

U.S. DEPARTMENT OF COMMERCE  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
NATIONAL WEATHER SERVICE  
NATIONAL METEOROLOGICAL CENTER

OFFICE NOTE 211

BATHY/TESAC Data Transmission and Monitoring Program

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This is an unreviewed manuscript, primarily intended for informal exchange of information among NMC staff members.

## Introduction

The Ocean Services Group (OSG) at the National Meteorological Center (NMC) near Washington, DC is actively participating in the Integrated Global Ocean Station System (IGOSS) to exchange radio BATHY/TESAC data in "real time" with the international community via the Global Telecommunications System (GTS). NMC participates by (1) entering data received from U.S. coastal radio stations on the GTS and (2) monitoring all data received from U.S. coastal radio stations and international GTS centers. The monitoring program summarizes the data by originating station or center and by ship. Also, OSG participates in the semi-annual World Meteorological Organization (WMO) monitoring exercise for evaluation of meteorological and oceanographic "data flow" on the GTS.

## GTS Transmissions

BATHY/TESAC data received at NMC have several sources. Most international data are received directly through the GTS, whereas the majority of U.S. data are received indirectly through Fleet Numerical Oceanographic Center (FNOC), Monterey, California from U.S. coastal radio stations. Some data is addressed directly to NMC through coastal radio stations. The U.S. BATHY/TESAC data are entered onto the GTS four times daily; the times vary, but approximately at 09Z, 11Z, 21Z and 23Z. Because the bulk of data transmitted from FNOC are received only twice daily after 00Z and 12Z, the NMC transmissions following at 09Z and 21Z tend to be quite large. The 11Z and 23Z transmissions, 2 hours later, may contain no data.

At transmission time, each bulletin received since last transmission is checked to determine its origin. Data already on the GTS are allowed to continue on the circuit. However, data from U.S. coastal radio stations are placed on the GTS provided that the message passes a set of minimal data error checks.

The OSG philosophy has been to check data primarily for gross errors, making as few decisions as possible concerning a BATHY/TESAC message. Recommendations concerning error checking and correcting will be proposed later.

An incoming bulletin is stripped of its header and each BATHY/TESAC report is scanned in the following manner:

1. The time group is checked to insure a / is present in last position.
2. Identify 5 digit 7's or 8's group for BATHY; or 7's or 8's with 1, 2, 3 possible in last digit for TESAC.
3. Ship call letters are identified, if any, at the end of the message.
4. Between the time group and call letters, only numbers are valid, anything else is replace by blanks.
5. The message is compressed by removing excess blanks.

6. Each of the data groups is checked for 5 digits. If more than 3 groups contain other than 5 digits, the message is considered in error and will not be transmitted.

7. A new report is checked against reports already transmitted to avoid duplicate reports. A duplicate report is one whose latitude, longitude and time is the same as a report that has been transmitted during the last 24 hours.

The header of BATHY/TESAC bulletins transmitted from NMC follow the standard WMO format as follows:

SOVD1 KWBC 251820

The first 5 digit group identifies the following data as BATHY reports.

The WMO format is as follows:

S	—	identifies the data type, in this case, surface or sub-
O		surface sea temperature, salinity or current data.
V	-	moble ships (Note, however, that BATHY bulletins contain data received from fixed buoys)
D	-	WMO region 4, Western North Atlantic Gulf of Mexico and Eastern North Pacific.
1	-	bulletin number identifier.

SOVD1 through SOVD5 are used to transmit BATHY data and SOVD6 through SOVD9 are used to transmit TESAC data. Using this format, BATHY and TESAC data are transmitted in separate bulletins. If more bulletins are required than there are bulletin identifiers, the last identifier is repeated and flagged with RTD. (See last bulletin header in figure 1). The second group of the header contains 4 letters (KWBC) identifying the originating center (WASHINGTON) of the bulletin. The third group contains 6 digits that gives the day, hour and minute of bulletin transmission.

The reports within a bulletin follow the standard FM63-V (BATHY data) or FM64-V (TESAC data) format of WMO. At present a 1280 character limit per bulletin allows about 6 BATHY reports per bulletin. A sample transmission is presented in Figure 1.

If no BATHY or TESAC data are transmitted, a "NIL" bulletin transmission is made. The NIL bulletin makes it evident that no data was transmitted, rather than questioning whether data is missing.

SOVD1 KWBC 261215  
NIL

SOVD6 KWBC 261215  
NIL

#### Data Monitoring

The quantity of all BATHY/TESAC data received at NMC are monitored on a weekly basis. These data are edited manually to correct errors in call

signs of bulletins and call signs of ship reports. The data are summarized for the number of BATHY's, TESAC's and BUOYS received by U.S. coastal stations and the GTS; and by ship (Figure 2). Master lists are maintained to identify 1) the call sign of a station or center with its city and country and 2) the call sign of a ship with its name and country of registry. An unknown ship name is identified by xxx. The weekly summaries are merged to produce monthly semi-annual and annual summaries. An annual ship participation list is published in the Gulfstream (Kundrat, 1980) which is presented in Figures 3a and 3b.

NMC uses the summaries to monitor the amount of data it receives from various ships and centers through the GTS, as well as the amount of data it is entering on the GTS. NMC forwards the IGOSS statistical evaluation sheet (Figure 4) to the Intergovernmental Oceanographic Commission (IOC), where comparisons are made with similar reports from other GTS centers, to monitor each countries participation, as well as to identify problems with the data exchange system.

Twice yearly, in June and December, the WMO itself conducts an exercise monitoring meteorological and oceanographic data transmitted and received on the GTS by various countries. OSG supports the overall NMC exercise by monitoring BATHY/TESAC data during the special test.

#### Other NMC BATHY/TESAC Services

A number of other services are provided at NMC concerning BATHY/TESAC data. A weekly listing of the radio reports are produced (Figure 5), with and without duplicates, and is distributed upon request for both global and selected limited areas. Also, the BATHY/TESAC reports are put on tape weekly and sent to the Regional National Oceanographic Data Center (RNODC), Washington, D.C., where the data are retained and are available upon request.

OSG itself processes BATHY data in real time to use sea surface temperatures and subsurface temperatures in analyses prepared at NMC. During POLYMODE, for example, NMC acted as a real time center in preparing subsurface maps (NOAA, 1978). BATHY/TESAC data services prepared at NMC are listed in Table 1.

1. Daily real time use of surface and subsurface measurements.
2. Four times daily GTS transmissions.
3. Center and ship monitoring statistical summary.
4. Weekly global listing of all received bulletins and reports
  - a. with duplicates removed
  - b. no duplicates removed
5. Weekly selected limited area listing of reports.
6. Weekly data tape sent to RNODC for distribution.
7. Annual ship participation list.

Table 1. BATHY/TESAC Data Services

### Recommendations

IGOSS has devoted a number of years to monitoring and improving the quantity of BATHY/TESAC being exchanged over the GTS. IG OSS should now emphasize the role of monitoring and improving the quality of that data. A first step suggested is to monitor and document the frequency of various types of errors found in radio messages. Huber (1979) reported the Specialized Oceanographic Data Center, Federal Republic of Germany, has been applying quality control procedures to correct BATHY/TESAC data during FGGE. The next step would be to establish a set of IG OSS approved quality control procedures that would be used to correct "certain" types of errors at the appropriate GTS centers prior to transmission.

The utility of these real time radio data lie in their ability to adequately describe the real ocean. A detailed study is needed to compare radio messages to the strip chart recorded aboard ship, showing discrepancies and errors between the reports. The credibility of the BATHY/TESAC real time program could improve provided the loss of accuracy and detail of the radio messages could be documented.

## References

- Huber, Klaus, 1979: "Quality Control Procedures Applied to IGOSS Data at the Specialized Oceanographic Data Center, Federal Republic, Germany," IOC Workshop Report No. 7 (Supplement), Intergovernmental Oceanographic Commission, Paris, pp. 227-243.
- Kundrat, John, 1980: "Gulfstream V(2), U.S. Dept. of Commerce, National Weather Service, Washington, DC, pp. 6-7.
- National Oceanic and Atmospheric Administration (NOAA), 1978: IGOSS/POLYMODE Experiment Final Report: Ocean Services Branch, NWS, Washington, DC, 15 pp.

SOVD1 KWBC 020824  
 JJXX 02040 10067 52954 03826 88888 00252 41252 50227 63207 81193  
 99901 10178 20177 27171 73157 89156 99902 27146 99903 42130  
 61130 99904 50112 WNCU  
 JJXX 02040 19007 72653 08555 88888 00228 09223 56222 66207 77207  
 90202 93195 99901 10193 50168 99902 32140 54132 88126 99903  
 2 3 55106 98100 99904 12054 60088 NNH  
 JJXX 02040 12057 70001 12003 88888 00259 05257 10248 31230 43200  
 63173 70173 99901 11150 36135 99902 67116 99903 84085 99904  
 50082  
 JJXX 01040 23387 70002 11810 88888 00267 09253 19252 37248 42220  
 48209 52208 65180 70184 83155 95143 99901 12143 53130 80130  
 99902 97111 99904 WTEP  
 JJXX 02040 18307 70003 12029 88888 00262 18258 25257 39225 55203  
 62198 73172 81175 95158 99901 01158 11153 20152 21148 29140  
 49139 52134 70134 99902 28123 70120 99904 50082 WTEP  
 JJXX 02040 23457 70000 12141 88888 00280 05261 25257 31253 45250  
 55220 70190 80183 95184 99901 05155 09157 70134 99902 79124  
 99904 50083

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SOVD5 KWBC 020824  
 JJXX 02040 19247 13919 16505 88888 00095 50095 99901 10093 15092  
 90090 70080 85078 92071 99902 08070 35057 60055 69058 71056  
 99903 02056 02055 45050 75050 82046 99904 25049 37047 40048  
 15045 50045 JJLL  
 JJXX 03040 00007 73459 17618 88888 00148 50146 90146 99901 01143  
 10140 50138 90136 99902 10135 40135 50134 60133 70132 80131  
 85130 86128 90127 99903 00125 18120 30117 40116 50115 55115  
 60113 70112 80112 82109 50109 95108 99904 00108 10107 26107  
 35105 50103 THPV  
 JJXX 01040 18027 52530 17918 88888 00250 32249 50233 52220 57219  
 77197 99901 70170 93169 99902 39157 50156 85142 99903 10138  
 11135 45126 65125 99904 05114 40101 60098 DHCK  
 JJXX 02040 17587 51850 17605 88888 00280 50280 70245 99901 55220  
 57218 71217 90210 99902 22165 32193 70175 82170 95170 99903  
 28149 99904 02127 12118 20117 60102 DHCK  
 JJXX 02040 05507 52226 17748 88888 00260 50253 50236 67235 77225  
 99901 11214 42206 55204 99902 50177 99903 10165 18160 30159  
 51154 98135 99904 12135 60103 DHCK

SOVD5 KWBC 020824 RTD  
 JJXX 02040 22407 50400 15630 88888 00279 55277 99901 14271 99902  
 10148 20145 50120 99903 70100 99904 50086 KR3F  
 JJXX 03040 00007 52601 11118 88888 00264 05268 410262  
 JJXX 03040 00007 75743 17402 88888 00080 03050 06033 10031 18031  
 26028 82026 83027 99901 19027 20028 28029 00000 NMMJ  
 JJXX 03040 00007 71016 15700 88888 00274 50274 99901 00138 50117  
 99902 00110 50105 99903 00100 50097 99904 00094 50090 A85L  
 JJXX 03040 00017 72045 10815 88888 00242 18240 43239 46211 55183  
 61167 67161 99901 10142 46131 83125 99902 07122 44114 99903  
 66097 APFS  
 JJXX 02040 23457 70000 12141 88888 00280 05261 25257 31253 45250  
 55220 70190 80183 95184 99901 05155 09157 70134 99902 79124  
 99904 50082  
 JJXX 03040 00007 71111 09859 88888 00292 46282 65266 74236 81226  
 95196 99901 00179 18152 31140 99903 07110 58101 99904 60087  
 NRUC

Figure 1. Sample of part of XBT bulletin transmission generated at NMC.

CALL SIGN	TOTAL	BATHY	TESAC	BOUY	SHIP NAME	COUNTRY
CWPF	14	14	0	0	ESQUIMALT, BRITISH COLUMBIA	CANADA
EDZW	5	5	0	0	OFFENBACH	GERMANY
EGRR	28	28	0	0	BRACKNELL	ENGLAND
KNMF	8	8	0	0	COAST GUARD BOSTON, MA.	USA
KNWC	353	352	1	0	MONTEREY, CA.	USA
KSAN	8	8	0	0	SAN DIEGO, CA.	USA
KWBC	1	1	0	0	WASHINGTON, D.C.	USA
RJTD	20	20	0	0	TOKYO	JAPAN
RUHB	13	12	1	0	KHABAROVSK	USSR
RUML	7	7	0	0	***	USSR ?
RUMS	12	12	0	0	MUSCOW	USSR
TOTL	469	467	2	0	TOTAL BATHYS & TESACS REC'D	
A8VI	9	9	0	0	PACOUCHESS	USA
A8WW	1	1	0	0	KOREAN FIR	USA
A8YI	1	1	0	0	PACBARON	USA
CG8R	7	7	0	0	VANCOUVER	CANADA
C7L	10	10	0	0	OCEAN STATION LIMA	UK
C7P	13	13	0	0	OCEAN STATION PAPA	CANADA
C7R	10	10	0	0	OCEAN STATION ROMEO	FRANCE
DCL	5	5	0	0	FEHMARNBELT-FEUERSCHIFF	FRG
DGSR	2	2	0	0	COLUMBUS TASMANIA	FRG
DGVK	3	3	0	0	COLUMBIA VICTORIA	FRG
DGZV	10	10	0	0	COLUMBUS VIRGINIA	FRG
DHCV	9	9	0	0	COLUMBUS WELLINGTON	FRG
DHFC	4	4	0	0	SEATRAN LEXINGTON	FRG
DHPV	4	4	0	0	PLUVIUS	FRG
ELEC	8	8	0	0	MARCONA EXPORTER	USA-MARCONA CORP.
ELXF	4	4	0	0	KOREAN PRIDE	USA
EREB	1	1	0	0	VOLNA	USSR
EREH	10	10	0	0	PRIBOI	USSR
ERET	2	2	0	0	GEORGE OUSHAKOV	USSR
EREU	1	1	0	0	ERNST KRENKEL	USSR
EWVW	3	3	0	0	KARA-DAG	USSR
FNEL	2	2	0	0	FRANCE II	FRANCE
FPERL	2	2	0	0	FANNING ISLAND	USA
J8ES	6	6	0	0	YAMASHIN MARU	USA
JCFU	3	3	0	0	GOLDEN ARROW	JAPAN
JDOC	2	2	0	0	HIEI MARU	JAPAN
JDRP	1	1	0	0	TAKUYO	JAPAN
JEMM	4	4	0	0	ASIA MARU	JAPAN
JHJE	2	2	0	0	QUEENS WAY BRIDGE	JAPAN
JJKQ	12	12	0	0	HARUNA MARU	JAPAN
JJLL	13	13	0	0	KASHU MARU	JAPAN
JKFS	4	4	0	0	JAPAN ACE	JAPAN
JKIC	1	1	0	0	HAHONE MARU	JAPAN
JNXV	14	14	0	0	AMERICA MARU	JAPAN
JPZO	7	7	0	0	GOLDEN GATE BRIDGE	JAPAN
JQXW	6	6	0	0	HIERU MARU	JAPAN
KCNX	3	3	0	0	AFRICAN METEOR	USA-FARRELL
KNBD	1	1	0	0	DELAWARE II	USA-NOAA
KR SF	8	8	0	0	WECCMA	USA
MDBE	2	2	0	0	WEATHER ADVISER	UK
MEDD	4	4	0	0	WEATHER MONITOR	UK
NAAG	22	22	0	0	GLACIER	USA-USCG
NCFX	1	1	0	0	***	USA ?
NDIT	14	13	1	0	MELLON	USA-USCG
NHNU	1	1	0	0	HUDSON	USA
NI ZX	29	29	0	0	MARSHFIELD	USA
NLGA	7	7	0	0	***	USA ?
NLVS	6	6	0	0	RUSH	USA-USCG
NLWA	10	10	0	0	PVT LEONARD C BRASTROM	USA-USNS
NNUD	20	20	0	0	SILAS BENT	USA-NAVOCEANO
NRDL	11	11	0	0	INGHAM	USA-USCG
NRFFJ	6	6	0	0	NORTHWIND	USA-USCG
NRUN	2	2	0	0	DURABLE	USA
NTJZ	1	1	0	0	***	USA ?
NTRI	1	1	0	0	WILKES	USA-NAVOCEANO
NYCQ	5	5	0	0	BOUTWELL	USA-USCG
NZSK	1	1	0	0	E. KANE	USA-NAVOCEANO
PACM	6	6	0	0	***	USA ?
UNAC	2	1	1	0	SHOKALSKEY	USSR
UPUI	9	9	0	0	***	USSR ?
UVMM	1	1	0	0	***	USSR ?
UZGH	3	3	0	0	PASSAT	USSR
VP415	1	1	0	0	AIRCRAFT SQUADRON	CANADA
WMRJ	7	7	0	0	NORMAC VEGA	USA-MOORE MCCORMACK
WMRU	2	2	0	0	NORMAC LYNX	USA-MOORE MCCORMACK
WMVF	3	3	0	0	ALBATROSS IV	USA-NOAA
WNCU	7	7	0	0	GLOMAR CHALLENGER	USA-SCRIPPS
WTEF	4	4	0	0	RAINIER	USA-NJAA
WPPI	12	12	0	0	PRESIDENT VAN BJUREN	USA-AMERICAN PRESIDENT
SMCB	3	3	0	0	PACMERCHANT	USA
6ZFW	1	1	0	0	PACSTAR	USA
BATHYS	467	0	0	0	TOTAL BATHYS REC'D	
IBATHY	467	0	0	0	TOTAL IGOSS BATHYS REC'D.	
ITESAC	2	0	0	0	TOTAL IGOSS TESACS REC'D	
TESACS	2	0	0	0	TOTAL TESACS REC'D	
TOTALS	469	0	0	0	TOTAL OF ALL REPORTS REC'D	
CHPFXX	1	1	0	0	SENT FROM CWPF * NO CALL SIGN	
KNWCXX	35	35	0	0	SENT FROM KNWC * NO CALL SIGN	
KSANXX	1	1	0	0	SENT FROM KSAN * NO CALL SIGN	
KWBCXX	1	1	0	0	SENT FROM KWBC * NO CALL SIGN	
RJTDXX	19	19	0	0	SENT FROM RJTD * NO CALL SIGN	
XXXX	57	57	0	0	NO SHIP CALL SIGN REC'D	

Figure 2. Edited weekly summary.



**BATHYTHERMOGRAPH (BATHY) AND TEMPERATURE/SALINITY (TESAC)  
REPORTS RECEIVED BY THE NATIONAL WEATHER SERVICE IN 1979**

Compiled by John J. Kundrat, Jr.

The National Weather Service wishes to acknowledge the following ships for providing BATHY and TESAC observations from the world oceans to the National Meteorological Center (NMC). The number of observations received from each ship, from January through December 1979, is listed below.

It is requested that any discrepancies between the number of BATHY's or TESAC's listed (received at NMC) and the number transmitted by a ship be reported to:

Chief, Oceanographic Services Branch (W161)  
8060 13th Street  
Silver Spring, MD 20910  
(301) 427-7278

Anyone wishing information on the BATHY/TESAC program, in terms of participation or data availability, may contact the same address.

Ship Call Sign	Ship Name	Country	Bathy's Recvd. by NMC	Tesac's Recvd. by NMC	Ship Call Sign	Ship Name	Country	Bathy's Recvd. by NMC	Tesac's Recvd. by NMC
AAAA	USCG Oceanographic Unit	USA	40		FNRZ	Nickel I	France		1
A8SL	Pacduke	USA	5		FNXE	Rodin	France		30
A8VI	Pacduchess	USA	98		FPERL	Fanning Island	USA		38
A8WW	Korean Fir	USA	15		GLNE	Discovery	UK		288
A8YI	Pacbaron	USA	28		GNAM	Cirolana	UK		33
CGBR	Vancouver	Canada	955		GOOB	Dart America	UK		3
CGBV	Dawson	Canada	6	72	GOVM	Dilkara	UK		10
CGDG	Hudson	Canada		44	GULL	Miranda	UK		34
CGDN	Quadra	Canada	757		JBES	Yamashin Maru	Japan		328
CYQD	Quappelle	Canada	2		JBOA	Keifu Maru	Japan		43
C7L	Ocean Station Lima	UK	306		JCFU	Golden Arrow	Japan		81
C7M	Ocean Station Mike	Netherlands	120		JCZF	Hotaka Maru	Japan		74
C7P	Ocean Station Papa	Canada	168		JDBD	Beishu Maru	Japan		32
C7R	Ocean Station Romeo	France	322		JDOC	Hiei Maru	Japan		126
DBBH	Meteor	FRG	207		JDRP	Takuyo	Japan		28
DBFB	Gauss	FRG	59		JEMM	Asia Maru	Japan		220
DBFK	Heincke	FRG	4		JFZG	Hakusan Maru	Japan		289
DBFP	Walther Herwig	FRG	40		JGFM	Pacific Arrow	Japan		312
DBFR	Anton Dohrn	FRG	282		JGZK	Ryofu Maru	Japan		181
DCL	Fehmarnbelt-Feuerschiff	FRG	232		JHJE	Queens Way Bridge	Japan		220
DECC	Carib	FRG	1		JJKQ	Haruna Maru	Japan		281
DGHR	Seefalke	FRG	1		JJLL	Kashu Maru	Japan		319
DGSR	Columbus Tasmania	FRG	43		JKFS	Japan Ace	Japan		328
DGVK	Columbus Victoria	FRG	202		JKIC	Hahone Maru	Japan		160
DGZV	Columbus Virginia	FRG	68		JNEJ	Japan Teak	Japan		1
DHCW	Columbus Wellington	FRG	185		JNXV	America Maru	Japan		238
DHFC	Seatrain Lexington	FRG	154		JPVB	Seifu Maru	Japan		55
DHPV	Pluvius	FRG	157		JPZD	Golden Gate Bridge	Japan		237
DSCZ	Planet	FRG	2		JQXW	Hieru Maru	Japan		274
ELCE	Esso Caribbean	USA	6		KCMV	African Comet	USA		2
ELEC	Marcona Explorer	USA	151		KCNX	African Meteor	USA		27
ELXF	Korean Pride	USA	46		KGKV	Texaco New York	USA		5
EREA	Monsoon	USSR	280	53	KHPV	Seatrain Princeton	USA		1
EREB	Volna	USSR	159	118	KJCL	Gyre	USA		68
EREC	Prylyv	USSR	231	182	KNBD	Delaware II	USA		77
EREH	Priboi	USSR	183	119	KPZK	Californian	USA		51
EREI	Ocean	USSR	172	110	KRDH	President Fillmore	USA		4
ERES	Bugaev	USSR	313	205	KRSF	Wecoma	USA		269
ERET	George Oushakov	USSR	387	93	KSBG	Arco Juneau	USA		11
EREU	Ernst Krenkel	USSR	353	296	KSVE	Hawaiian Queen	USA		128
ESGU	Percy 3	USSR		22	LOIO	Islas Orcadas	Argentina		29
EWVW	Kara-Dag	USSR	3		LOPP	Bahia Aguirre	Argentina		14
FNBA	Cryos	France	35		MDBE	Weather Advisor	UK		220
FNBG	Capricorne	France	3	47	MEDD	Weather Monitor	UK		219
FNCW	Rousseau	France	35		NAAO	Glacier	USA		255
FNDF	Cezanne	France	4		NAQD	Jarvis	USA		76
FNEJ	France I	France	144		NBAD	Bartlett	USA		19
FNEL	France II	France	128		NBLM	Potomac	USA		1
FNIB	Thalassa	France	11		NBTM	Polar Star	USA		105
FNOY	Jean Charcot	France	27		NDIS	Neches	USA		9

Figure 3a.

Ship Call Sign	Ship Name	Country	Bathy's Recvd. by NMC	Tesac's Recvd. by NMC	Ship Call Sign	Ship Name	Country	Bathy's Recvd. by NMC	Tesac's Recvd. by NMC
NDIT	Mellon	USA	91	2	VP46	Aircraft Squadron	USA	16	
NDWA	Morgenthau	USA	48		VP47	Aircraft Squadron	USA	10	
NENC	Sealift Pacific	USA	5		VP48	Aircraft Squadron	USA	1	
NFKQ	Sealift Arabian Sea	USA	58		VP50	Aircraft Squadron	USA	2	
NGDF	Munro	USA	104		VP69	Aircraft Squadron	USA	1	
NHNU	Hudson	USA	101		VP91	Aircraft Squadron	USA	1	
NHOP	Navasota	USA	35		VWVK	Darshak	India	57	
NHWR	Midgett	USA	153		VXN	Aircraft	USA	332	
NIKA	Sealift Atlantic	USA	182		WCGN	Chevron California	USA	81	
NIZX	Marshfield	USA	63		WCIO	Arco Anchorage	USA	20	
NJOR	Gallatin	USA	76		WEZA	Austral Lighting	USA	82	
NJPJ	Reliance	USA	2		WEZP	Austral Rainbow	USA	140	
NJTH	Shoshone	USA	33		WEZT	Austral Moon	USA	46	
NLKL	Westwind	USA	79		WLRL	President Truman	USA	1	
NLPM	Chase	USA	3		WMRG	Mormac Argo	USA	3	
NLVS	Rush	USA	9		WMRJ	Mormac Vega	USA	15	
NLWA	Bradstrom	USA	159		WMRU	Mormac Lynx	USA	37	
NMAG	Hamilton	USA	68		WMSD	Mormac Draco	USA	58	
NMMJ	Sherman	USA	19		WMSF	Mormac Rigel	USA	1	
NNHA	Acushnet	USA	149		WMSM	Mormac Altair	USA	47	
NNUD	Silas Bent	USA	123		WMVF	Albatross IV	USA	147	
NOSP	Vigorous	USA	16		WNCU	Glomar Challenger	USA	103	
NRDC	Campbell	USA	102		WNKP	Manuawili	USA	257	
NRDL	Ingham	USA	155		WTDF	Cromwell	USA	424	
NRDT	Taney	USA	79		WTDK	David Star Jordan	USA	32	
NRFJ	Northwind	USA	48		WTDM	Miller Freeman	USA	24	
NRUN	Durable	USA	2		WTEA	Discoverer	USA	164	
NRUO	Polar Star	USA	52		WTEB	Fairweather	USA	9	
NRXD	Evergreen	USA	96	34	WTEF	Rainier	USA	4	
NSNF	Maumee	USA	6		WTEG	Mount Mitchell	USA	59	
NSTF	Steadfast	USA	1		WTEP	Oceanographer	USA	222	
NTRI	Wilkes	USA	565		WTER	Researcher	USA	693	
NTUG	American Explorer	USA	44		WTES	Surveyor	USA	10	
NUOP	Yukon	USA	19		WVFO	Endeavor	USA	26	
NYCQ	Boutwell	USA	65		WVFX	President McKinley	USA	34	
NYGG	Chauvenet	USA	62		WWPI	President Van Buren	USA	56	
NZSK	Kane	USA	156		WXBR	Chevron Mississippi	USA	55	
ORXA	Recteur Du Buisson	France	3		WY4621	Cabrillo	USA	1	
PBVQ	Cumulus	Netherlands	127		WZY9373	Prospector	USA	1	
SNSP	Wieczno	Poland	17		XCWU	Dragamines	Mexico	80	
TFEA	Bjarni Saemundsson	Iceland	54		XCYT	Mariano Matamoroz	Mexico	2	
TFJA	Arni Fridriksson	Iceland	4		5LFX	Pacbaroness	USA	14	
UBLF	Kurchatov	USSR	16	28	5MCB	Pacmerchant	USA	29	
UEGV	Prof. Derugyn	USSR	53		6ZDG	Marina	USA	1	
UHMO	Aliot	USSR	47		6ZFW	Pacstar	USA	39	
UHQS	Academic Korolev	USSR	141	160	6ZKG	Lake Berryessa	USA	68	
ULYN	Vernadsky	USSR	57	41	8JNZ	Kofu Maru	Japan	108	
UMAY	Academic Shirshov	USSR	239	232	9VAJ	Seatrain Trenton	USA	118	
UMFW	Prof. Zubov	USSR	239	61					
UMWZ	Mirny	USSR	2	2					
UNAC	Shokalskey	USSR	351	339					
UQIH	Lomonosov	USSR	113	92					
UREU	Ossipenko	USSR		1					
UYWH	Belogorsk	USSR	55						
UZGH	Passat	USSR	402	182					
VJZJ	Yarra	Australia	15						
VKLB	Hobart	Australia	75						
VKLC	Brisbane	Australia	47						
VLAA	Allunga	Australia	3						
VLNB	Torrens	Australia	118						
VPO1	Aircraft Squadron	USA	20						
VPO6	Aircraft Squadron	USA	10						
VP19	Aircraft Squadron	USA	2						
VP26	Aircraft Squadron	USA	1						
VP31	Aircraft Squadron	USA	3						
VP40	Aircraft Squadron	USA	2						
VP415	Aircraft Squadron	Canada	9						
VP44	Aircraft Squadron	USA	2						

  

UNIDENTIFIED SOURCES									
		Argentina		14					
		Australia		2		7			
		Canada	109	194					
		UK	66	1					
		France	13						
		FRG	89						
		Japan	1500						
		South Africa	42						
		USSR	1989	1696					
		USA	1663	42					

  

DATA TOTALS-1979		
BATHY	TESAC	TOTAL
27,457	4,484	31,941

Figure 3b.

IGOSS STATISTICAL EVALUATION SHEET

NATIONAL CENTRE: KWBC Washington

MONTH: December

COUNTRY: USA

YEAR: 1979

INPUT

Data input consists of all data collected from coastal radio stations and entered on to the GTS.

GTS Centre	BATHY	TESAC	BUOY
KWBC	1393	2	0

OUTPUT

Data output consists of all data received by the telecommunication centre from other GTS centres.

GTS Centre	BATHY	TESAC	BUOY
CWPF	28		
EDZW	25		
EGRR	153		
RJTD	61		
RUHB	71	3	
RUML	13		
RUMS	109		
SABM	3		
Total Output	463	3	0

Figure 4.



SLIP

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Primary

Secondary

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<i>(scribbles)</i>



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