CONTRACT ON GRANT HUMBER<br/>NOOD14-76-C-0197; NR (<br/>400*</li> <li>CONTRACTOR GRANT HUMBER<br/>Woods Hole Oceanographic Institution<br/>Woods Hole Oceanographic Institution<br/>WORDA/National Space Technology Laboratory<br/>Bay St. Louis, MS 39529</li> <li>MUNDER OF PAGES<br/>132</li> <li>MUNDER OF PAGES<br/>1332</li> <li>MUNDER OF PAGES<br/>134</li> <li>MUNDER OF PAGES<br/>135</li> <li>MUNDER OF PAGES<br/>135</li> <li>MUNDER OF PAGES<br/>136</li> <li>MUNDER OF PAGES<br/>137</li> <li>MUNDER OF PAGES<br/>138</li> <li>MUNDER OF PAGES<br/>138</li> <li>MUNDER OF PAGES<br/>139</li> <li>MUNDER OF PAGES<br/>130</li> <li>MUNDER OF PAGES<br/>134</li> <li>MUNDER OF PAGES<br/>135</li> <li>MUNDER OF PAGES<br/>135</li> <li>MUNDER OF PAGES<br/>136</li> <li>MUNDER OF PAGES<br/>137</li> <li>MUNDER OF PAGES<br/>138</li> <li>MUNDER OF PAGES<br/>138</li> <li>MUNDER OF PAGES<br/>139</li> <li>MUNDER OF PAGES<br/>130</li> <li>MUNDER OF PAGES<br/>131</li> <li>MUNDER OF PAGES<br/>132</li> <li>MUNDER OF PAGES<br/>133</li> <li>MUNDER OF PAGES<br/>133</li> <li>MUNDER OF PAGES<br/>134</li> <li>MUNDER OF PAGES<br/>135</li> <li>MUNDER OF PAGES<br/>135</li> <li></li></ul> | WHQI-81-92 AD-A708  | 88-3  |
| DRIFTING VERTICAL CURRENT METER, MOORED AANDERAA<br>THERMISTOR CHAIN, AND XBT DATA - JASIN 1978       Technical Report         ATLANTIS-II CRUISE (102)       E. GRUTALEY GREATHING ONG. REPORT NUM<br>E. PERFORMING ORGANIZATION NAME AND ADDRESS       E. GRUTALEY GREATHING ONG. REPORT NUM<br>(NO0014-76-C-0197; NR (<br>400)         * PERFORMING ORGANIZATION NAME AND ADDRESS       I. COUTALEY GREATHING ONG.<br>400)       F. GRUTALEY GREATHING ONG.<br>400)         * PERFORMING ORGANIZATION NAME AND ADDRESS       I. REPORT DATE<br>0. TABEE AND ADDRESS       I. REPORT DATE<br>0. Cober 1981         NORDA/National Space Technology Laboratory<br>Bay St. Louis, MS 39529       I. NEPORT DATE<br>0. Cober 1981       I. NUMBER OF PAGES<br>132         It WONTONING AGENCY NAME A ADDRESS(If different from Controlling Office)       I. SECURITY CLASS (of this report<br>UNCLASSIFIED         Its BECLISSIFIC TON STATEMENT (of MN REPORT)       I. SECURITY CLASS (of this report<br>UNCLASSIFIED         Its SECURITY CLASS (of this Report)       Approved for public release; distribution unlimited.         The report should be cited as: Woods Hole Oceanog. Tech. Rept. WHOI-81-<br>15. KEV WORDS (Continue on reverse alds (Increasery and (dentify by block number)         I. JASIN       . Vertical current meter<br>3. Temperature data         20. ABSTAACT (Continue on reverse alds (Increasery and (dentify by block number)         The report presents summaries of three data sets taken at and in the<br>vicinity of the oceanographic moorings deployed in the 1978 Joint-Air-Sec<br>Interaction Project (JASIN). The data sets are: (1) the temperature data<br>10. The coperature dat   | 4. TITLE (and Subtitle)   | 5. TYPE OF REPORT & PERIOD CO   |
| International Control of the second state second state of the second state of the second state   | DRIFTING VERTICAL CURRENT METER, MOORED AANDERAA  | Technical Report  |
| 7. AUTHOR(#)       *. CONTRACT OR GRANT HUMBER(<br>Nancy J. Pennington and Robert A. Weller       *. CONTRACT OR GRANT HUMBER(<br>MOD014-76-C-0197; NR (<br>400         9. PERFORMING ORGANIZATION NAME AND ADDRESS       *. CONTRACT OR GRANT HUMBER(<br>MOD04-76-C-0197; NR (<br>400         9. PERFORMING ORGANIZATION NAME AND ADDRESS       *. REPAR MORE UNIT PROJECT.<br>400         Woods Hole; Massachusetts 02543       *. Report Date<br>October 1981         10. CONTROLLING OFFICE NAME AND ADDRESS       *. NR 083-400         11. CONTROLLING OFFICE NAME AND ADDRESS       October 1981         13. NUMBER OF PACES       October 1981         14. NUMBER OF PACES       October 1981         15. NUMBER OF PACES       0.100         16. DISTRIBUTION STATEMENT (of the Report)       Approved for public release; distribution unlimited.         17. DISTRIBUTION STATEMENT (of the electroct milered in Block 20, if different from Report)         18. SUPPLEMENTARY MOTES         This report should be cited as: Woods Hole Oceanog. Tech. Rept. WH01-81-<br>5000000000000000000000000000000000000  | ATLANTIS II CHAIN, AND XBI DAIA - JASIN 1978  | 6. PERFORMING ORG. REPORT NUM   |
| 7. AUTHOR(#)       I. CONTRACT OF GRANT HUMBER<br>Nancy J. Pennington and Robert A. Weller       I. CONTRACT OF GRANT HUMBER<br>NO0014-76-C-0197; NR (<br>4001         9. PERFORMING ORGANIZATION NAME AND ADDRESS       NO0014-76-C-0197; NR (<br>4001         Woods Hole Oceanographic Institution<br>Woods Hole; Massachusetts 02543       NR 083-400         11. CONTROLLING DEFICE NAME AND ADDRESS       NR 083-400         12. CONTROLLING DEFICE NAME AND ADDRESS       October 1981         13. NUMBER OF PAGES       October 1981         14. MONITORING AGENCY NAME A ADDRESS       October 1981         15. NUMBER OF PAGES       13.         16. DISTRIBUTION STATEMENT (of the Report)       INCLASSIFIED         17. DISTRIBUTION STATEMENT (of the ebenetic entered in Block 20, if different from Report)         16. SUPPLEMENTARY NOTES         This report should be cited as: Woods Hole Oceanog. Tech. Rept. WHOI-81-<br>SCREDULE         17. DISTRIBUTION STATEMENT (of the ebenetic entered in Block 20, if different from Report)         18. SUPPLEMENTARY NOTES         This report should be cited as: Woods Hole Oceanog. Tech. Rept. WHOI-81-<br>1. JASIN         2. Vertical current meter         3. Temperature data         26. ABSTRACY (Continue on reverse side if necessary and identify by Mock number)         1. JASIN         27. Vertical current meter         3. Temperature data         26. ABSTRACY (COM   | ATEANTIS-II GROIDE (TOE)  |   |
| Nancy J. Pennington and Robert A. Weller       NU0014-76-C-0197; NR I         Nancy J. Pennington and Robert A. Weller       N00014-76-C-0197; NR I         Woods Hole Oceanographic Institution       Woods Hole Oceanographic Institution         Woods Hole, Massachusetts 02543       *NR 083-400         II. CONTROLLING OFFICE NAME AND ADDRESS       12. REPORT DATE         NORDA/National Space Technology Laboratory       13. Number OF FACES         Bay St. Louis, MS 39529       13. Number OF FACES         II. MONITORING AGENCY NAME & ADDRESS(// different from Controlling Office)       13. Security CLASS (of this report         MONITORING AGENCY NAME & ADDRESS(// different from Controlling Office)       13. Security CLASS (of this report         II. DISTRIBUTION STATEMENT (of this Report)       NUNCLASSIFIED         Approved for public release; distribution unlimited.       14. SUPPLEMENTARY MOTES         This report should be cited as: Woods Hole Oceanog. Tech. Rept. WHOI-81-81-81.         13. JASIN       2. Vertical current meter         3. Temperature data       14. Second forminus on reverse side l'increasery and Identify by Mock number)         1. JASIN       2. Vertical current meter         3. Temperature data       12. Nemperature data sets are: (1) the temperature, pressure and vertical motion records from the freely drifting Vertical Current meter         3. Temperature data thermistor the ATLANTIS II, (2) the temperature data ft the A   | 7. AUTHOR(e)  | B. CONTRACT OR GRANT NUMBER   |
| OCE 77-25803     Oce 79     O  | Nancy J. Pennington and Robert A. Weller  | NUUU14-76-C-0197; NR 0  |
| <ul> <li>PERFORMING ORGANIZATION NAME AND ADDRESS</li> <li>IC TOTAL ADDRESS WOODS HOLE OR CALL AND ADDRESS WOODS HOLE OR CALL AND ADDRESS OR ADDRESS ADDRESS ADDRES</li></ul>   |   | 400"<br>0CF 77-25803  |
| Woods Hole Oceanographic Institution<br>Woods Hole, Massachusetts 02543       *NR 083-400         11. CONTROLLING DEFICE NAME AND ADDRESS<br>NORDA/National Space Technology Laboratory<br>Bay St. Louis, MS 39529       12. REPORT DATE<br>October 1981         13. NUMBER OF PACES<br>132       13. NUMBER OF PACES<br>132         14. MONITORING AGENCY NAME & ADDRESS(// different from Controlling Office)       15. SECURITY CLASS. (of this report<br>UNCLASSIFIED<br>13. SECURITY CLASS. (of this report)         14. MONITORING AGENCY NAME & ADDRESS(// different from Controlling Office)       16. SECURITY CLASS. (of this report)         15. DISTRIBUTION STATEMENT (of the Report)       18. SECURITY CLASS. (of this report)         16. DISTRIBUTION STATEMENT (of the ebetrect entered in Block 20, if different from Report)       19. Security of the ebetrect entered in Block 20, if different from Report)         17. DISTRIBUTION STATEMENT (of the ebetrect entered in Block 20, if different from Report)       1. JASIN         17. DISTRIBUTION STATEMENT (of the ebetrect entered in Block 20, if different from Report)       1. JASIN         18. SEPPLEMENTARY WOTES       This report should be cited as: Woods Hole Oceanog. Tech. Rept. WHOI-81-<br>14. JASIN         20. ADSTRACY (Continue on reverse side if necessary and identify by block number)       1. JASIN         20. ADSTRACY (Continue on reverse side if necessary and identify by block number)       1. JASIN         20. ADSTRACY (Continue on reverse side if necessary and identify by block number)       1. JASIN         20. ADSTRACY   | 9. PERFORMING ORGANIZATION NAME AND ADDRESS   | 10. PROGRAM ELEMENT, PROJECT.   |
| Woods Hole, Massachusetts 02543       *NR 083-400         11. contracting office name and address       12. Report Date         NORDA/National Space Technology Laboratory       13. Number of Pages         Bay St. Louis, MS 39529       13. Number of Pages         13. Number of Pages       13. Number of Pages         14. MONITORING AGENCY NAME & ADDRESS(II different from Controlling Office)       15. SECURITY CLASS. (of this report)         14. MONITORING AGENCY NAME & ADDRESS(II different from Controlling Office)       15. SECURITY CLASS. (of this report)         15. DISTRIBUTION STATEMENT (of this Report)       15. SECURITY CLASS. (of this report)         Approved for public release; distribution unlimited.       17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, If different from Report)         17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, If different from Report)       16. Supplementary notes         17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, If different from Report)       17. JASIN         18. Supplementary notes       This report should be cited as: Woods Hole Oceanog. Tech. Rept. WHOI-81-81-81-81-82-82-82-82-82-82-82-82-82-82-82-82-82-   | Woods Hole Oceanographic Institution  | AREA & WORK UNIT NUMBERS  |
| <ul> <li>11. CONTROLLING OFFICE NAME AND ADDRESS</li> <li>12. REPORT DATE<br/>October 1981</li> <li>13. NUMBER OF PAGES<br/>132</li> <li>14. MONITORING AGENCY NAME &amp; ADDRESS(II different from Controlling Office)</li> <li>15. SECURITY CLASS. (of this report)</li> <li>16. DISTRIBUTION STATEMENT (of the Report)</li> <li>Approved for public release; distribution unlimited.</li> <li>17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, If different from Report)</li> <li>18. SUPPLEMENTARY MOTES</li> <li>This report should be cited as: Woods Hole Oceanog. Tech. Rept. WHOI-81-</li> <li>19. ASIN</li> <li>2. Vertical current meter</li> <li>3. Temperature data</li> <li>20. ABSTRACY (Continue on reverse side // necessary and identify by block number)</li> <li>1. JASIN</li> <li>2. Vertical current meter</li> <li>3. Temperature data</li> <li>20. ABSTRACY (Continue on reverse side // necessary and identify by block number)</li> <li>1. The report presents summaries of three data sets taken at and in the vicinity of the oceanographic moorings deployed in the 1978 Joint-Air-See Interaction Project (JASIN). The data sets are: (1) the temperature, pressure and vertical motion records from the freely drifting Vertical Current so on N.H.O.I. mooring 653, designated as JAS mooring W3, and (3) the expendable bathythermograph (XBT) data collected from the ATLANTIS II while participating in the JASIN Project.</li> </ul>   | Woods Hole, Massachusetts 02543   | *NR 083-400   |
| <ul> <li>11. CONTROLLING OFFICE NAME AND ADDRESS</li> <li>NORDA/National Space Technology Laboratory<br/>Bay St. Louis, MS 39529</li> <li>13. NUMBER OF PAGES</li> <li>14. MONITORING AGENCY NAME &amp; ADDRESS(II different from Controlling Office)</li> <li>15. SECURITY CLASS. (of the report)</li> <li>Approved for public release; distribution unlimited.</li> <li>17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)</li> <li>18. SUPPLEMENTARY MOTES</li> <li>This report should be cited as: Woods Hole Oceanog. Tech. Rept. WHOI-81-</li> <li>19. KEY WORDS (Continue on reverse side if necessary and identify by block number)</li> <li>1. JASIN</li> <li>2. Vertical current meter</li> <li>3. Temperature data</li> </ul> 20. ABSTRACY (Continue on reverse side if necessary and identify by block number) The report presents summaries of three data sets taken at and in the vicinity of the oceanographic moorings deployed in the 1978 Joint-Air-Sea Interaction Project (JASIN). The data sets are: (1) the temperature, pressure and vertical motion records from the Freely drifting Vertical Current so on N.H.O.I. mooring 653, designated as JAS mooring W3, and (3) the expendable bathythermograph (XBT) data collected from the ATLANTIS II while participating in the JASIN Project.   |   |   |
| NORDA/National Space lectrology Laboratory<br>Bay St. Louis, MS 39529       15. NUMBER OF PAGES<br>132         IT MONITORING AGENCY NAME & ADDRESS(II different from Controlling Office)       15. NUMBER OF PAGES<br>132         IT MONITORING AGENCY NAME & ADDRESS(II different from Controlling Office)       15. SECURITY CLASS. (a) this report<br>UNCLASSIFIED         15. DISTRIBUTION STATEMENT (of the Report)       Approved for public release; distribution unlimited.         17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, If different from Report)         18. SUPPLEMENTARY NOTES         This report should be cited as: Woods Hole Oceanog. Tech. Rept. WHOI-81-         19. XEY WORDS (Continue on reverse side if necessary and identify by block number)         1. JASIN         2. Vertical current meter         3. Temperature data         20. ABSTRACT (Continue on reverse side if necessary and identify by block number)         1. JASIN         20. ABSTRACT (Continue on reverse side if necessary and identify by block number)         1. JASIN         20. ABSTRACT (Continue on reverse side if necessary and identify by block number)         1. JASIN         20. ABSTRACT (Continue on reverse side if necessary and identify by block number)         1. JASIN         2. Vertical current meter         3. Temperature data         20. ABSTRACT (Continue on reverse side if necessary and identify by block number)  | 11. CONTROLLING OFFICE NAME AND ADDRESS   | 12. REPORT DATE<br>October 1981   |
| 132         13         13         14         MONITORING AGENCY NAME & ADDRESS(II different from Controlling Office)         15         15         16         DISTRIBUTION STATEMENT (of the Report)         Approved for public release; distribution unlimited.         17         17         18         19         19         19         19         10         10         11         11         12         13         14         15         16         17         17         18         19         19         10         10         11         11         12         13         14         15         16         17         18         19         10         14         14         15         16         17         18         19  | NURDA/National Space lechnology Laboratory  | 13. NUMBER OF PAGES   |
| 14       MONITORING AGENCY NAME & ADDRESS(II different from Controlling Office)       15. SECURITY CLASS. (of this report<br>UNCLASSIFIED         18       DEFINITION STATEMENT (of this Report)         Approved for public release; distribution unlimited.         17. DISTRIBUTION STATEMENT (of the aberract entered in Block 20, if different from Report)         18. SUPPLEMENTARY HOTES         This report should be cited as: Woods Hole Oceanog. Tech. Rept. WHOI-81-         19. KEY WORDS (Continue on reverce aide if necessary and identify by block number)         1. JASIN         2. Vertical current meter         3. Temperature data         20. ABSTRACT (Continue on reverce aide if necessary and identify by block number)         1. JASIN         20. ABSTRACT (Continue on reverce aide if necessary and identify by block number)         1. UASIN         20. ABSTRACT (Continue on reverce aide if necessary and identify by block number)         1. UASIN         20. ABSTRACT (Continue on reverce aide if necessary and identify by block number)         1. UASIN         21. ABSTRACT (Continue on reverce aide if necessary and identify by block number)         1. UASIN         22. ABSTRACT (Continue on reverce aide if necessary and identify by block number)         1. UASIN         22. ABSTRACT (Continue on reverce aide if necessary and identify by block number)         23. Temperature d  | Day JC. LUUIS, MJ JJJCJ   | 132   |
| UNCLASSIFIED<br>15. DISTRIBUTION STATEMENT (of this Report)<br>Approved for public release; distribution unlimited.<br>17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)<br>18. SUPPLEMENTARY HOTES<br>This report should be cited as: Woods Hole Oceanog. Tech. Rept. WHOI-81-<br>19. KEY WORDS (Continue on reverse side if necessary and identify by block number)<br>1JASIN<br>2. Vertical current meter<br>3. Temperature data<br>20. ABSTRACY (Continue on reverse side if necessary and identify by block number)<br>The report presents summaries of three data sets taken at and in the<br>vicinity of the oceanographic moorings deployed in the 1978 Joint-Air-See<br>Interaction Project (JASIN). The data sets are: (1) the temperature,<br>pressure and vertical motion records from the freely drifting Vertical CL<br>Meters (VCMs) deployed from the ATLANTIS II, (2) the temperature data fi<br>the Anderaa thermistor chains on W.H.O.I. mooring 653, designated as JAS<br>mooring W3, and (3) the expendable bathythermograph (XBT) data collected<br>from the ATLANTIS II while participating in the JASIN Project.  | 14 MONITORING AGENCY NAME & ADDRESS(II different from Controlling Office)   | 15. SECURITY CLASS. (of this report)  |
| Instruction Statement (of the Report)  Approved for public release; distribution unlimited.  Approved for public release; distribution unlimited.  I. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)  I. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)  I. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)  I. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)  I. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)  I. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)  I. JASIN  2. Vertical current meter 3. Temperature data  20. ABSTRACT (Continue on reverse side if necessary and identify by block number)  The report presents summaries of three data sets taken at and in the vicinity of the oceanographic moorings deployed in the 1978 Joint-Air-Sea Interaction Project (JASIN). The data sets are: (1) the temperature, pressure and vertical motion records from the freely drifting Vertical Cu Meters (VCMs) deployed fron the ATLANTIS II, (2) the temperature data fr the Aanderaa thermistor chains on W.H.O.I. mooring 63, designated as JAS mooring W3, and (3) the expendable bathythermograph (XBT) data collected from the ATLANTIS II while participating in the JASIN Project.   |   |   |
| SCHEDULE         SCHEDULE         IS: DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)         This report should be cited as: Woods Hole Oceanog. Tech. Rept. WHOI-81-         II: SUPPLEMENTARY NOTES         This report should be cited as: Woods Hole Oceanog. Tech. Rept. WHOI-81-         II: ALSIN         2. Vertical current meter         The report presents summaries of three data sets taken at and in the vicinity of the oceanographic moorings deployed in the 1978 Joint-Air-Sea Interaction Project (JASIN). The data sets are: (1) the temperature, pressure and vertical motion records from the freely drifting Vertical CM Meters (VCMs) deployed from the AILANTIS II, (2) the temperature data fr the Aanderaa thermistor chains on W.H.O.I. mooring 653, designated as JAS mooring W3, and (3) the expendable bathythermograph (XBT) data collecter from the AILANTIS II while participating in the JASIN Project.  |   | UNCLASSIFICATION DOWNGRA  |
| <ul> <li>16. DISTRIBUTION STATEMENT (of the Report)<br/>Approved for public release; distribution unlimited.</li> <li>17. DISTRIBUTION STATEMENT (of the observed entered in Block 20, if different from Report)</li> <li>18. SUPPLEMENTARY NOTES<br/>This report should be cited as: Woods Hole Oceanog. Tech. Rept. WHOI-81-</li> <li>19. KEY WORDS (Continue on reverse olds if necessary and identify by block number)</li> <li>1. JASIN</li> <li>2. Vertical current meter</li> <li>3. Temperature data</li> <li>20. ABSTRACT (Continue on reverse olds if necessary and identify by block number)<br/>The report presents summaries of three data sets taken at and in the vicinity of the oceanographic moorings deployed in the 1978 Joint-Air-Sea Interaction Project (JASIN). The data sets are: (1) the temperature, pressure and vertical motion records from the freely drifting Vertical Cu Meters (VCMS) deployed fron the ALANTIS II, (2) the temperature data JAS mooring W3, and (3) the expendable bathythermograph (XBT) data collected from the ATLANTIS II while participating in the JASIN Project.</li> </ul>  |   | SCHEDULE  |
| Approved for public release; distribution unlimited.<br>Approved for public release; distribution unlimited.<br>Distribution STATEMENT (of the observation for an and the observation of the   | 16. DISTRIBUTION STATEMENT (of this Report)   |   |
| <ul> <li>18. SUPPLEMENTARY NOTES This report should be cited as: Woods Hole Oceanog. Tech. Rept. WHOI-81- </li> <li>19. KEY WORDS (Continue on reverse side if necessary and identify by block number) <ol> <li>JASIN</li> <li>Vertical current meter</li> <li>Temperature data</li> </ol> </li> <li>20. ABSTRACT (Continue on reverse side if necessary and identify by block number) <ol> <li>The report presents summaries of three data sets taken at and in the vicinity of the oceanographic moorings deployed in the 1978 Joint-Air-Sea Interaction Project (JASIN). The data sets are: (1) the temperature, pressure and vertical motion records from the freely drifting Vertical Cu Meters (VCMs) deployed from the ATLANTIS II, (2) the temperature data from the ATLANTIS II while participating in the JASIN Project.</li> </ol></li></ul>  |   | tea.  |
| <ul> <li>19. KEY WORDS (Continue on reverse elde II necessary and Identify by block number) <ol> <li>JASIN</li> <li>Vertical current meter</li> <li>Temperature data</li> </ol> </li> <li>20. ABSTRACT (Continue on reverse elde II necessary and Identify by block number) <ol> <li>The report presents summaries of three data sets taken at and in the vicinity of the oceanographic moorings deployed in the 1978 Joint-Air-Sea Interaction Project (JASIN). The data sets are: (1) the temperature, pressure and vertical motion records from the freely drifting Vertical Cu Meters (VCMs) deployed fron the ATLANTIS II, (2) the temperature data fr the Aanderaa thermistor chains on W.H.O.I. mooring 653, designated as JAS mooring W3, and (3) the expendable bathythermograph (XBT) data collected from the ATLANTIS II while participating in the JASIN Project.</li> </ol> </li> </ul>   | 17. DISTRIBUTION STATEMENT (of the abetract entered in Block 20, if different fro   | n Report)   |
| 20. ABSTRACT (Continue on reverse elde if necessary and identify by block number)<br>The report presents summaries of three data sets taken at and in the<br>vicinity of the oceanographic moorings deployed in the 1978 Joint-Air-Sea<br>Interaction Project (JASIN). The data sets are: (1) the temperature,<br>pressure and vertical motion records from the freely drifting Vertical Cu<br>Meters (VCMs) deployed fron the ATLANTIS II, (2) the temperature data fr<br>the Aanderaa thermistor chains on W.H.O.I. mooring 653, designated as JAS<br>mooring W3, and (3) the expendable bathythermograph (XBT) data collected<br>from the ATLANTIS II while participating in the JASIN Project.   | 17. DISTRIBUTION STATEMENT (of the abetract entered in Block 20, if different fro<br>18. SUPPLEMENTARY NOTES<br>This report should be cited as: Woods Hole Oceand   | m Report)<br>og. Tech. Rept. WHOI-81-   |
| from the ATLANTIS II while participating in the JASIN Project.   | <ul> <li>17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different fro</li> <li>18. SUPPLEMENTARY NOTES</li> <li>This report should be cited as: Woods Hole Oceand</li> <li>19. KEY WORDS (Continue on reverse elde If necessary and identify by block number)</li> <li>1. (IASIN</li> <li>2. Vertical current meter</li> <li>3. Temperature data</li> </ul>  | m Report)<br>og. Tech. Rept. WHOI-81-   |
|  | <ul> <li>17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different fro</li> <li>18. SUPPLEMENTARY NOTES</li> <li>This report should be cited as: Woods Hole Oceant</li> <li>19. KEY WORDS (Continue on reverse elde If necessary and Identify by block number)</li> <li>1. (JASIN</li> <li>2. Vertical current meter</li> <li>3. Temperature data</li> </ul> 20. ABSTRACT (Continue on reverse elde if necessary and identify by block number) The report presents summaries of three data sticinity of the oceanographic moorings deployed in Interaction Project (JASIN). The data sets are: pressure and vertical motion records from the free Meters (VCMs) deployed fron the ATLANTIS II, (2) the Aanderaa thermistor chains on W.H.O.I. mooring mooring W3, and (3) the expendable bathythermographic mooring | sets taken at and in the<br>n the 1978 Joint-Air-Sea<br>(1) the temperature,<br>ely drifting Vertical Cu<br>the temperature data fr<br>g 653, designated as JAS<br>aph (XBT) data collected |

-----

ALC: NO

-

ALC: LOGAL

の日本のないで、「日本の」のない

ę

WH01-81-92

# DRIFTING VERTICAL CURRENT METER, MOORED AANDERAA THERMISTOR CHAIN, AND XBT DATA -JASIN 1978 ATLANTIS-II CRUISE (102)

by

Nancy J. Pennington and Robert A. Weller

# WOODS HOLE OCEANOGRAPHIC INSTITUTION Woods Hole, Massachusetts 02543

October 1981

### TECHNICAL REPORT

Prepared for the Office of Naval Research under Contract N00014-76-C-0197; NR 083-400 and for the National Science Foundation under Grant OCE 77-25803.

Reproduction in whole or in part is permitted for any purpose of the United States Government. This report should be cited as: Woods Hole Oceanog. Inst. Tech. Rept. WHOI-81-92.

Approved for public release; distribution unlimited.

Approved for Distribution:

Valentine Worthington, Chairman Department of Physical Oceanography

Accession For

Distribution/

Availability Codes Avail and/or Special

ECI

DEC 28 198

NTIS GRA&I

DTIC TAB Unannounced Justification

By\_

Dist

#### Abstract

. . . . .

The report presents summaries of three data sets taken at and in the vicinity of the oceanographic moorings deployed in the 1978 Joint Air-Sea Interaction Project (JASIN). The data sets are: (1) the temperature, pressure and vertical motion records from the freely drifting Vertical Current Meters (VCMs) deployed from the ATLANTIS II, (2) the temperature data from the Aanderaa thermistor chains on W.H.O.I. mooring 653, designated as JASIN mooring W3, and (3) the expendable bathythermograph (XBT) data collected from the ATLANTIS II while participating in the JASIN Project.

i

# TABLE OF CONTENTS

مغربة المعاد

|  | Page |
|--|------|
|  |      |
| List of Tables                         | iii  |
| List of Figures                        | iii  |
| Preface                                | vi   |
| Acknowledgements                       | v    |
| Introduction                           | vi   |
| Part I - Vertical Current Meters (VCM) | 1    |
| Part II - Aanderaa Thermistor Chain    | 19   |
| Part III - Expanded Scale XBTs         | 97   |
| References                             | 132  |

and the state of the

からいとならる

.

ii

# LIST OF TABLES

|    |  | Page      |
|----|--|-----------|
| 1. | Vertical Current Meter (VCM; Summary Sheet | 6         |
| 2. | XBT Positions                              | 101 - 104 |

1. AL.

. . . . . . . .

25 24

÷

١.

LIST OF FIGURES

| 1.  | Chart of JASIN area.                                  | vii      |
|-----|---|----------|
| 2.  | VCM drop area.  | 4        |
| 3.  | Side view of Vertical Current Meter (VCM).            | 5        |
| 4.  | VCM drift patterns.                                   | 9        |
| 5.  | VCM Drop 1 time series.                               | 10       |
| 6.  | VCM Drop 2 time series.                               | 11       |
| 7.  | VCM Drop 3 time series.                               | 12       |
| 8.  | VCM Drop 4 time series.                               | 13       |
| 9.  | VCM Drop 7 time series.                               | 14       |
| 10. | VCM Drop 8 time series.                               | 15       |
| 11. | VCM Drop 9 time series.                               | 16       |
| 12. | VCM Drop 10 time series.                              | 17       |
| 13. | Displacement plots of VCM drops.                      | 18       |
| 14. | Design of mooring W3 showing position of              |          |
|     | Aanderaa thermistor chain.                            | 22       |
| 15. | 37 daily temperature time series.                     | 23 - 59  |
| 16. | 37 daily 9.2° ~ 13.0° isotherms by .2°C.              | 60 - 96  |
| 17. | XBT area.   | 100      |
| 18. | XBT sections during Leg 1 and Leg 2.                  | 105      |
| 19. | Comparison of a regular XBT and an expanded scale XBT | . 106    |
| 20. | Details of XBT system.                                | 107      |
| 21. | Block diagram of XBT.                                 | 109      |
| 22. | Electric circuit diagram of EXBT system.              | 110      |
| 23. | T-S diagrams for CTD stations.                        | 112      |
| 24. | T-S diagram for Fixed Intensive Array (FIA) area.     | 113      |
| 25. | Salinity on 10° surface.                              | 114      |
| 26. | XBT profiles for 17 sections.                         | 15 - 131 |

k. Maarkatededaalatku itu urterek uureren ertere

# PREFACE

This report is the fourth and last in the JASIN (Joint Air-Sea Interaction project) data series. The other reports are:

| Report # | WHOI # | Authors   | Subject                        |
|----------|--------|---|--------------------------------|
| 1        | 79-42  | Pennington, N. and<br>M. G. Briscoe               | CTD Profiles                   |
| 2        | 79-43  | Briscoe, M. G., C. Mills,<br>R. Payne and K. Peal | Meteorological<br>measurements |
| 3        | 79-65  | Tarbell, S., M. G. Briscoe<br>and R. Weller       | Current meter<br>data          |

#### ACKNOWL EDGEMENTS

The W.H.O.I. buoy group designed, prepared, deployed, and recovered the moorings. Jerry Dean was responsible for the preparation and use of the Vertical Current Meters. Rick Trask analyzed the failures of the Aanderaa thermistor chain recorders and, after JASIN, came up with solutions to those failures. We thank Mary Ann Lucas for her typing and editing of this report.

This work has been supported by ONR Contract N00014-76-C-0197, NR083-400 and by NSF Grant OCE77-25803.

#### INTRODUCTION

The Joint Air-Sea Interaction project (JASIN) was a multi-national program initiated in 1966 by the Royal Meteorological Society (U.K); the major field experiment was conducted in July to September 1978 northwest of Scotland in the northern end of Rockall Trough. Some fourteen ships, four aircraft, nine countries, and sixty principal investigators participated. Pollard (1978) provides an overview of the JASIN 1978 experiment.

Work done by participants from the Woods Hole Oceanographic Institution included the deployment of moored current meters and meteorological instrumentation (see Tarbell, <u>et</u>. <u>al</u>., 1979), hydrographic work from the ATLANTIS II (A-II) (see Pennington and Briscoe, 1979), shipboard meteorological measurements (see Briscoe, <u>et</u>. <u>al</u>., 1979), and temperature measurements from moored Aanderaa thermistor chains, XBTs, and the freely drifting Vertical Current Meters (VCMs). This data report contains a description of the Aanderaa thermistor chain, XBT, and VCM components of the JASIN work and summaries of the three data sets.

Figure 1 shows the overall JASIN area and the Fixed Intensive Array (FIA) where most of the JASIN moorings were located. The FIA is detailed in the lower left of Figure 1. Mooring Kl from the Institut fur Meereskunde (Kiel, F. R. Germany), moorings B1-B4 from Oregon State University, and mooring H2 from NOAA/PMEL in Seattle are shown for reference.

The Vertical Current Meters were deployed to track the horizontal velocity field in the vicinity of the moorings and to provide a direct measurement of the vertical component of velocity and of temperature as they drifted. The Aanderaa TR-1 thermistor chain was deployed to investigate the vertical structure of the temperature variability at the location of mooring W3. The XBTs were taken to collect information on the spatial variability of the temperature field in the vicinity of the FIA. This data report is divided into three parts. Parts 1, 2, and 3 cover the Vertical Current Meters, Aanderaa thermistor chains, and XBTs, respectively.

Vi



o.**新主法** a survey a survey and a subject of a listic of

Pittel Barrier + P

語言を読ま

FIGURE 1: Chart of JASIN Area



Part I. Vertical Current Meters

\_\_\_\_\_

and a state of the second s

. .

fina ang shi . .. <sup>1</sup>.. <sup>1</sup>.. .

\_\_\_\_\_

-

2

and an in the State

· ·

#### Vertical Current Meters (VCM)

The VCMs are neutrally buoyant, free-floating instruments which are ballasted to sink to a predetermined depth. While floating at that depth the instrument makes measurements of the vertical velocity relative to itself, of pressure, and of temperature. Three instruments, VCM #1, VCM #2, and VCM #5, were deployed during JASIN in a total of ten different drops. The area within which the floats drifted is shown in Figure 2.

Relative vertical current is sensed by an array of vanes mounted axially around the float, Fig. 3. Because the float compressibility is less (about 1/2) than that of the water, vertical motions in the water generate relative vertical flow past the vanes causing the entire float to rotate. This rotation is sensed relative to an internal compass. The sum of the pressure change (float vertical motion) and the rotation of the float (flow relative to the float) is a measure of total vertical water displacement, with a resolution of about 2 cm. The temperature measurement is accurate to about 0.010°C. On some VCMs (VCM-DT), temperature difference was measured by thermistors placed 1 m apart along the outside of the pressure housing. The accuracy is about .002°C (Dean, 1979). The calibration of float rotation to vertical displacement was done using a plot of relative displacement, proportional to float turns, vs. pressure as the instrument sank during deployment. From the slope of this curve the calibration constant was determined.

The VCM floats used in JASIN were weighed in a fresh water tank at Woods Hole and ballasted to be neutrally buoyant at a selected surface temperature and salinity standard of  $11.0^{\circ}$ C and  $35.32^{\circ}/_{\circ\circ}$ . The ballast was then adjusted for depth based on <u>in situ</u> temperature and salinity at the desired depth. The VCM float constants are approximately

| 0.0804 gm/meter | ballast for depth,      |
|-----------------|-------------------------|
| 0.332 gm/°C     | temperature correction, |
| 27 gm/°/        | salinity correction.    |

A summary of desired depths and actual depths is included in Table 1.



ates control and a first inter a state of a state of a state of the states

Figure 2. White Areas -- VCM Drops



Figure 3. Scaled side view of the vertical current meter (VCM) showing its orientation when neutrally buoyant. The overall length of the instrument from recovery bail (top) to the transducer (bottom) is 2.2 meters. Vertical motion is sensed by eight inclined vanes shown at the mid-point of the cylinder.

TABLE 1. ATLANTIS-II-102 JASIN 1978

and the second and the solution and

12°30'.41W 12°47'.15W 11°47'.72W 12°49'.42W 12°27'.54W 12°53'.24W 12°54'.88W 12°44'.71W 12°44'.71W RETRIEVAL POSITION LONG. WL0. \$0.65 59°C4'.14N 58°34'.70N 59°06'.01N 59°01'.65N 59°11'.62N 59°11'.72N NIE.'90°63 NIE. 60°62 LAT. 12°26°.72W 12°32'.81W 12°04'.77W 12°36'.03W 12°21'.20W 12°30'.88W 12°30'.88W 12°28'.27W 12°28'.27W DEPLOYMENT POSITION LONG. VERTICAL CURRENT METER (VCM) SUMMARY SHEET 59°02'.69N 59°00'.47N N77.'10.62 59°00'.44N 58°41'.28N 58°57'.60N 58°57'.60N 58°58'.50N 58°58'.50N LAT. IN TERCOMPARISON INTERCOMPARISON VCM #2 (DT) VCM #2(DT) VCM #2(DT) VCM #2 (DT) VCM #2(DT) VCM #2(DT) VCM #2 (DT) COMMENT VCM #5 VCM #5 VCM #1 lost on 6 Aug 78 during recovery operations Aug 78 29 Jul 78 Aug 78 6 Aug 78 9 Aug 78 11 Aug 78 11 Aug 78 13 Aug 78 13 Aug 78 1420 0350 2000 TIME 0113 0927 1154 1335 1703 END 1701 2 -28 Jul 78 Aug 78 Aug 78 5 Aug 78 8 Aug 78 9 Aug 78 START TIME 9 Aug 78 12 Aug 78 12 Aug 78 1208 2250 1134 1230 1409 1408 1507 0107 0106 m HOURS DATA 5.0 26.2 32.4 12.8 18.3 45.8 47.5 39.8 39.9 DEPTH E E e E E E E E E NOM. 213 90 113 83 83 75 70 76 68 VCM DROP Ş ----2 m ŝ Q 3 œ σ 10 6

267.7

· • The VCM includes an AMF acoustic release receiver and a release of Will.O.I. design. On command from the ship, or on preset command from an internal timer, the float drops a 900 gm weight and returns to the surface for recovery. A flashing light turns on at release time, and the "ping" rate doubles to confirm release. Four hydrophones, two on each side of the ship, were streamed for the purpose of tracking the VCMs. During JASIN, however, the need for the ATLANTIS II to participate during parts of every day in other experimental work made detailed tracking of the floats impossible. The acoustic tracking capability and the light simplify finding the float on the surface in spite of its low profile in the water. Nine recoveries were made under a variety of weather and light conditions during this cruise. An instrument was lost on the fifth drop during recovery operations.

For further references on VCM design and performance, see Burt <u>et al</u> (1974), Dorson (1974), and Voorhis (1971).

Data recorded each 16 seconds on a digital data cassette recorder include average temperature, as temperature difference (in the VCM-DT models), and pressure for the record interval; accumulated turns at the time of recording; and total number of record intervals since a reference time zero. Preliminary data processing aboard ship consists of reading the data cassette and producing a computer compatible 9-track data record. Data from the 9T tape could be listed and plotted on the Calcomp in engineering units for an early check on quality and a preliminary scientific evaluation.

Table 1 summarizes the VCM performance. There were 11 days, 37 hours of good data records. Drop 6 could not be decoded. Drop 1 was a short duration test deployment. Drop 5 ended with the loss of VCM #1 during recovery. Drops 2, 4, 7, 8, 9 and 10 were conducted in the vicinity of mooring W2, and drop 3 was conducted to the southeast of mooring W2 (Fig. 4). The floats deployed near W2 drifted to the northwest or west. Drops 7 and 8 and drops 9 and 10 were simultaneous deployments of two floats. The float deployed during drop 3 drifted to the southeast.

うちしたち からいの いいちのちち たちちのたち

Figures 5-12 give time series of pressure, temperature, tdif., and float rotation, labelled turns. The floats' pressure record shows that the

instruments oscillated with an amplitude of upwards of 20 meters. Vertical water displacement time series, calculated from the pressure and rotation records and averaged over 12 minute intervals, are shown in Fig. 13. Upward displacement of the water was observed by the VCMs deployed during JASIN.



Figure 4. VCM drift patterns.



State State and a state of the state of the

. . .. .

sublide above a

alist house to a statistic back the state of the

Figure 5.







10111 C 123

Figure 7.



Made and ... have been added

Figure 8.

13



A State for sea where the state beaution

100

Figure 9.



ara a da arawa a tana indalika kita da da kuna a da kuna kuna kuna kuna a madan da kuna kuna da da da da da da

Figure 10.



Figure 11.



Mignie 12.

17

A UNE ALCORE



Figure 13. VCM Displacement plots.

「「「「「「「」」」

- -

# Part II.

# Aanderaa Thermistor Chain



#### Aanderaa Thermistor Chains

1977 - La

and the second second

Three Aanderaa thermistor chains (TR-1) were deployed on W.H.O.I. mooring 653, identified in JASIN as mooring W3. The recording packages of the instruments were each held in a stainless steel bracket with a strength member that fastened in-line with the mooring. The thermistor chains were attached to the wire rope of the mooring with spiral shaped plastic coils (commonly used for wrapping bundles of wires together).

Two of the Aanderaa thermistor chains deployed during JASIN failed to record any data because the magnetic tape became fouled around the tape drive capstan, early in the experiment. The problem occurred because the lower take-up spool did not maintain the proper tension in the tape which allowed the tape to go slack and eventually foul. Subsequent investigations revealed that in the two instruments that failed the shaft on which the lower take-up spool turns was of an older design whereas the corresponding take-up spool had undergone modifications. When this assembly was subjected to cold temperatures, it became jammed which in turn let the tape go slack. The instrument which functioned properly during the experiment did not have this mismatch of new and old components.

The data from the one instrument that did work has been presented in two ways. First, the temperatures recorded by the thermistors (at 31, 34, 37, 40, 43, 46, 49, 52, 55, and 58 m depths, nominally) have been plotted. Second, isotherm depths (for the 13.0, 12.8, 12.6, 12.4, 12.2, 12.0, 11.8, 11.6, 11.4, 11.2, 11.0, 10.8, 10.6, 10.4, 10.2, 10.0, 9.8, 9.6, 9.4, and 9.2°C isotherms) have been plotted. In both cases the scales have been chosen to match the scales used in the Oregon State University data reports covering their JASIN thermistor chain data.



Figure 14.





\_\_\_\_






































are service of













The state of the s





......



a water and the





Constant State State State Strand Sections



÷.

, 3 . de : 1

and the second second













-----



DAY 213

and a set in the other shifts

記書に言語な




and the second secon









*ся* .















Isotherm depths for .2° increments ranging from 10.4° to Figure 16. 12.8°.













and. to adding a state



And a little lit







Isotherm depths for .2° increments ranging from 10.0° to *Figure 16.* 12.8°.

DAY 226







というのの知識が

. ]





and the line













15.10.100





March and a strate of the state of the

















1.1.1.1.1

كالمشكطية

Contraction and

























A MARINE DATA AND A CARDON AND A







## Part III Expanded Scale XBTs

音を言まえてい
. . .

#### XBT Data

Some 169 XBTs (expendable bathythermographs) were dropped from ATLANTIS II during the JASIN experiment. Figure 17 shows the area in which the XBTs were dropped. Table 2 lists the time, location, and bucket temperature associated with each drop. Figure 18 shows the patterns of the XBT drop locations. EXBT System

The standard Sippican Co. Expendable Bathythermograph (XBT) bridge and recording system has an indicated temperature scale of  $-2^{\circ}C - 35^{\circ}C$ , approximately 5°C/inch and a depth scale of 100 meters/inch. These fixed scales are somewhat awkward when one is working in regions of the ocean where the temperature of the entire water column varies by as little as 2°C. To overcome these limitations we replaced the Sippican XBT bridge and recorder with a simple and inexpensive bridge. We utilized an Hewlett Packard strip chart recorder (model 7100B) to plot the output from the bridge. Figure 19 illustrates the difference between the EXBT scales and the standard Sippican XBT recorder scales. Theory of Operation

The Sippican XBT probe consists of a molded projectile with a thermistor recessed in the nose, which falls through the water column at an approximately constant rate. The resistance of the thermistor is sensed through a copper wire which unwinds from a spool contained within the projectile (see Fig. 20a) and from a second spool remaining in the launcher.

The thermistor's resistance,  $R_T$ , decreases about 5% per degree centigrade temperature increase. In addition to the resistance change of interest, the resistance of the copper wire,  $R_C$ , and the sea water to ship's ground,  $R_{sw}$ , vary continuously. Figure 20c details the resistance involved in the primary and secondary measurement loops. The secondary loop is identical to the primary loop except that it does not contain a thermistor.



Ę.

जन्म का <del>ह</del>िन्द्र में जन्म

199

Figure 17. XBT positions.

| Tal | 510 | e 2 |
|-----|-----|-----|
|-----|-----|-----|

\_\_\_\_\_\_

and the second second

JASIN 1978 ATLANTIS-II-102

XBT Positions

|           |          | UTC   |           |                |                            |
|-----------|----------|-------|-----------|----------------|----------------------------|
| ID        |          | START | LAT       | LONG           |                            |
| ŧ         | Date     | TIME  | (N)       | (W)            | COMMENTE                   |
| LEG 1     |          |       |           |                | CONTENTS                   |
|           |          |       |           |                |                            |
| 1         | 8-7      | 1300  | 59° 15.56 | 130 00 37      | SFA SUPEACE MEMD - 12 190  |
| 2         | 7        | 1433  | 13.64     | 120 58 72      | SEA SONTACE TEMP = 13.1 °C |
| 3         | . 7      | 1534  | 12.56     | 55 53          | 13.2                       |
| 4         | 7        | 1654  | 10 68     | 57,53<br>57 EU | 13.4                       |
| 5         | 7        | 1758  | 10.00     | 32.50          | 13.3                       |
| 6         | 7        | 1003  | 09.01     | 49.04          | 13.1                       |
| 7         | 7        | 1037  | 00.00     | 47.76          | 13.5                       |
| 8         | 7        | 2227  | 07.11     | 43.85          | 13.1                       |
| 9 A .     | 7        | 2113  | 03.26     | 39.63          | 13.2                       |
| 0         | 7        | 2110  | 04.92     | 38.32          | -                          |
| 20        | ,<br>0 b | 213/  | 04.58     | 38.29          | 13.2                       |
| 101       | 8-8      | 0131  | 58 56.82  | 24.66          | 13.5?                      |
|           | 8        | 0136  | 56.65     | 24.04          | 13.5                       |
| 11        | 8        | -     | 55.73     | 22.13          | 13.3                       |
| 12        | 8        | 0308  | 54.27     | 19.36          | 13.5                       |
| 13        | 8        | 0339  | 52.90     | 16.56          | 13.3                       |
| 14        | 8        | 0507  | 51.29     | 13.80          | 13.7                       |
| 15        | 8        | 0532  | 49.99     | 11.03          | 13.2                       |
| 16        | 8        | 0655  | 48.06     | 07.60          | 13.5                       |
| 17        | 8        | 0747  | 47.40     | 05.86          | 13.2                       |
| 18        | 8        | 1118  | 45.91     | 02.37          | 13.2                       |
| 19        | 8        | 1138  | 44.47     | 11° 59.76      | 13.1                       |
| 20        | 8        | 1250  | 44.15     | 12° 00.50      | 13.3                       |
| 21        | 8        | 1300  | 45.01     | 02.03          | 13.1                       |
| 22        | 8        | 1310  | 46.07     | 03.82          | 13 1                       |
| 23        | ABORTED  |       |           |                | 1.0 · 1                    |
| 23A       | 8        | 1321  | 47.41     | 06.07          | 1.2.0                      |
| 24        | 8        | 1330  | 48.50     | 07.91          | 13.0                       |
| 25        | 8        | 1340  | 49.76     | 09.89          | 13 1                       |
| 26        | 8        | 1350  | 51.05     | 11.68          | 12 1                       |
| 27        | 8        | 1400  | 52.40     | 13 38          | 12.1                       |
| 28        | 8        | 1410  | 53 74     | 15 12          | 13.1                       |
| 29        | 8        | 1420  | 55 17     | 16 40          | 13.2                       |
| 30        | Ř        | 1430  | 56 80     | 17 21          | 13.1                       |
| 31        | 8        | 1400  | 50.00     | 10 17          | 13.1                       |
| 32        | ц<br>В   | 1450  | 50.34     | 10.17          | 13.1                       |
| 3-        | 8-10     | 1450  | 59.02     | 19.39          | 13.2                       |
| 24        | 10       | 0100  | 59 00.00  | 30.00          | 13.3                       |
| 34<br>35  | 10       | 0.00  | 00.23     | 22.70          | 13.0                       |
| 30        | 10       | 0110  | 00.26     | 20.01          | 13.0                       |
| 30        | 10       | 0120  | 00.22     | 17.31          | 13.0                       |
| .5/<br>วย | 10       | 0130  | 00.27     | 14.01          | 13.0                       |
| 38<br>30  | 10       | 0140  | 00.21     | 11.88          | 12.95                      |
| 39        | 10       | 0150  | 00.19     | 09.12          | 12.95                      |
| 40        | 10       | 0200  | 00.23     | 06.37          | 12,95                      |

2012/01/2012

# Table 2 (continued)

XBT Positions

|      | -    | UTC   |           |           |                                      |
|------|------|-------|-----------|-----------|--------------------------------------|
| TD . |      | START | LAT       | LONG      |                                      |
| #    | DATE | TIME  | (N)       | (W)       | COMMENTS                             |
|      |      |       | ()        | ()        | 001210.010                           |
| 41   | 8-10 | 0210  | 59' 00.19 | 12° 03.61 | SEA SURFACE TEMP = $12.95^{\circ}$ C |
| 42   | 10   | 0220  | 00.05     | 00.86     | 12.95                                |
| 43   | 10   | 0224  | 58° 59,98 | 11° 59.83 | 12.95                                |
| 44   | 10   | 0230  | 59.47     | 59.78     | 12.95                                |
| 45   | 10   | 0240  | 58,50     | 12° 01.68 | 12,95                                |
| 46   | 10   | 0250  | 57.52     | 03,56     | 12.95                                |
| 47   | 10   | 0300  | 56.48     | 05.41     | 12.95                                |
| 48   | 10   | 0310  | 55.60     | 07.36     | 12.9                                 |
| 49   | 10   | 0320  | 54.55     | 09.23     | 12.95                                |
| 50   | 10   | 0331  | 53.51     | 11.35     | 13.0                                 |
| 51   | 10   | 0340  | 52.66     | 13.09     | 12.95                                |
| 52   | 10   | 0350  | 51.69     | 14.95     | 12.95                                |
| 53   | 10   | 0400  | 50.75     | 16.80     | 13.0                                 |
| 54   | 10   | 0410  | 49.69     | 18.86     | 13.0                                 |
| 55   | 10   | 0418  | 49.03     | 20.17     | 13.05                                |
| 56   | 10   | 1200  | 59° 05.49 | 25.99     | 13.5                                 |
| 57   | 10   | 1215  | 05.42     | 21.58     | 13.1                                 |
| 58   | 10   | 1223  | 05.32     | 18.52     | -                                    |
| 59   | 10   | 1230  | 05.23     | 17.01     | 13.1                                 |
| 60   | 10   | 1245  | 05.12     | 12.37     | 13.2                                 |
| 61   | 10   | 1300  | 05.05     | 07.75     | 12.9                                 |
| 62   | 10   | 1315  | 05.05     | 03.21     | 12.8                                 |
| 63   | 10   | 1330  | 05.11     | 11° 58.73 | 12.9                                 |
| 64   | 10   | 1345  | 04.82     | 54.62     | 12.9                                 |
| 65   | 10   | 1400  | 02.80     | 54.76     | 13.0                                 |
| 66   | 10   | 1415  | 00.41     | 54.93     | 13.2                                 |
| 67   | 10   | 1430  | 58° 58.22 | 54.82     | 13.2                                 |
| 68   | 10   | 1445  | 56.10     | 54.76     | 13.45                                |
| 69   | 10   | 1500  | 53.96     | 54.90     | 13.5                                 |
| 70   | 10   | 1515  | 51.89     | 54.93     | 13.4                                 |
| 71   | 10   | 1530  | 49.80     | 54.88     | 13.4                                 |
| 72   | 10   | 1545  | 47.74     | 54.83     | 13.1                                 |
| 72A  | 10   | 1600  | 45.63     | 54.98     | 13.3                                 |
| 73   | 10   | 1615  | 44.67     | 57.70     | 13.1                                 |
| 74   | 10   | 1630  | 44.79     | 12° 02.29 | 13.0                                 |
| 75   | 10   | 1645  | 44.95     | 06.88     | 13.0                                 |
| 7E   | 10   | 1700  | 44.97     | 11.47     | 13.2                                 |
| 77   | 10   | 1715  | 45.03     | 16.01     | 13.2                                 |
| 78   | 10   | 1730  | 45.04     | 20.66     | 13.1                                 |
| 79   | 10   | 1745  | 45.05     | 25.27     | 13.0                                 |
| °0,  | 10   | 1800  | 47.68     | 25.21     | 13.0                                 |
| 81   | 10   | 1815  | 50.40     | 24.89     | 13.0                                 |
| 82   | 10   | 1830  | 53,08     | 24.97     | 13.0                                 |
| 83   | 10   | 1845  | 55 81     | 25 28     | ונו                                  |

# Table 2 (continued)

.

# XBT Positions

|       |      | UTC   |           |           |                            |
|-------|------|-------|-----------|-----------|----------------------------|
| ID    |      | START | LAT       | LONG      | 00101000                   |
| #     | DATE | TIME  | (N)       | (W)       | COMMENTS                   |
| LEG 2 |      |       |           |           |                            |
| 84    | 9-4  | 0830  | 58° 56.18 | 12° 29.96 | TEST                       |
| 85    | 4    | 0900  | 56.38     | 23.54     | START THERMISTOR CHAIN BUT |
| 86    | 4    | 0910  | 16.65     | 21.60     | TURN NORTH                 |
| 87    | 4    | 0920  | 57.64     | 21.47     |                            |
| 88    | 4    | 0930  | 58.60     | 21.4.2    |                            |
| 89    | 4    | 0940  | 59.60     | 21.32     |                            |
| 90    | 4    | 0950  | 00.61     | 21.20     |                            |
| 91    | 4    | 1000  | 59° 01.59 | 21.08     |                            |
| 92    | 4    | 1010  | 02.62     | 20.97     |                            |
| 93    | 4    | 1020  | 03.61     | 20.89     |                            |
| 94    | .4   | 1030  | 04.21     | 21.68     | TURN WEST                  |
| 95    | 4    | 1040  | 00.21     | 23.45     |                            |
| 96    | -    |       |           |           |                            |
| 97    | 4    | 1050  | 04.13     | 25.26     |                            |
| 98    | 4    | 1100  | 04.02     | 27.03     |                            |
| 99    | 4    | 1110  | 03.95     | 28.79     |                            |
| 100   | 4    | ∿1120 | 03.91     | 30.55     |                            |
| 101   | 4    | 1123  | 03.91     | 31.44     |                            |
| 102   | 4    | 1130  | 03.78     | 32.35     |                            |
| 103   | 4    | 1140  | 03.77     | 34.16     |                            |
| 104   | 4    | 1150  | 03.63     | 36.01     |                            |
| 105   | 4    | 1200  | 03,59     | 37.82     | TURN SOUTH                 |
| 106   | -    |       |           |           |                            |
| 107   | 4    | 1210  | 02.73     | 38.28     |                            |
| 108   | 4    | 1220  | 01.61     | 38.23     |                            |
| 109   | 4    | 1230  | 00.48     | 38.17     |                            |
| 110   | 4    | 1240  | 58° 59.40 | 38.19     |                            |
| 111   | 4    | 1250  | 58.28     | 38.21     |                            |
| 112   | 4    | 1300  | 57.19     | 38.24     |                            |
| 113   | 4    | 1310  | 56.18     | 38.29     |                            |
| 114   | 4    | 1320  | 55.79     | 39.65     | TURN EAST                  |
| 115   | 4    | 1330  | 55,90     | 34.99     |                            |
| 116   | 4    | 1340  | 55.92     | 33.11     |                            |
| 117   | 4    | 1350  | 55.95     | 31.23     |                            |
| 118   | 4    | 1400  | 55.97     | 29.41     |                            |
| 119   | 4    | 1410  | 56.00     | 27.55     |                            |
| 120   | 4    | 1420  | 56.05     | 25.77     |                            |
| 121   | 4    | 1430  | 513       | 23.97     |                            |
| 122   | 4    | 1440  | 56.13     | 22.17     |                            |
| 122A  | 4    | 1450  | 56.97     | 21.94     | TURN NORTH                 |

# Table 2 (continued)

XBT Positions

|      |            | UTC   |           |           |           |          |
|------|------------|-------|-----------|-----------|-----------|----------|
| ID   |            | START | LAT       | LONG      |           |          |
| #    | DATE       | TIME  | (N)       | (W)       |           | COMMENTS |
| 123  | 9-4        | 1500  | 58° 57.91 | 12° 22.07 |           |          |
| 124  | 4          | 1510  | 58.90     | 22.22     |           |          |
| 125  | 4          | 1520  | 59.87     | 22.38     |           |          |
| 126  | 4          | 1530  | 59° 00.78 | 22.54     |           |          |
| 127  | 4          | 1540  | 01.70     | 22.73     |           |          |
| 128  | 4          | 1550  | 02.64     | 22.92     |           |          |
| 129  | 4          | 1600  | 03.57     | 23.13     |           |          |
| 130  | 4          | 1610  | 04.26     | 23.93     | TURN WEST |          |
| 131  | 4          | 1620  | 04.19     | 25.95     |           |          |
| 132  | 4          | 1630  | 04.16     | 28.02     |           |          |
| 133  | 4          | 1640  | -         | -         |           |          |
| 134  | 4          | 1650  | 04.07     | 32.19     |           |          |
| 135  | 4          | 1700  | 04.02     | 34.40     |           |          |
| 136  | , <b>4</b> | 1710  | 04.00     | 36.67     |           |          |
| 137  | 4          | 1720  | 03.86     | 38.67     |           |          |
| 138  | 4          | 1734  | -         | -         |           |          |
| 139  | 4          | 1740  | 02.10     | 39.39     |           |          |
| 140  | 4          | 1750  | 01.18     | 39.67     |           |          |
| 141  | 4          | 1800  | 00.33     | 39.94     |           |          |
| 142  | 4          | 1810  | 58° 59.51 | 40.12     |           |          |
| 143  | 4          | 1820  | 58.55     | 40.25     |           |          |
| 144  | 4          | 1830  | 57.61     | 40.32     |           |          |
| 145  | 9-5        | 1030  | 59° 05.31 | 39.92     |           |          |
| 146  | 5          | 1045  | 04.96     | 38.30     |           |          |
| 147  | 5          | 1100  | 05.09     | 36.22     |           |          |
| 148  | 5          | 1115  | 05.23     | 33.72     |           |          |
| 149  | 5          | 1130  | 05.27     | 31.25     |           |          |
| 150  | 5          | 1145  | 05.24     | 28.66     |           |          |
| 150N | 5          | 1150  | 01.25     | 27.83     |           | •        |
| 151  | 5          | 1200  | 05.25     | 26.20     |           |          |
| 152  | 5          | 1215  | 05.33     | 23.67     |           |          |
| 153  | 5          | 1230  | 05.25     | 21.42     |           |          |
| 154  | 5          | 1245  | 04.74     | 19.68     |           |          |
| 155  | 5          | 1300  | 03.38     | 20.01     |           |          |
| 156  | 5          | 1315  | 01.94     | 20.06     |           |          |
| 157  | 5          | 1330  | 00.57     | 20.01     |           |          |
| 158  | 5          | 1345  | 58° 59.15 | 20.13     |           |          |
| 159  | 5          | 1400  | 57.76     | 19,98     |           |          |
| 160  | 5          | 1415  | 56.40     | 20.12     |           |          |
| 161  | 5          | 1430  | 55.11     | 19.98     |           |          |
| 162  | 5          | 1445  | 54.73     | 22.42     |           |          |
| 162A | 2          | 1447  | -         |           |           |          |
| 163  | 5<br>F     | 1200  | 54.75     | 25.23     |           |          |
| 104  | 5          | 1212  | 54.77     | 28.02     |           |          |
| 105  | 5          | 1530  | 54.89     | 30.63     |           |          |
| 100  | 5<br>F     | 1545  | 54.86     | 33.15     |           |          |
| 101  | 5          | T000  | 54.95     | 35.66     |           |          |
| 168  | 5          | 1615  | 54.90     | 38.07     |           |          |
| 169  | 5          | 1630  | 54.07     | 44.26     |           |          |



日本の記録をあるため、日本の記録の



actives and the active of the second



And an Additional Stream of the strength of th









Figure 20. Details of a regular XB' system: probe (a), canister (b), and resistances network (c).

The expanded scale XBT recording system is comprised of the new bridge and analog recorder (Fig. 21). The bridge consists of a precision voltage source, a dual constant corrent source, and a differential amplifier (Fig. 22). The constant current source supplies two identical currents which flow through the primary and secondary loops of the XBT probe and sea-water-whip ground path (Fig. 20c). The constant current I flowing in the primary loop results in potential  $V_1$ :

$$V_1 = I (R_{sw} + R_c + R_t)$$

The current I in the secondary loop results in a potential  $V_2$ :

$$V_2 = I \quad (R_{sw} + R_c)$$

The resistance variation  $R_t$  can be isolated by monitoring the differential voltage  $V_1 - V_2$ .

$$R_{t} = (V_{1} - V_{2})/I$$
.

The analog recorder is then used to record an output from the bridge proportional to  $R_{t}$ .

Below are given the resistance and temperature values supplied by Sippican Co. (Sippican Manual R-467B, Table 5-1) used to obtain R(T) and T(R) for interpretation of EXBT data. Also given below is the relationship between elapsed time and depth of the XBT probe.

| Temperature °C | <u>Resistance k</u> |
|----------------|---------------------|
| 5.0            | 12.697              |
| 5.6            | 12,357              |
| 6.0            | 12.085              |
| 6.7            | 11.699              |
| 7.0            | 11.506              |
| 7.8            | 11,080              |
| 8.0            | 10.958              |
| 8.9            | 10.496              |
| 9.0            | 10.439              |
| 10.0           | 9.948               |
| 11.0           | 9.483               |
| 11.1           | 9.434               |
| 12.0           | 9.043               |
| 12.2           | 8.950               |
| 13.0           | 8.625               |
| 14.0           | 8.230               |





Least-square minimization was used to obtain fourth order polynomials for R(T) and T(R).

| A <sub>0</sub> | -  | 16.32902                            | B <sub>0</sub> =              | 51.08125  |      |
|----------------|----|-------------------------------------|-------------------------------|-----------|------|
| A,             |    | 8336822                             | B, -                          | -7.256200 |      |
| A              | -  | .2395431 10 <sup>-1</sup>           | B <sub>2</sub> =              | .4455120  |      |
| A <sub>3</sub> | •  | 524036 10 <sup>-3</sup>             | B3 *                          | 153488    | 10-1 |
| λ4             | ** | .844554 10 <sup>-5</sup>            | B <sub>4</sub> =              | .217192   | 10-3 |
| T (R)          | *  | $B_0 + B_1 R + B_2 R^2 + B_3 R^3 +$ | <sup>B</sup> 4 <sup>R</sup> 4 |           |      |
| R(T)           | =  | $A_1 + A_1T + A_2T^2 + A_3T^3 +$    | A4T4                          |           |      |
| *D(t)          | =  | $6.472t - 0.00216 t^2$              |                               |           |      |
| T              | =  | Temperature [°C]                    |                               |           |      |
| R              | =  | Resistance [k ]                     |                               |           |      |
| D              | -  | Depth [m]                           |                               |           |      |
| t              | =  | Time [secs]                         |                               |           |      |

\* From Sippican (1970) Ocean Engineering Bulletin No. 1.

## Data

The individual traces of XBT data have been grouped in sections and are presented in Figure 26. The depths of the 12.5°, 12°, 11°, 10° and 9°C isotherms are indicated. Figures 23 and 24 are included to show the variation in the T-S relation encountered in the JASIN area. Colder, fresher water was found to the north and warmer, saltier water to the south (Figure 25).







:

.....

114

Salinity on 10°C Surface: Figure 25.

(a) Leg l; (b) Leg 2.



. Martin

ž

Figure 26. XBT Section 1.

त्मन्त्रे संस्थित संस्थित संस्थित संस्थित

the sector is the sector of th

second states and



XBT Section 2.



「「「「「「」」」」

me o constante en



addig to the literation

117 -







Statistics

ALC: FARME

. F532



and the state of the

istan da a da da



用品: 花的 御太 黄金市監領人 一一 。

5. N. 7.



विश्व का किसीम कि सामित को मिलाका के जा का का किस



144.00

Strait Chickstern

102 12.00

XBT Section 7.





ų k

XBT Section 9.



XBT Section 10.







1. 2. A.2.04

a solution and the solution of the so-

Said in the second second

Ą



and state with the structure



Manual South Lander Contract

1000

Diama in a state of the state o



第211日 1月1日

orane series and the little in the little in the



and a state of the second s

weiter mit ihne in weiter weiter auf die besteht weiter weiter beiter beiter beiter beiter beiter beiter beiter





ALC: NO

XBT Section 17.

क्रिके हिंदी है कि अन्द्रस्थर का कि

「「「「「「「「」」」」」

#### REFERENCES

- Briscoe, M. G. (1979). Cruise report, Atlantis-II [The Joint Air-Sea Interaction Project (JASIN 1978)], Woods Hole Oceanographic Institution, <u>Technical Report W.H.O.I.-79-64</u>.
- Briscoe, M. G., C. A. Mills, R. E. Payne, and K. R. Peal (1979). Atlantis-II (cruise 102) moored and shipborne surface meteorological measurements during JASIN 1976, Woods Hole Oceanographic Institution, Technical Report W.H.O.I.-79-43.
- Burt, K., D. C. Webb, D. L. Dorson, A. J. Williams, III (1974). Telemetry Receiver and Acoustic Command System; IEEE International Conference on Engineering in the Ocean Environment Record. IEEE Publication #74-CH0873-0 OCC 1974, Vol. II, pp. 53-56.

Dean, J. P. (1979). A moored instrument for vertical temperature gradients, Journal of Geophysical Research, 84(C8), 5089-5091.

- Dorson, Donald (1974). A Low Point Ocean Data Recorder; IEEE International Conference on Engineering in the Ocean Environment Record, IEEE Publication #74-CH0873-0 OCC 1974, Vol. II, pp. 51, 52.
- Pennington, N., and M. G. Briscoe (1979). Atlantis-II (cruise 102) preliminary CTD data from JASIN 1978, Woods Hole Oceanographic Institution, <u>Technical Report W.H.O.I.-79-42</u>.
- Pollard, R. T. (1978). The Joint Air-Sea Interaction Experiment JASIN 1978, <u>Bulletin of the American Meteorological Society</u>, <u>59</u> (10), 1310-1318.
- Tarbell, S., M. G. Briscoe, and R. A. Weller (1979). A compilation of moored current meter and wind recorder data, Volume XVIII (JASIN 1978, Moorings 651-653). Woods Hole Oceanographic Institution, <u>Technical Report W.H.O.I.-79-65</u>.
- Voorhis, Arthur D. (1971). Response Characteristics of the Neutrally Buoyant Float. Woods Hole Oceanographic Institution, <u>Technical</u> <u>Report W.H.O.I.</u>. 71-73.

## MANDATORY DISTRIBUTION LIST

# FOR UNCLASSIFIED TECHNICAL REPORTS, REPRINTS, AND FINAL REPORTS PUBLISHED BY OCEANOGRAPHIC CONTRACTORS OF THE OCEAN SCIENCE AND TECHNOLOGY DIVISION OF THE OFFICE OF NAVAL RESEARCH

(REVISED NOVEMBER 1978)

1 Deputy Under Secretary of Defense (Research and Advanced Technology) Military Assistant for Environmental Science Room 3D129 Washington, D.C. 20301

Office of Naval Research 800 North Quincy Street Arlington, VA 22217 ATTN: Code 483 ATTN: Code 460

2 ATTN: 102B

3

1

6

1 1

1

1 CDR Joe Spigai, (USN) ONR Representative Woods Hole Oceanographic Inst. Woods Hole, MA 02543

Commanding Officer Naval Research Laboratory Washington, D.C. 20375 ATTN: Library, Code 2627

12 Defense Technical Information Center Cameron Station Alexandria, VA 22314 ATTN: DCA

> Commander Naval Oceanographic Office NSTL Station Bay St. Louis, MS 39522 ATTN: Code 8100 ATTN: Code 6000 'TTN: Code 3300

- NODC/NOAA Code D781 Wisconsin Avenue, N.W. Nashington, D.C. 20235
- 1 Ar. Michael H. Kelly Administrative Contracting Officer Department of the Navy Office of Naval Research Eastern/Central Regional Office Building 114, Section D 666 Summer Street Boston, MA 02210
| Vertical Current Meter                                       |   |  |
|--|---|--|
| Temperature data<br>Demoninten Banco 1                       | DRIFTING VENTICAL CURGENT NETER, MODNED ANNEERA<br>DRIFTING VENTICAL CURGENT NETER, MODNED ANNEERAA<br>DREMUTSING CARAK, MARIEV J. PREMIONEDA AND BAGNAY A 14615-12<br>(2015) DV MARIEV J. PREMIONEDA AND BAGNAY A 14615-12   | <ol> <li>Bertical Current Mater</li> <li>Femperature data</li> <li>Panalmetre Mater</li> </ol>   |
| ieller, Robert A.  | 122 pages. Dictober 1981. Prepared for the Office of<br>Bawal Messerch ander Contract MODIAL-Ac-C-1997, MR 083-<br>400 am for the Mational Science Foundation under Grant   | IL Geller, Medert A.   |
| N00014-76-C-0197; NR 083-400                                 | · 002 //-25803.   | III. M00014-76-C-0197; MR DE3-400  |
| . OCE <i>Tr-2</i> 5803<br>This report is <b>UNCLASSIFIED</b> | The report presents summaries of three data sets<br>takes at and in the richity of the commongraphic morings<br>(des)0yed in the 1970 boint Air-sa interaction Project<br>(ABB)1. The data sets are: (1) the temperature, pressure<br>and vertical mation records from the ATLANTIS II. (2) the<br>comparature data from the Amadera thermition dates an<br>M.M.O.I. moring 63, designated a AUSIM moring Wartical<br>(3) the expensible bubythermograph (201) data collected from<br>the ALLANTIS II while participating in the AUSIM Project. | CN. OCC 77-25003<br>This request is UNIXASSIFIED   |
|  | woods kole Gesenographic Institution  |  |
| Vertical Comment Makers                                      | (1940)-81-92  |  |
| Temerative data  | DELETING VENTION, CLERENT HETER, MINHED ANNERAA   |  |
| Fernington, Namey J.   | THERMISTOR CHAIN, MED XXT DATA - JASIK 1978 ATLMNTS-II<br>CRUISE (102) by Xwmcy J. Pennington and Robert A. Meller.   | L. Peentington, Marcy J.   |
| Meiler, Robert A.  | 132 pages. October 1961. Prepared for the Office of<br>Maval Mesearch under Contract WOOH-76-C-0197. MK 083-<br>MM for the Matimus Science Scundarios induc Error   | II. Weller, Nobert A.  |
| . #00014-76-C-0197; NR 083-400                               | 00 17-25003.  | III. NOOD14-76-C-0197; MR 083-400  |
| . OCE <i>71-2</i> 5803                                       | The report presents summaries of three data sets<br>taken at and in the vicinity of the oceanographic moorings<br>deployed in the 1978 Joint Air-Sea Interaction Project<br>(JASIM). The data sets are: (1) the transcripton Prosence<br>and working motion records from the freely drifting Scritcal<br>Current Mass (Prom the Science from the AirWarts II, (2) the   | 11. OC: 77-25 <b>8</b> 03  |
| This report is UNCLASSIFIED                                  | W.H.O.I. mooring 653, designated as JASIM mooring 43, and<br>[3] the expendable bathythermograph (261) data collected from<br>the AllAMIIS II while participating in the ASIM Project.  | This report is UNCLASSIFIED  |
|  |   |  |
|  |   |  |
|  | This report is unclassified<br>JASIN<br>Bartical Current Neter<br>Temperature data<br>Famington, Kancy J.<br>Famington, Kancy J.<br>Kanington, Kancy J.<br>Kanington, Kancy J.<br>Famington, Kancy J.<br>Famington, Kancy J.<br>Famington, Kancy J.<br>Famington, Kancy J.<br>Famington, Kancy J.   | Miss reserve is und.x551F10       Last of the factor and the derivation from the factor parts and the derivation for the destroation for the destroation of the des |