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[IGSMAIL-5447]: Proposed IGS05 Realization
      • To: < igsmail @ igscb.jpl.nasa.gov>
      • Subject: [IGSMAIL-5447]: Proposed IGS05 Realization
      • From: Ferland, Rémi < RFerland @ NRCan.gc.ca>
      • Date: Thu, 19 Oct 2006 11:10:28 -0400
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      • Thread-topic: Proposed IGS05 Realization
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 IGS Electronic Mail 19 Oct 08:10:39 PDT 2006 Message Number 5447
Author: R. Ferland
Dear colleagues,
 You will find below a review of the IGS05 proposed reference frame realization, along with some comparisons and analysis of its effects on the apparent geocenter, ERP's and the scale.
              See IGSMAIL 5438 by Gerd Gendt for the proposed timeline:
http://igsch
             I have updated the proposed realization "IGS05.snx".
 For those of you who may need it, I have also posted a corresponding "IGT05.snx" which uses the relative antenna phase center offsets. Those can be found at:
            macs.geod.nrcan.gc.ca
/pub/requests/sinex/IGS05
 and should be made available soon at the igscb.
 The proposed update includes:
             - 1) Reference Frame Stations review
- 2) ITRF2000 to ITRF2005 update.
- 3) Relative to absolute antenna phase calibration change
Preliminary versions of the IGS realization of was provided last spring (last one IGS05_060606.snx).

This latest release differs only slightly from the earlier one. One version was presented at the last IGS workshop in Darmstadt in May 2006, where details of the changes were provided. (see: <a href="http://nng.esoc.esa.de/ws2006/Ferland.pdf">http://nng.esoc.esa.de/ws2006/Ferland.pdf</a>)

In summary, the proposed changes w.r.t IGb00 were:

-89 stations were retained,
-10 were removed and
-50 were added

Total 139 stations was in the proposed realization.
 Following the recent official release of ITRF2005,
 (http://itrf.ensg.ign.fr/ITRF_solutions/20 the proposed realization has been updated.
                                                  solutions/2005/ITRF2005.php)
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The station selection generally follows the criterions from:
Kouba, J., J. Ray and M.M. Watkins, IGS Reference Frame Realization,
1998 IGS Analysis Center Workshop Proceedings, European Space Operations
Centre, Darmstadt, Germany. and from the guidelines:

Moore, A., IGS Site Guidelines, Jet Propulsion Laboratory, 2004.

## 1) Review of the proposed realization:

BAKO:

The originally proposed network of 139 stations was reviewed. The following stations may no longer be suitable for the IGS05 reference frame realization. It is proposed to remove them:

```
Equipment Change
                Discontinuity introduced at 06:213:00000, Equipment Change/Cut-off angle change.
BRMU:
CORD:
                Decommissioned.
               Decommissioned.
Discontinuity introduced at 06:183:00000,
Cause Unknown.
Discontinuity introduced at 06:209:45000,
Antenna & receiver Change.
Discontinuity introduced at 06:239:79200,
THAS:
OUS2:
                Radome removed.
                Discontinuity introduced at 06:211:00000, Cause Unknown.
```

Discontinuity introduced at 06:149:00000,

This would reduce the originally proposed 139 stations network to 132 stations. The following stations performance is currently questionable:  $\frac{1}{2} \left( \frac{1}{2} \right) = \frac{1}{2} \left( \frac{1}{2} \right) \left( \frac{1}{$ 

```
Off since 06:056 due to equipment problems,
Data availability ???,
No data since 06:166,
NICO:
         Recent Solutions are questionable.
```

It is proposed to leave them in, hoping that their status does improve.

The following section first compares the currently proposed realization with the previous one, dating back to last June. It is followed by the effect  ${\sf prop}({\sf p$ of the alignment of the proposed IGS05 to ITF2005.

```
IGS05:
       IGS05 - IGS05 060606.snx:
2-1)
```

Since significant testing, has already taken place with the "IGS05\_060606.snx" and earlier proposed realizations, comparisons are first made with the latest. The coordinates for all the proposed realizations were

extracted from ITRF2005 (and its preliminary release). The position differences at the reference epoch (2000.0) between this proposed release and the previous one are sub-mm for about half of the stations. Only 2 (CONZ and KOKB) have horizontal positions exceeding 2mm, and 2 (CONZ and NOT1) have 3D position exceeding 3mm; velocity differences are all sub-mm/y. The larger differences at those two stations are likely caused by the ties with other techniques.

The proposed realization relative to absolute receiver antenna phase center corrections have also been updated using all the available test solutions up to GPS week 1389. Results with data available up to April were presented at the workshop.

(See: <a href="http://nng.esoc.esa.de/ws2006/ABSA4.pdf">http://nng.esoc.esa.de/ws2006/ABSA4.pdf</a>) The inclusion of an additional 6 months of data affects the phase center corrections (N,E,H) components by less than 2mm (RMS).

Although the vertical component of the correction is the most significant, the 3D corrections were applied. Those final corrections are:

nose	Ill	naı coı	rections	are:	
Code	Pt	Soln o	d d. Lat	d. Lon (mm)	d. Hei (mm)
ALGO	Α	7 [		-0.4	16.5
ALIC	Α	1 1		0.1	13.2
ALRT	A A	1 I 4 I		-1.0 -2.1	-12.8 11.0
AMC2 ARTU	A	3 1		-0.6	15.4
ASC1	A	1 1	1 2	-3.0	4.7
ASPA	Α	1 1	-2.0	1.4	4.1
BAHR	A	1 1		-0.6	15.5
BILI BJFS	A A	4 I 1 I		1.9 1.8	-2.5 25.9
BOR1	A	2 1		0.4	4.6
BRAZ	Α	1 1		-2.0	12.1
BRUS	A	2 1		0.3	3.6
CAGL CAS1	A A	3 I 3 I		2.2 1.3	3.8 6.5
CEDU	A	1 1		0.5	18.9
CHAT	Α	1 1	-3.0	0.4	18.9
CHPI	A	1 1	-2.5	-2.5	10.4
COCO	A A	4 I 3 I		-1.7 2.2	13.7 8.4
CONZ	Α	2 1	-2.6	-1.5	11.3
CR01	Α	1 1		-0.5	18.9
DAEJ DARW	A A	1 I 1 I		2.6 0.7	16.4 12.6
DAV1	A	1 1		0.5	9.2
DGAR	Α	2 I	-0.9	-1.2	5.4
DRAO	A	3 I		-1.1 -2.1	12.6
DUBO FAIR	A A	4 I 6 I		0.7	19.9 10.2
FLIN	A	2 I	0.5	-1.8	12.1
GLPS	A	1 1		-0.6	7.9
GLSV GODE	A A	1 I 2 I		3.0 -0.0	5.1 15.3
GOLD	A	7 1		-1.6	7.8
GOUG	Α	1 [	-5.0	-0.5	93.2
GRAS	A	3 I 4 I		1.1	3.4
GUAM GUAO	A A	1 1	-3.2 -1.0	0.0	16.0 8.7
HARB	Α	1 [		3.6	8.7 14.3
HLFX	A	1 1	-1.1	-1.0	16.6
HNLC HOB2	A A	1 I 2 I		-1.2 -0.2	10.2 14.6
HOFN	A	2 1		0.5	3.3
HOLM	Α	1 1		-0.5	0.5
HRAO HYDE	A A	1 I 2 I		1.8 -1.6	16.0 9.9
IISC	В	2 1		-1.0	8.2
IRKT	Α	1 1		1.0	18.0
ISPA JAB1	A A	1 I 2 I		-2.7 0.2	9.7 13.9
JOZE	A	2 1		0.0	-4.9
KARR	Α	1 1	-0.5	1.6	10.0
KELY	В	1 1		-0.5	0.6
KERG KIT3	A A	2 I 1 I		1.7 -0.9	18.2 28.9
KOKB	Α	5 I	-3.4	1.1	9.9
KUNM	A	2 [	-1.9	1.9	21.8
LAE1 LPGS	A A	1 I 1 I		-1.4 -0.8	19.9 24.0
MAC1	A	4 1	2 2	-0.1	18.4
MADR	Α	9 1	-0.5	0.1	5.5
MALI MANA	A	2 [	-1.8	0.5	14.1 17.7
MAS1	A A	2 I 1 I		-2.4 -2.1	7.9
MATE	Α	4 I	0.6	1.3	9.7
MAW1	A	1 1		1.3	10.7
MBAR MCM4	A A	1 I 3 I		0.6 1.3	15.9 4.3
MDO1	A	3 [		-2.5	20.1
MDVJ	A	1 1		-0.2	14.9
METS MKEA	A A	1 I 1 I	0.4	0.8	1.2 12.7
NICO	A	2 [		1.1	17.3
NKLG	Α	1 I	-0.8	3.1	14.1
NLIB	A	2 [		-1.4	15.0
NOT1 NOUM	A A	1 I 1 I		3.7 -1.0	10.2 7.5
NOVJ	Α	1 1		-3.0	34.9
NRC1	Α	1 1	-1.3	-0.5	16.2
NRIL NYA1	A A	1 I 2 I		0.8	3.5 -9.7
NYAL	A	3 1	-0.9	0 0	-8.9
OHI2	Α	1 I	-2.2	-0.3 -1.3 -1.0	8.7
OHI3	A a	1 I	-6.5	-1.0 0.4	1.2
ONSA PDEL	A A	3 I 1 I		-3.2	5.3
PERT	Α	4 I	-0.9	2.0	19.6
PETP	A	3 I		-0.1 -2.0	12.8
PIE1 PIMO	A A	1 I 3 I	-2.4	1.4	11.7 19.9
POL2	Α	1 1	0.6	-0.7	18.0
POLV	A	1 1		1.1	0.4
POTS QAQ1	A A	1 I 3 I		0.8 -1.2	0.9 5.9
QUIN	Α	3 I	-3.5	-1.6	10.4
RABT	A	1 I		1.0	11.8
RAMO	A	3 I	-3.4	0.3	12.9

```
1 D
3 D
1 D
                                       -1.6
0.1
-2.0
-2.6
-0.8
                                                         -0.6
-0.7
-0.4
REUN
                                                                           20.8
                                                                           2.1
14.7
9.4
15.4
14.4
11.7
REYK A
RIOG A
SANT A
SCH2 A
SCUB A
SEY1 A
SFER A
                                                         -1.4
-0.9
1.4
0.2
                                        -2.2
-1.2
0.8
-2.1
-3.1
-4.0
STJO A
SUTH A
SYOG A
                                                         -1.3
2.1
0.3
THTI A
THU3 A
TIDB A
TIXI A
TOW2 A
                                        -1.2
-1.8
-1.6
                                                         0.8
-1.0
0.1
                                                                           22.3
-3.6
16.6
                                        -0.4
-0.4
-0.8
                                                         0.7
                                                            0.9
TRAB A
TRO1 A
                        1 D
4 D
                                          0.5
TROM A
TSKB A
                                                          0.8
                                                                           2.0
                                        0.7
-2.1
-1.7
-3.6
-0.8
ULAB A
UNSA A
USNO A
                       1 D
1 D
1 D
                                                         1.6
-1.0
-0.5
                                                                           18.5
VESL A
VILL A
WES2 A
                                                         -0.1
-0.2
-0.8
                                                                           -5.1
11.1
20.4
WHIT A
WILL A
WSRT A
                                        -0.2
-0.5
-0.1
                                                         -0.0
-0.9
0.5
                    3 D
4 D
2 D
5 D
2 D
2 D
                                                         0.5
2.9
1.9
WTZR A
WUHN A
                                        -0.3
                                                                           3.1
22.1
                                         -0.2
YAR1 A
YELL A
                                        -0.6
YSSK A
ZIMM A
                       2 D
2 D
                                        -0.2
0.7
                                                                           11.5
10.6
15.6
Obs. Mean
Mean Std.
                                        -1.2
1.6
                                       2.0
R.M.S.
```

2-2) IGS05 --> ITRF2005:

To remain consistent with ITRF2005, the proposed realization was also realigned to ITRF2005 using a 7-parameters transformation (3 rotations, 3 translations, 1 scale); the rates were assumed unaffected by the phase center change

center change. The estimated transformation parameters are:

R X	(mas)	:	-0.01118
R Y	(mas)	:	-0.00693
R Z	(mas)	:	-0.00046
T X	(m)	:	0.00165
T Y	(m)	:	-0.00016
T Z	(m)	:	0.00236
SCT.	(nnh)		-1 85533

This shows the effect of the relative to absolute phase center calibration change. Note that ALRT, GOUG and NOVJ were excluded from the estimation of the transformation parameters due to the size of their phase center corrections. As expected, the scale is the dominant parameter.

The residuals ITRF2005 minus IGS05 (after transformation):

SOLUTION ESTIMATE Difference (mm) & (mm/y)

Code	Pt	Soln	d	d. Lat (mm)	d. Lon (mm)	d. Hei (mm)
ALGO	Α	7	D	-0.6	-1.1	-6.7
ALIC	Α	1	D	-1.1	1.0	0.7
ALRT	А	1	D	1.8	-0.4	22.1
AMC2	Α	4	D	-0.8	0.7	-0.5
ARTU	Α	3	D	-2.0	1.8	-6.0
ASC1	Α	1	D	-1.6	2.8	5.8
ASPA	Α	1	D	0.3	-1.9	9.9
BAHR	Α	1	D	-0.1	1.8	-5.5
BILI	Α	4	D	-2.4	-1.4	12.7
BJFS	Α	1	D	-1.5	-0.4	-14.9
BOR1	Α	2	D	0.0	-0.1	4.4
BRAZ	Α	1	D	-0.2	0.9	-0.8
BRUS	Α	2	D	-0.5	-0.3	5.3
CAGL	Α	3	D	-1.3	-2.0	5.3
CAS1	Α	3	D	3.4	0.3	7.8
CEDU	Α	1	D	-1.0	0.5	-4.8
CHAT	Α	1	D	2.7	-0.9	-4.3
CHPI	Α	1	D	-0.5	1.5	1.2
CHUR	Α	4	D	-2.0	0.3	-3.9
COCO	A	3	D	-0.6	-0.5	4.3
CONZ	A	2	D	-0.0	-0.1	1.4
CRO1	Α	1	D	0.2	-0.9	-8.6
DAEJ	A	1	D	-2.1	-1.4	-5.1
DARW	A	1	D	-1.2	0.4	0.9
DAV1	A	1	D	2.2	1.4	4.7
DGAR	A	2	D	-1.2	2.9	6.4
DRAO	A	3	D	-0.9	-0.1	-2.1
DUBO	A	4	D	-2.4	0.6	-9.9
FAIR	Α	6	D	-0.9	-1.3	0.0
FLIN	Α	2	D	-2.3	0.4	-2.1
GLPS	A	1	D	-0.6	-1.0	3.8
GLSV	A	1	D	-0.7	-2.3	4.0
GODE	A	2	D	-0.6	-1.5	-5.4
GOLD	A	7	D	0.6	0.3	3.1
GOUG	A	1	D	1.9	0.6	-81.1
GRAS	A	3	D	-0.3	-1.0	5.6
GUAM	A	4	D	0.9	0.9	-3.3
GUAO	A	1	D	-0.5	0.5	1.6
HARB	A	1	D	-1.3	-2.5	-2.7
HLFX	A	1	D	-0.4	-0.4	-7.1
HNLC	A	1	D	-0.3	0.6	2.1
HOB2	A	2	D	2.2	0.8	-0.1
HOFN	A	2	D	-0.7	-1.0	5.7
HOLM	A	1	D	-1.1 0.4	-0.7 -0.7	9.3
HRAO HYDE	A A	2	D D	0.4	3.2	-4.4 1.1
IISC	В	2	D	-0.5	2.6	2.9
IRKT	A	1	D	-2.0	0.5	-7.7
ISPA	A	1	D	-2.0	1.0	3.6
ISFA	А	Τ.	D	-0.8	1.0	3.0

JOZE A 2 D -1.6 0.4 13.9 KARR A 1 D -1.0 -0.2 3.5 KELY B 1 D -0.1 -0.7 8.6 KERG A 2 D 1.1 0.2 -4.9 KERG A 2 D 0.7 -1.7 2.4 KERG A 5 D 0.7 -1.7 2.4 KERG A 2 D 0.7 -0.5 -1.7 2.4 KERG A 2 D 0.7 -0.5 -1.7 2.4 KERG A 1 D -0.2 2.2 -6.3 LPGS A 1 D -0.7 -0.5 -11.7 MADR A 2 D 0.0 5 -0.3 3.5 MANA A 2 D 1.9 0.8 -6.6 MAS1 A 1 D 0.1 1.7 1.4 MART A 4 D 0.1 1.7 1.4 MART A 4 D 0.1 1.7 1.4 MART A 4 D 0.1 1.7 1.4 MART A 1 D 0.0 0.4 5.4 MCM4 A 3 D 2.6 -1.4 10.2 MMOU A 3 D 1.1 1.0 0.9 3 MKEG A 1 D 0.4 -0.3 7.8 MKEG A 1 D 0.4 -0.3 7.8 MKEG A 1 D 0.8 -1.6 0.3 7.8 MKIG A 1 D 0.1 -1.2 -3.3 -1.0 NOUM A 1 D 0.2 -1.5 -0.1 -4.8 NOT1 A 1 D 0.1 -1.2 -3.3 -1.0 NOUM A 1 D 0.2 -1.5 -0.1 4.8 NOT1 A 1 D 0.4 -1.0 -6.5 NOUM A 1 D 0.2 -1.5 -0.1 4.8 NOT1 A 1 D 0.4 -1.0 -6.5 NOUM A 1 D 0.2 -1.5 -0.1 -4.8 NOT1 A 1 D 0.4 -1.0 -6.5 NOUM A 1 D 0.2 -1.5 -0.1 -4.8 NOT1 A 1 D 0.4 -1.0 -6.5 NOUM A 1 D 0.2 -1.5 -0.1 -4.8 NOT1 A 1 D 0.4 -1.0 -6.5 NOUM A 1 D 0.2 -1.5 -0.1 -4.8 NOT1 A 1 D 0.4 -1.0 -6.5 NOUM A 1 D 0.2 -1.5 -0.1 -4.8 NOT1 A 1 D 0.4 -1.0 -6.5 NOUM A 1 D 0.2 -1.5 -0.1 -4.8 NOT1 A 1 D 0.4 -1.0 -6.5 NOUM A 1 D 0.2 -1.5 -0.1 -4.8 NOT1 A 1 D 0.4 -1.0 -6.5 NOUM A 1 D 0.3 -1.5 NOUM A 1 D 0.3 -1.8 NOT1 A 1 D 0.4 -1.0 -6.5 NOUM A 1 D 0.3 -0.2 7.4 PDEL A 1 D 0.0 0.3 0.4 NOWAL A 3 D 0.6 6.1 NOWAL A 3 D 0.0 0.1 -2.2 -2.7 NOWAL A 3 D 0.6 6.1 NOWAL A 3 D 0.6 6.1 NOWAL A 3 D 0.6 6.1 NOWAL A 3 D 0.0 0.1 -2.2 -2.7 NOWAL A 3 D 0.0 0.1 -2.2 -2.9 NOWAL A 3 D 0.0 0.3 -2.0 NOWAL A 3 D 0.0 0.3 -2.0 NOWAL A 3 D 0.0 0.1 -2.2	JAB1	A	2 D	-1.0	0.9	-0.3
KELY B 1 D -0.1 -0.7 8.6 KERG A 2 D 1.1 0.2 -44.9 KIT3 A 1 D -0.2 2.3 -19.0 KOKB A 5 D 0.7 -1.7 2.4 KUNM A 2 D 0-0.1 -0.4 -10.5 LAE1 A 1 D -0.2 2.2 -6.3 LPGS A 1 D -0.2 2.2 -6.3 LPGS A 1 D -0.7 -0.5 -11.7 MADR A 9 D -0.5 0.3 -3.7 MADR A 9 D -0.5 0.3 -3.7 MADR A 9 D -0.6 0.7 -3.3 MANA A 2 D 1.9 0.8 -6.6 MAS1 A 1 D -0.1 1.7 1.4 MATE A 4 D 0.1 1.5 -0.9 -0.6 MAW1 A 1 D 2.1 0.6 3.1 MBAR A 1 D 0.0 0.4 -5.4 MCM4 A 3 D 2.6 -1.4 10.2 MDO1 A 3 D 1.1 1.0 -9.3 MKEA A 1 D 0.8 -1.6 -0.3 -7.9 MKLG A 1 D -0.4 -0.3 7.8 MKEA A 1 D 0.8 -1.6 -0.3 -7.9 NKLG A 1 D -1.7 -2.7 -3.9 NKLG A 1 D -1.7 -2.7 -3.9 NKLG A 1 D -1.2 -3.3 -1.0 NOUM A 1 D -2.2 1.1 6.7 NNOT1 A 1 D -1.2 -3.3 -1.0 NOUM A 1 D -2.2 1.1 6.7 NNOT1 A 1 D -1.3 0.6 6.1 NNOT1 A 1 D -0.3 -6.5 NNOT1 A 1 D -0.3 -6.5 NNOT1 A 1 D -0.3 -6.5 NNOT1 A 1 D -0.3 0.6 6.1 NNOT1 A 1 D -0.4 -1.0 0.6 NNAI A 2 D 1.3 0.6 6.1 NNOT1 A 1 D -0.4 -1.0 0.6 NNAI A 3 D 1.8 0.4 18.1 OHIZ A 1 D -0.1 -0.0 4.8 OHIZ A 1 D -0.1 -0.0 6.9 NYAL A 3 D 1.8 0.4 18.1 OHIZ A 1 D -0.1 -0.0 6.9 NYAL A 3 D 1.8 0.4 18.1 OHIZ A 1 D -0.1 -0.0 6.9 NYAL A 3 D 1.8 0.4 18.1 OHIZ A 1 D -0.1 -0.0 6.9 NYAL A 3 D 1.8 0.6 6.1 NYAI A 2 D -0.3 0.6 6.1 NYAI A 3 D -0.3 0.6 6.1 NYAI A 3 D -0.3 0.2 0.5 6.8 NYAI A 3 D -0.3 0.6 6.1 NYAI A 3 D -0.1 0.0 0.0 0.1 NYAI A 1 D -0.1 0.0 0.0 0.0 0.1 NYAI A 1 D -0.1 0.0 0.0 0.0 0.0 0.0 0.0 0						
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MANA A 2 D 1.9 0.8 -6.6 MANI A 1 D -0.1 1.7 1.4 MATE A 4 D -1.5 -0.9 -0.6 MANI A 1 D 2.1 0.6 3.1 MCM4 A 3 D 2.6 -1.4 10.2 MDO1 A 3 D 1.1 1.0 -9.3 MDVJ A 1 D -4.4 1.0 -5.7 METS A 1 D -0.4 -0.3 7.8 MKEA A 1 D 0.8 -1.6 -0.3 NICO A 2 D 2.0 -0.3 -7.9 NKLIG A 1 D -1.7 -2.7 -3.9 NKLIG A 1 D -1.7 -2.7 -3.9 NKLIG A 1 D -1.7 -2.7 -3.9 NKLIG A 1 D -1.2 -3.3 -1.0 NOUM A 1 D -2.2 1.1 6.7 NNOVJ A 1 D -6.3 4.5 -25.1 NRC1 A 1 D -0.4 -1.0 -6.5 NRIL A 1 D -0.1 3 0.6 6.1 NYAI A 3 D 1.8 0.4 18.1 OMI3 A 1 D -0.1 -0.0 4.8 OMI3 A 1 D -0.1 -0.0 A 8.8 PETP A 3 D -2.5 0.8 -1.9 PIEI A 1 D -0.8 0.6 -0.9 PIEI A 1 D -0.8 0.6 -0.9 PIEI A 1 D -0.9 -0.3 8.8 PETP A 3 D -2.5 0.8 -1.9 POLV A 1 D -0.9 -0.3 8.8 POTS A 1 D -0.9 -0.3 8.8 POTS A 1 D -0.2 -0.6 8.1 OMI3 A 3 D -0.3 0.2 -0.1 -7.7 POL2 A 1 D -0.9 -0.3 8.8 POTS A 1 D -0.9 -0.3 8.8 POTS A 1 D -0.2 -0.6 6.3 AREVIX A 3 D -0.1 -0.1 3.1 SCH2 A 1 D -0.4 -1.1 -1.4 SANT A 3 D -0.1 -0.1 3.1 SCH2 A 1 D -0.4 -1.1 -1.4 SANT A 3 D -0.1 -0.1 3.1 SCH2 A 1 D -0.4 -1.1 -1.4 SANT A 3 D -0.1 -0.1 3.1 SCH2 A 1 D -0.2 -2.9 -3.9 SEYI A 2 D -1.1 1.3 -0.5 SEYI A 2 D -1.1 1.3 -0.5 SEYI A 2 D -0.1 -0.1 3.1 SCH2 A 1 D -0.2 -0.6 -3.4 REUN A 1 D -0.2 -0.6 -3.4 REUN A 1 D -0.2 -0.6 -3.4 REUN A 1 D -0.2 -0.6 -3.4 SCH2 A 1 D -0.6 -0.5 SCH2 A 1 D -0.2 -0.6 -3.4 SCH2 A 1 D -0.5 SCH2 A 1 D -0.5 SCH2 A 1 D -0.6 SCH2 A 1 D -0.5 SCH2 A 1 D -0.6	MADR	A	9 D	-0.5	-0.3	3.5
MAMI A 1 D 2.1 0.6 3.1 MCM4 A 3 D 0.0 0.4 -5.4 MCM4 A 3 D 2.6 -1.4 10.2 MD01 A 3 D 1.1 1.0 -9.3 MDVJ A 1 D -4.4 1.0 -5.7 METS A 1 D -0.4 -0.3 7.8 MKEA A 1 D 0.8 -1.6 -0.3 7.8 MKEA A 1 D 0.8 -1.6 -0.3 7.8 MKEA A 1 D 0.8 -1.6 -0.3 7.9 NKLG A 1 D -1.7 -2.7 -3.9 NKLG A 1 D -1.7 -2.7 -3.9 NKLG A 1 D -1.7 -2.7 -3.9 NKLG A 1 D -1.2 -3.3 -1.0 NOUM A 1 D -2.2 1.1 6.7 NOVJ A 1 D -6.3 4.5 -25.1 NRC1 A 1 D -1.3 0.6 6.5 NRIL A 1 D -0.4 -1.0 -6.5 NRIL A 1 D -0.4 -1.0 0.6 6.5 NRIL A 1 D -0.1 0.0 4.8 OHI3 A 1 D -0.1 -0.0 4.8 OHI3 A 1 D -0.1 -0.0 4.8 OHI3 A 1 D -0.1 2.5 3.8 PERT A 4 D -0.2 -0.6 -5.8 PETP A 3 D -2.5 0.8 -1.9 PIEI A 1 D -0.8 0.6 -0.9 PIEI A 1 D -0.8 0.6 -0.9 PIEI A 1 D -0.9 -0.3 8.8 POTS A 1 D -0.9 -0.3 8.8 POTS A 1 D -0.9 -0.3 8.8 POTS A 1 D -0.2 -0.6 8.1 QQUIN A 3 D 1.0 0.3 0.4 RABT A 1 D -0.2 -0.6 8.1 QQUIN A 3 D -0.3 0.2 -0.1 -7.7 MAMA A 3 D -0.3 0.2 -0.1 -7.7 MAMA A 3 D -0.9 -0.3 8.8 POTS A 1 D -0.2 -0.6 8.1 REYK A 3 D -0.1 0.0 6.9 REYK A 3 D -0.1 0				-0.6	0.7	-3.3 -6.6
MAMI A 1 D 2.1 0.6 3.1 MCMA A 1 D 0.0 0.4 -5.4 MCMA A 3 D 2.6 -1.4 10.2 MD01 A 3 D 1.1 1.0 -9.3 MDVJ A 1 D -4.4 1.0 -5.7 METS A 1 D 0.8 -1.6 -0.3 7.8 MKEA A 1 D 0.8 -1.6 -0.3 7.9 NKLIG A 1 D -1.7 -2.7 -3.9 NKLIG A 1 D -1.7 -2.7 -3.9 NKLIG A 1 D -1.2 -3.3 -1.0 NOUM A 1 D -2.2 1.1 6.7 NOVJ A 1 D -6.3 4.5 -25.1 NRC1 A 1 D -1.3 0.6 6.5 NRIL A 1 D -1.3 0.6 6.5 NRIL A 1 D -1.3 0.6 6.5 NRIL A 1 D -0.4 -1.0 -6.5 NRIL A 1 D -0.1 3 0.6 6.5 NRIL A 1 D -0.1 3 0.6 6.5 NRIL A 1 D -0.1 3 0.6 6.5 NRIL A 3 D 1.8 0.4 18.1 ONIA A 3 D 1.8 0.4 18.1 ONIA A 3 D 1.8 0.4 18.1 ONIA A 3 D -0.3 -0.2 7.4 PDEL A 1 D -0.1 2.5 3.8 PERT A 4 D -0.2 -0.6 -5.8 PETP A 3 D -2.5 0.8 -1.9 PIEI A 1 D -0.8 0.6 -0.9 PIEI A 1 D -0.8 0.6 -0.9 PIEI A 1 D -0.9 -0.3 8.8 POTS A 1 D -0.9 -0.3 8.8 POTS A 1 D -0.9 -0.3 8.8 POTS A 1 D -0.2 -0.6 8.1 ONIA A 3 D 1.0 0.3 0.4 RABT A 1 D -0.9 -0.3 8.8 POTS A 1 D -0.2 -0.6 8.1 ONIA A 3 D -0.3 0.4 RABT A 1 D -0.6 0.7 2.2 -8.9 REYK A 3 D -0.1 0.0 6.9 REYK A 3 D -0.1						1.4
MBAR A 1 D 0.0 0.4 -5.4  MCM4 A 3 D 2.6 -1.4 10.2  MDOUJ A 1 D -4.4 1.0 -5.7  METS A 1 D 0.8 -1.6 -0.3  NICO A 2 D 0.8 -1.6 -0.3  NICO A 2 D 2.0 -0.3 -7.9  NLIB A 2 D -1.5 -0.1 -4.8  NOT1 A 1 D -1.2 -3.3 -1.0  NOUM A 1 D -2.2 1.1 6.7  NOVJ A 1 D -6.3 4.5 -25.1  NRC1 A 1 D -1.3 0.6 6.1  NYA1 A 2 D 1.2 -0.2 18.9  NYAL A 3 D 1.8 0.4 18.1  OHIZ A 1 D -0.1 -0.0 4.8  OHIZ A 1 D -0.1 2.5 3.8  PERT A 4 D -0.2 -0.6 -5.8  PETP A 3 D -2.5 0.8 -1.9  PIEI A 1 D -0.8 0.6 -0.9  PIMO A 3 D 0.2 -0.1 -7.7  POLZ A 1 D -0.2 -0.6 8.1  QAQI A 3 D 0.0 0.1 3.2  QUIN A 3 D 0.0 0.1 3.2  REWN A 1 D -0.4 -1.1 -0.4  SANT A 3 D -0.1 -0.1 3.1  SFER A 5 D -0.1 -0.1 3.1  SFER A 5 D -2.0 -2.1 5.7  STJO A 4 D 0.9 0.1 -7.4  SYOG A 1 D -0.2 -2.9 -3.9  SEYI A 1 D -0.1 -0.1 3.1  SFER A 5 D -2.0 -2.1 5.7  TRABB A 1 D -0.6 -1.0 -1.2  TRAMB A 1 D -0.6 -1.0 -1.2  TRAMB A 1 D -0.6 -1.0 -1.2  TRAMB A 1 D -0.6 -1.0 -1.2  SFER A 5 D -2.0 -2.1 5.7  TRABB A 1 D -0.6 -1.0 -0.5  THUI A 1 D -0.8 -0.6 -1.2  THUI A 1 D -0.6 -0.9 0.5 -2.2  TIXI A 1 D -0.1 0.0 6.9  SCUB A 1 D -0.2 -0.6 6.0  SUB A 1 D -0.2 -0.6 6.0  SUB A 1 D -0.2 -0.9 0.5 -2.2  TIXI A 1 D -0.1 0.5 7.1  TRABB A 1 D -0.2 -0.6 -1.0 -7.4  TROM A 1 D -0.2 -0.6 -1.0 -7.4  TROM A 1 D -0.2 -0.6 -1.0 -7.4  TROM A 1 D -0.0 -0.1 1.5 -2.7  TRABB A 1 D -0.0 -0.1 0.5 7.1  TRABB A 1 D -0.0 -0.1 0.5 7.1  TRABB A 1 D -0.0 -0.0 0.1 1.2  TROM A 1 D -0.2 -0.6 -1.0 -7.2  TRABB A 1 D -0.2 -0.6 -1.0 -7.2  UNNA A 1 D -0.6 -0.6 -1.9 -2.2  SYSK A 2 D -0.1 -0.6 -1.9 -2.9  WHIT A 4 D -0.0 -0.5 5.9  WHIH A 4 D -2.1 -0.6 -1.0 -0.5  THIT OHIT A 1 D -0.6 -1.				-1.5	-0.9	-0.6
MCM4         A         3         D         2.6         -1.4         10.2         -9.3           MDVJ         A         1         D         -4.4         1.0         -9.3           METS         A         1         D         -0.4         -0.3         7.8           METS         A         1         D         -0.4         -0.3         7.8           MKEA         A         1         D         -0.4         -0.3         7.8           NKLG         A         1         D         -0.4         -0.3         -7.9           NKLG         A         1         D         -1.7         -2.7         -3.9           NKLG         A         1         D         -1.2         -3.3         -1.0           NOVI         A         1         D         -1.2         -3.3         -1.0           NRCI         A         1         D         -6.5         A         -55.1           NRCI         A         1         D         -1.3         0.6         6.1           NYAL         A         2         D         1.2         -0.2         18.9           NYAL         A         3<				0.0		-5.4
METS A 1 D -0.4 -0.3 7.8  METS A 1 D D -0.8 -1.6 -0.3  NICO A 2 D 2.0 -0.3 -7.9  NKLIG A 1 D -1.7 -2.7 -3.9  NKLIG A 1 D -1.7 -2.7 -3.9  NKLIG A 1 D -1.5 -0.1 -4.8  NOT1 A 1 D -1.2 -3.3 -1.0  NOUM A 1 D -1.2 -3.3 -1.0  NOUM A 1 D -6.3 4.5 -25.1  NRC1 A 1 D -0.4 -1.0 -6.5  NRCI A 1 D -0.4 -1.0 -6.5  NRIL A 1 D -0.4 -1.0 -6.5  NYAL A 3 D 1.8 0.4 18.1  OHI2 A 1 D -0.1 -0.0 4.8  OHI3 A 1 D -0.1 -0.0 6.5  NYAL A 3 D 1.8 0.4 18.1  ONSA A 3 D -0.3 -0.2 7.4  PETP A 3 D -0.3 -0.2 7.4  PETP A 3 D -0.5 0.8 -1.9  PIEL A 1 D -0.8 0.6 -0.9  PIMO A 3 D 0.2 -0.1 -7.7  POLV A 1 D -0.9 -0.3 8.8  POTS A 1 D -0.2 -0.6 8.1  QAQ1 A 3 D 0.0 0.1 3.2  QUIN A 3 D 1.0 0.3 0.4  RABT A 1 D -0.4 -1.1 3.2  QUIN A 3 D 1.0 0.3 0.4  REUN A 1 D -0.4 -1.1 -1.4  SANT A 3 D -0.1 0.6 -3.4  REUN A 1 D -0.4 -1.1 -1.4  SANT A 3 D -0.1 0.0 6.9  RIOG A 1 D -0.4 -1.1 -1.4  SANT A 3 D -0.1 0.0 6.9  SEY1 A 2 D -1.1 1.3 -0.5  SCUB A 1 D -0.2 -2.9 -3.9  SEY1 A 2 D -1.1 1.3 -0.5  THII A 1 D -0.6 0.2 -2.9 -3.9  SEY1 A 2 D -1.1 1.3 -0.5  THUB A 2 D 0.9 0.5 -2.2  TROM A 1 D -0.2 -2.1 5.7  STJO A 4 D 0.9 0.5 -2.2  TROM A 1 D -0.2 -0.1 3.1  SYNG A 1 D -0.2 -0.1 3.1  SYNG A 1 D -0.2 -0.1 3.1  SYNG A 1 D -0.2 -0.1 3.1  THII A 1 D -0.6 0.2 -2.9 -3.9  SEY1 A 2 D -1.1 1.3 -0.5  THU3 A 1 D -0.1 0.0 6.9  SEY1 A 2 D -1.1 1.3 -0.5  SUB A 1 D -0.2 -2.9 -3.9  SYNG A D -0.1 0.5 7.1  TRABB A 1 D -0.2 -0.6 -1.2  TROM A 1 D -0.2 -0.6 -1.2  TROM A 1 D -0.2 -0.6 -1.2  TROM A 1 D -0.2 -0.6 -1.9 -1.9  WHIT A 1 D -0.6 0.2 -0.9 -1.9  WHIT A 1 D -0.8 0.9 0.5 -2.2  TROM A 1 D -0.2 -0.6 -1.9 -1.9  WHIT A 1 D -0.6 0.2 -0.9 -1.9  WHIT A 1 D -0.6 0.2 -0.6 -1.0  WESS A 2 D -0.6 0.3 -2.0  OBS. Mean Mean Std. 1.5 10.3	MCM4	A	3 D	2.6	-1.4	10.2
METS A 1 D -0.4 -0.3 7.8  METS A 1 D D -0.8 -1.6 -0.3  NICO A 2 D 2.0 -0.3 -7.9  NKLIG A 1 D -1.7 -2.7 -3.9  NKLIG A 1 D -1.7 -2.7 -3.9  NKLIG A 1 D -1.5 -0.1 -4.8  NOT1 A 1 D -1.2 -3.3 -1.0  NOUM A 1 D -1.2 -3.3 -1.0  NOUM A 1 D -6.3 4.5 -25.1  NRC1 A 1 D -0.4 -1.0 -6.5  NRCI A 1 D -0.4 -1.0 -6.5  NRIL A 1 D -0.4 -1.0 -6.5  NYAL A 3 D 1.8 0.4 18.1  OHI2 A 1 D -0.1 -0.0 4.8  OHI3 A 1 D -0.1 -0.0 6.5  NYAL A 3 D 1.8 0.4 18.1  ONSA A 3 D -0.3 -0.2 7.4  PETP A 3 D -0.3 -0.2 7.4  PETP A 3 D -0.5 0.8 -1.9  PIEL A 1 D -0.8 0.6 -0.9  PIMO A 3 D 0.2 -0.1 -7.7  POLV A 1 D -0.9 -0.3 8.8  POTS A 1 D -0.2 -0.6 8.1  QAQ1 A 3 D 0.0 0.1 3.2  QUIN A 3 D 1.0 0.3 0.4  RABT A 1 D -0.4 -1.1 3.2  QUIN A 3 D 1.0 0.3 0.4  REUN A 1 D -0.4 -1.1 -1.4  SANT A 3 D -0.1 0.6 -3.4  REUN A 1 D -0.4 -1.1 -1.4  SANT A 3 D -0.1 0.0 6.9  RIOG A 1 D -0.4 -1.1 -1.4  SANT A 3 D -0.1 0.0 6.9  SEY1 A 2 D -1.1 1.3 -0.5  SCUB A 1 D -0.2 -2.9 -3.9  SEY1 A 2 D -1.1 1.3 -0.5  THII A 1 D -0.6 0.2 -2.9 -3.9  SEY1 A 2 D -1.1 1.3 -0.5  THUB A 2 D 0.9 0.5 -2.2  TROM A 1 D -0.2 -2.1 5.7  STJO A 4 D 0.9 0.5 -2.2  TROM A 1 D -0.2 -0.1 3.1  SYNG A 1 D -0.2 -0.1 3.1  SYNG A 1 D -0.2 -0.1 3.1  SYNG A 1 D -0.2 -0.1 3.1  THII A 1 D -0.6 0.2 -2.9 -3.9  SEY1 A 2 D -1.1 1.3 -0.5  THU3 A 1 D -0.1 0.0 6.9  SEY1 A 2 D -1.1 1.3 -0.5  SUB A 1 D -0.2 -2.9 -3.9  SYNG A D -0.1 0.5 7.1  TRABB A 1 D -0.2 -0.6 -1.2  TROM A 1 D -0.2 -0.6 -1.2  TROM A 1 D -0.2 -0.6 -1.2  TROM A 1 D -0.2 -0.6 -1.9 -1.9  WHIT A 1 D -0.6 0.2 -0.9 -1.9  WHIT A 1 D -0.8 0.9 0.5 -2.2  TROM A 1 D -0.2 -0.6 -1.9 -1.9  WHIT A 1 D -0.6 0.2 -0.9 -1.9  WHIT A 1 D -0.6 0.2 -0.6 -1.0  WESS A 2 D -0.6 0.3 -2.0  OBS. Mean Mean Std. 1.5 10.3					1 0	-9.3 -5.7
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NYAL A 2 D 1.2 -0.2 18.9 NYAL A 3 D 1.8 0.4 18.1 OHI3 A 1 D -0.1 -0.0 4.8 OHI3 A 1 D -0.1 -0.0 4.8 ONSA A 3 D -0.3 -0.2 7.4 PDEL A 1 D -0.1 2.5 3.8 PERT A 4 D -0.2 -0.6 -5.8 PETP A 3 D -2.5 0.8 -1.9 PIE1 A 1 D -0.8 0.6 -0.9 PIMO A 3 D 0.2 -0.1 -7.7 POL2 A 1 D -0.9 -0.3 8.8 POTS A 1 D -0.9 -0.3 8.8 POTS A 1 D -0.9 -0.3 8.8 POTS A 1 D -0.2 -0.6 8.1 QAQ1 A 3 D 0.0 0.1 3.2 QUIN A 3 D 1.0 0.3 0.4 REUN A 3 D 1.0 0.3 0.4 REUN A 1 D -0.6 -1.2 -2.7 RAMO A 3 D -0.7 2.2 -8.9 RIGG A 1 D -0.7 2.2 -8.9 RIGG A 1 D -0.4 -1.1 -1.4 SANT A 3 D -0.1 0.0 6.9 RIGG A 1 D -0.4 -1.1 1 -1.4 SANT A 3 D -0.1 0.0 6.9 RIGG A 1 D -0.3 -0.5 -6.0 SCUB A 1 D -0.2 -2.9 -3.9 SEY1 A 2 D -1.1 1.3 -0.5 SFER A 5 D -2.0 -2.1 5.7 STJO A 4 D 0.9 0.1 1.3 -8.3 THTI A 1 D -0.6 -1.9 -8.5 THU3 A 1 D -0.6 -1.9 -8.5 THU3 A 1 D -0.1 1.0 5 8.5 THU3 A 1 D -0.1 1.6 -0.4 12.9 TIDB A 2 D 0.9 0.5 -2.2 TIXI A 1 D -0.1 0.5 7.1 TRABB A 1 D -0.1 0.5 7.1 TRABB A 1 D -0.2 -0.9 0.5 -2.2 TIXI A 1 D -0.1 0.5 7.1 TRABB A 1 D -0.2 0.0 -7.2 TRAMO A 1 D -0.1 1.5 2.7 TRABB A 1 D -0.2 0.0 -7.2 TRAMO A 1 D -0.1 1.5 2.7 TRABB A 1 D -0.2 0.0 0.7 TRABB A 1 D -0.6 0.3 0.2 USNO A 1 D -0.6 0.3 0.2 USNO A 1 D -0.6 0.2 0.0 0.7 TRABB A 1 D -0.6 0.0 0.0 0.1 1.7 TRABB A 1 D -0.6 0.0 0.0 0.1 1.7 TRABB A 1 D -0.6 0.0 0.0 0.1 1.7 TRABB A				-0.4	-1.0	-6.5
NYAL A 3 D 1.8 0.4 18.1 OHI2 A 1 D -0.1 -0.0 4.8 OHI3 A 1 D 4.2 -0.3 12.3 ONSA A 3 D -0.3 -0.2 7.4 PDEL A 1 D -0.1 2.5 3.8 PERT A 4 D -0.2 -0.6 -5.8 PETF A 3 D -2.5 0.8 -1.9 PIET A 1 D -0.8 0.6 -0.9 PIMO A 3 D -2.5 0.8 -1.9 PIMO A 3 D 0.2 -0.1 -7.7 POL2 A 1 D -1.9 2.1 -8.0 POTS A 1 D -0.9 -0.3 8.8 POTS A 1 D -0.2 -0.6 6.1 QUIN A 3 D 0.0 0.1 3.2 QUIN A 3 D 1.0 0.3 0.4 RABET A 1 D -0.6 -1.2 -2.7 RAMO A 3 D 2.0 0.6 -3.4 REUN A 1 D -0.7 2.2 -8.9 REYK A 3 D -0.1 0.0 6.9 REYK A 3 D -0.1 0.0 6.9 SEY1 A 2 D -1.1 1.3 -0.5 SCUB A 1 D -0.2 -2.9 -3.9 SEY1 A 2 D -1.1 1.3 -0.5 STER A 5 D -2.0 -2.1 5.7 STJO A 4 D 0.9 0.1 -7.4 SUTH A 1 D 0.3 -1.1 0.0 STHU A 1 D -0.6 -1.2 -2.7 TROM A 1 D -0.6 -1.2 -2.7 TROM A 1 D -0.6 -1.9 -8.5 THU3 A 1 D -0.6 -1.9 -8.5 THU3 A 1 D -0.1 1.3 -8.3 THTI A 1 D -0.6 -1.9 -8.5 THU3 A 1 D -0.1 1.3 -8.3 THTI A 1 D -0.6 -1.9 -8.5 THU3 A 1 D -0.1 1.5 -7.4 TROM A 1 D -0.2 0.0 -7.2 TRAB A 1 D -0.2 0.0 -7.2 TRAB A 1 D -0.2 0.0 -7.2 TRAB A 1 D -0.1 1.5 2.7 TRAB A 1 D -0.1 1.5 2.7 TRAB A 1 D -0.1 1.5 2.7 TRAB A 1 D -0.2 0.0 -7.2 TRAB A 1 D -0.1 1.5 2.7 TRAB A 1 D -0.2 0.0 -7.2 TRAB A 1 D -0.1 1.5 2.7 TRAB A 1 D -0.1 1.5 2.7 TRAB A 1 D -0.1 0.5 8.5 TRAB A 2 D -0.6 0.3 -2.0 ULAB A 1 D -0.1 0.5 8.5 TRAB A 2 D -0.6 0.3 -2.0 ULAB A 1 D -0.1 1.5 2.7 TRAB A 1 D -0.2 0.0 -7.2 TRAB A 1 D -0.2 0.0 -7.2 TRAB A 1 D -0.4 0.2 0.0 -7.2 TRAB A 1 D -0.6 0.3 0.4 0.2 USNO A 1 D -0.2 0.0 -7.2 TRAB A 1 D -0.6 0.3 0.9 0.5 5.9 WHHN A 4 D -2.1 -1.5 5 -10.8 WESK A 2 D -0.6 0.3 5.9 WHHN A 4 D -2.1 -0.6 3.3 THU3 A 1 D -0.6 0.2 0.9 -1.9 WHLL A 5 D -1.2 0.0 0.9 -1.9 WHLL A 5 D -1.2 0.0 0.9 -1.9				-1.3 1.2	0.6 -0.2	
OHIS A 1 D 4.2 -0.3 12.3 ONSA A 3 D -0.3 -0.2 7.4 PDEL A 1 D -0.1 2.5 3.8 PERT A 4 D -0.2 -0.6 -5.8 PETP A 3 D -2.5 0.8 -1.9 PIE1 A 1 D -0.8 0.6 -0.9 PIMO A 3 D 0.2 -0.1 -7.7 POL2 A 1 D -1.9 2.1 -8.0 POL2 A 1 D -0.9 -0.3 8.8 POTS A 1 D -0.2 -0.6 8.1 OAQ1 A 3 D 0.0 0.1 3.2 QUIN A 3 D 0.0 0.1 3.2 QUIN A 3 D 1.0 0.3 0.4 RABET A 1 D -0.6 -1.2 -2.7 RAMO A 3 D 2.0 0.6 -3.4 REUN A 1 D -0.7 2.2 -8.9 REYK A 3 D -0.1 0.0 6.9 RIOG A 1 D -0.4 -1.1 -1.4 SANT A 3 D -0.1 0.0 6.9 RIOG A 1 D -0.4 -1.1 -1.4 SANT A 3 D -0.1 0.0 6.9 SCUB A 1 D -0.4 -1.1 -1.4 SANT A 3 D -0.1 0.0 6.9 SCUB A 1 D -0.2 -2.9 -3.9 SFER A 5 D -2.0 -2.1 5.7 STJO A 4 D 0.9 0.1 -7.4 SYOG A 1 D 2.1 1.3 -0.5 SFER A 5 D -2.0 -2.1 5.7 STJO A 4 D 0.9 0.1 -7.4 SYOG A 1 D -0.6 -1.9 -8.5 THU3 A 1 D -0.6 -1.9 -8.5 THU3 A 1 D -0.6 -1.9 -8.5 THU3 A 1 D -1.0 1.5 2.7 TRAB A 1 D -0.2 0.0 -7.2 TRAB A 1 D -0.2 0.0 0.7 TRAB A 1 D -0.6 0.3 0.2 0.8 THU4 A 1 D -0.6 0.3 0.3 0.9 THU4 A 1 D -0.6 0.3 0.9 THU4 A 1 D -0.6 0.2 0.0 0.7 TRAB A 1 D -0.6 0.3 0.9 THU4 A 1 D -0.6 0.2 0.0 0.7 TRAB A 1 D -0.6 0.3 0.9 THU4 A 1 D -0.6 0.0 0.3 0.9 THU4 A 1 D -0.6 0.0 0.3 0.9 THU4 A 1 D -0.6 0.0 0.0 0.1 1.8 TSKE A 2 D -0.6 0.3 0.9 THU4 A 1 D -0.6 0.0 0.0 0.1 1.8 TSKE A 2 D -0.6 0.3 0.9 THU4 A 1 D -0.6 0.0 0.0 0.1 1.8 TSKE A 2 D -0.6 0.0 0.3 0.9 THU4 A 1 D -0.6 0.0 0.0 0.0 0.1 1.8 TSKE A 2 D -0.6 0.0 0.0 0.0 0.1 1.8 TSKE A 2 D -0.6 0.0 0.0 0.0 0.0 0.0 0.0				1.8	0.4	18.1
PETT A 3 D -2.5 0.8 -1.9 PIEI A 1 D -0.8 0.6 -0.9 PIEI A 1 D -0.8 0.6 -0.9 POLY A 1 D -0.9 -0.3 8.8 POTS A 1 D -0.9 -0.3 8.8 POTS A 1 D -0.2 -0.6 8.1 QAQ1 A 3 D 0.0 0.1 3.2 QUIN A 3 D 1.0 0.3 0.4 REUN A 1 D -0.6 -1.2 -2.7 RAMO A 3 D 2.0 0.6 -3.4 REUN A 1 D -0.6 -1.2 -2.7 RAMO A 3 D -0.1 0.0 6.9 RIOG A 1 D -0.4 -1.1 -1.4 SANT A 3 D -0.1 0.0 6.9 RIOG A 1 D -0.4 -1.1 1 -1.4 SANT A 3 D -0.1 0.0 6.9 RIOG A 1 D -0.2 -2.9 -3.9 SCH2 A 1 D -0.3 -0.5 -6.0 SCUB A 1 D -0.2 -2.9 -3.9 SEY1 A 2 D -1.1 1.3 -8.3 THTI A 1 D -0.6 -1.9 -8.5 THU3 A 1 D -0.1 1.3 -8.3 THTI A 1 D -0.6 -0.4 12.9 TIDB A 2 D 0.9 0.5 -2.2 TIXI A 1 D -1.1 0.5 8.5 TOW2 A 1 D -1.1 0.5 8.5 TOW2 A 1 D -1.1 0.5 8.5 TOW2 A 1 D -1.1 0.5 8.5 TOW3 A 1 D -0.1 0.5 7.1 TRAB A 1 D -0.2 0.0 -7.2 USNO A 1 D -0.1 0.5 7.1 TSKB A 2 D -0.6 0.3 -2.0 USNO A 1 D -0.2 0.0 -7.2 USNO A 1 D -0.2 0.0 0.7 TRAB A 1 D -0.8 0.4 0.2 USNO A 1 D -0.9 1.1 0.5 8.5 TOW3 A 1 D -0.1 0.5 7.1 TSKB A 2 D -0.6 0.3 -2.0 USNO A 1 D -0.2 0.0 0.7 TRAB A 1 D -0.8 0.4 0.2 USNO A 1 D -0.2 0.0 0.7 TRAB A 1 D -0.8 0.4 0.2 USNO A 1 D -0.2 0.0 0.7 TSKB A 2 D -0.6 10.7 WHIT A 1 D -0.6 0.3 -2.0 WHIT A 1 D -0.6 0.3 5.9 WHIN A 4 D -2.1 1.5 -10.8 WSRT A 1 D -0.2 0.0 0.9 -1.9 WILL A 1 D -1.7 0.3 5.9 WHIN A 4 D -2.1 1.5 -10.8 WSRT A 2 D -1.0 0.6 3.3 ZIMM A 2 D -1.0 0.6 3.3 ZIMM A 2 D -1.0 0.6 5.5				-0.1	-0.0	4.8
PETT A 3 D -2.5 0.8 -1.9 PIEI A 1 D -0.8 0.6 -0.9 PIEI A 1 D -0.8 0.6 -0.9 POLY A 1 D -0.9 -0.3 8.8 POTS A 1 D -0.9 -0.3 8.8 POTS A 1 D -0.2 -0.6 8.1 QAQ1 A 3 D 0.0 0.1 3.2 QUIN A 3 D 1.0 0.3 0.4 REUN A 1 D -0.6 -1.2 -2.7 RAMO A 3 D 2.0 0.6 -3.4 REUN A 1 D -0.6 -1.2 -2.7 RAMO A 3 D -0.1 0.0 6.9 RIOG A 1 D -0.4 -1.1 -1.4 SANT A 3 D -0.1 0.0 6.9 RIOG A 1 D -0.4 -1.1 1 -1.4 SANT A 3 D -0.1 0.0 6.9 RIOG A 1 D -0.2 -2.9 -3.9 SCH2 A 1 D -0.3 -0.5 -6.0 SCUB A 1 D -0.2 -2.9 -3.9 SEY1 A 2 D -1.1 1.3 -8.3 THTI A 1 D -0.6 -1.9 -8.5 THU3 A 1 D -0.1 1.3 -8.3 THTI A 1 D -0.6 -0.4 12.9 TIDB A 2 D 0.9 0.5 -2.2 TIXI A 1 D -1.1 0.5 8.5 TOW2 A 1 D -1.1 0.5 8.5 TOW2 A 1 D -1.1 0.5 8.5 TOW2 A 1 D -1.1 0.5 8.5 TOW3 A 1 D -0.1 0.5 7.1 TRAB A 1 D -0.2 0.0 -7.2 USNO A 1 D -0.1 0.5 7.1 TSKB A 2 D -0.6 0.3 -2.0 USNO A 1 D -0.2 0.0 -7.2 USNO A 1 D -0.2 0.0 0.7 TRAB A 1 D -0.8 0.4 0.2 USNO A 1 D -0.9 1.1 0.5 8.5 TOW3 A 1 D -0.1 0.5 7.1 TSKB A 2 D -0.6 0.3 -2.0 USNO A 1 D -0.2 0.0 0.7 TRAB A 1 D -0.8 0.4 0.2 USNO A 1 D -0.2 0.0 0.7 TRAB A 1 D -0.8 0.4 0.2 USNO A 1 D -0.2 0.0 0.7 TSKB A 2 D -0.6 10.7 WHIT A 1 D -0.6 0.3 -2.0 WHIT A 1 D -0.6 0.3 5.9 WHIN A 4 D -2.1 1.5 -10.8 WSRT A 1 D -0.2 0.0 0.9 -1.9 WILL A 1 D -1.7 0.3 5.9 WHIN A 4 D -2.1 1.5 -10.8 WSRT A 2 D -1.0 0.6 3.3 ZIMM A 2 D -1.0 0.6 3.3 ZIMM A 2 D -1.0 0.6 5.5				-0.3	-0.2	7.4
PETT A 3 D -2.5 0.8 -1.9 PIEI A 1 D -0.8 0.6 -0.9 PIEI A 1 D -0.8 0.6 -0.9 POLY A 1 D -0.9 -0.3 8.8 POTS A 1 D -0.9 -0.3 8.8 POTS A 1 D -0.2 -0.6 8.1 QAQ1 A 3 D 0.0 0.1 3.2 QUIN A 3 D 1.0 0.3 0.4 REUN A 1 D -0.6 -1.2 -2.7 RAMO A 3 D 2.0 0.6 -3.4 REUN A 1 D -0.6 -1.2 -2.7 RAMO A 3 D -0.1 0.0 6.9 RIOG A 1 D -0.4 -1.1 -1.4 SANT A 3 D -0.1 0.0 6.9 RIOG A 1 D -0.4 -1.1 1 -1.4 SANT A 3 D -0.1 0.0 6.9 RIOG A 1 D -0.2 -2.9 -3.9 SCH2 A 1 D -0.3 -0.5 -6.0 SCUB A 1 D -0.2 -2.9 -3.9 SEY1 A 2 D -1.1 1.3 -8.3 THTI A 1 D -0.6 -1.9 -8.5 THU3 A 1 D -0.1 1.3 -8.3 THTI A 1 D -0.6 -0.4 12.9 TIDB A 2 D 0.9 0.5 -2.2 TIXI A 1 D -1.1 0.5 8.5 TOW2 A 1 D -1.1 0.5 8.5 TOW2 A 1 D -1.1 0.5 8.5 TOW2 A 1 D -1.1 0.5 8.5 TOW3 A 1 D -0.1 0.5 7.1 TRAB A 1 D -0.2 0.0 -7.2 USNO A 1 D -0.1 0.5 7.1 TSKB A 2 D -0.6 0.3 -2.0 USNO A 1 D -0.2 0.0 -7.2 USNO A 1 D -0.2 0.0 0.7 TRAB A 1 D -0.8 0.4 0.2 USNO A 1 D -0.9 1.1 0.5 8.5 TOW3 A 1 D -0.1 0.5 7.1 TSKB A 2 D -0.6 0.3 -2.0 USNO A 1 D -0.2 0.0 0.7 TRAB A 1 D -0.8 0.4 0.2 USNO A 1 D -0.2 0.0 0.7 TRAB A 1 D -0.8 0.4 0.2 USNO A 1 D -0.2 0.0 0.7 TSKB A 2 D -0.6 10.7 WHIT A 1 D -0.6 0.3 -2.0 WHIT A 1 D -0.6 0.3 5.9 WHIN A 4 D -2.1 1.5 -10.8 WSRT A 1 D -0.2 0.0 0.9 -1.9 WILL A 1 D -1.7 0.3 5.9 WHIN A 4 D -2.1 1.5 -10.8 WSRT A 2 D -1.0 0.6 3.3 ZIMM A 2 D -1.0 0.6 3.3 ZIMM A 2 D -1.0 0.6 5.5	PDEL	A	1 D	-0.1	2.5	3.8
PIMO A 3 D 0.2 -0.1 -7.7 POL2 A 1 D -1.9 2.1 -8.0 POLV A 1 D -0.9 -0.3 8.8 POTS A 1 D -0.2 -0.6 8.1 QQIN A 3 D 0.0 0.1 3.2 QUIN A 3 D 1.0 0.3 0.4 RABT A 1 D -0.6 -1.2 -2.7 RAMO A 3 D 2.0 0.6 -3.4 REUN A 1 D -0.7 2.2 -8.9 REYK A 3 D -0.1 0.0 0.6 -9.4 REUN A 1 D -0.7 2.2 -8.9 RIOG A 1 D -0.4 -1.1 -1.4 SANT A 3 D -0.1 0.0 6.9 RIOG A 1 D -0.4 -1.1 -1.4 SANT A 3 D -0.1 0.0 6.9 SCH2 A 1 D -0.2 -2.9 -3.9 SEY1 A 2 D -1.1 1.3 -0.5 SFER A 5 D -2.0 -2.1 5.7 STJO A 4 D 0.9 0.1 -7.4 SYOG A 1 D 2.1 1.3 -8.3 THTI A 1 D -0.6 -1.9 -8.5 THU3 A 1 D -0.6 -1.9 -8.5 THU3 A 1 D -1.0 -0.6 -1.9 -8.5 TIXI A 1 D -1.1 0.5 8.5 TIXI A 1 D -1.1 0.5 8.5 TIXI A 1 D -1.0 1.5 2.7 TRAB A 1 D -0.2 0.0 -7.2 TROM A 1 D -0.2 0.0 -7.2 TROM A 1 D -0.0 -0.1 1.2 TROM A 1 D -0.0 -0.1 1.5 TROM A 1 D -0.2 0.0 -7.2 TROM A 1 D -0.0 -0.1 1.5 TROM A 1 D -0.0 -0.1 1.6 0.2 USNO A 1 D -0.2 0.0 -7.2 TROM A 1 D -0.2 0.0 -7.2 TROM A 1 D -0.4 0.0 0.1 1.6 0.2 USNO A 1 D -0.2 0.0 0.7 TERM A 1 D -0.8 0.4 0.2 USNO A 1 D -0.2 0.0 0.7 TERM A 1 D -0.8 0.4 0.2 USNO A 1 D -0.2 0.0 0.7 TERMIT A 1 D -0.8 0.4 0.2 USNO A 1 D -0.2 0.0 0.7 ULAB A 1 D -0.8 0.4 0.2 USNO A 1 D -0.9 0.1 1.6 6.6 UNSA A 1 D -0.8 0.4 0.2 USNO A 1 D -0.2 0.0 0.7 WESL A 1 D 1.1 0.5 18.6 VILL A 5 D -0.2 0.0 -2.1 WESS A 9 D 0.2 0.6 1.7 WHIT A 1 D -0.6 0.9 0.9 WHHN A 4 D -2.1 1.5 5 1.8 WESS A 2 D -2.1 0.6 3.3 ZIMM A 2 D -1.0 0.4 2.3 YELL A 5 D -1.2 0.2 -2.8 YSSK A 2 D -2.1 0.6 3.3 ZIMM A 2 D -1.3 -2.7 7.0				-0.2 -2.5	0.0	-5.8 -1 9
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POLV A         1 D         -0.9         -0.3         8.8           POTS A         1 D         -0.2         -0.6         8.1           QAQ1 A         3 D         0.0         0.1         3.2           QUIN A         3 D         1.0         0.3         0.4           RABT A         1 D         -0.6         -1.2         -2.7           RAMO A         3 D         2.0         0.6         -3.4           REUN A         1 D         -0.7         2.2         -8.9           RIOG A         1 D         -0.4         -1.1         -1.4           SANT A         3 D         -0.1         0.1         3.1           SCUB A         1 D         -0.4         -1.1         -1.4           SANT A         3 D         -0.1         -0.1         3.1           SCUB A         1 D         -0.2         -2.9         -3.9           SEY1 A         2 D         -1.1         1.3         -0.5           SEPR A         5 D         -2.0         -2.1         5.7           STJO A         4 D         0.9         0.1         -7.4           SYOG A         1 D         0.3         -1.1         1.3				0.2	-0.1	-7.7
POTS A 1 D -0.2 -0.6 8.1 QQIN A 3 D 0.0 0.1 3.2 QUIN A 3 D 1.0 0.3 0.4 RABT A 1 D -0.6 -1.2 -2.7 RAMO A 3 D 2.0 0.6 -3.4 REUN A 1 D -0.7 2.2 -8.9 REYK A 3 D -0.1 0.0 6.9 RIOG A 1 D -0.4 -1.1 -1.4 SANT A 3 D -0.1 -0.1 3.1 SCH2 A 1 D -0.2 -2.9 -3.9 SEY1 A 2 D -1.1 1.3 -0.5 STER A 5 D -2.0 -2.1 5.7 STJO A 4 D 0.9 0.1 -7.4 SUTH A 1 D 0.3 -1.1 -0.4 SYOG A 1 D 2.1 1.3 -8.3 THTI A 1 D -0.6 -1.9 -8.5 THU3 A 1 D -0.6 -1.9 -8.5 THU3 A 1 D -1.6 -0.4 12.9 TIXI A 1 D -1.1 0.5 8.5 TOW2 A 1 D -1.0 1.5 2.7 TRAB A 1 D -0.2 0.0 -7.2 TRAB A 1 D -0.2 0.0 -7.2 TROM A 1 D -0.1 1.5 -7.1 TROM A 1 D -0.1 1.5 2.7 TRAB A 1 D -0.1 -0.5 8.5 ULAB A 1 D -0.1 -0.5 8.5 VILL A 5 D -0.2 0.0 -2.1 WESZ A 9 D 0.2 -0.6 -1.9 WESZ A 9 D 0.2 -0.6 -1.0, 8.6 VILL A 1 D -1.1 0.5 8.6 VILL A 5 D -0.2 0.0 -2.1 WESZ A 9 D 0.2 -0.6 -1.0, 7 WHIT A 1 D -0.8 -0.4 0.2 UNNA A 1 D -0.9 -0.9 -1.9 WILL A 1 D -1.7 -0.3 -1.5 WSRT A 1 D -0.2 -0.6 -10.7 WSRT A 1 D -0.2 -0.6 -2.1 WHIT A 1 D -0.2 -0.6 -1.0, 7 WHIT A 1 D -0.2 -0.6 -2.1 WESZ A 9 D 0.2 -0.6 -1.0, 7 WHIT A 1 D -0.2 -0.4 5.1 WHIT A 1 D -0.2 -0.6 -1.0, 7 WHIT A 1 D -0.2 -0.6 -2.1 WHIT A 1 D -0.2 -0.4 5.1 WHIT A 2 D -1.0 -0.2 -0.9 -1.9 WHIT A 1 D -0.2 -0.4 5.1 WHIT A 1 D -0.2 -0.4 5.1 WHIT A 1 D -0.2 -0.4 2.3 YELL A 5 D -1.2 -0.2 -2.8 YSSK A 2 D -2.1 -0.6 3.3 ZIMM A 2 D -1.0 -0.4 2.3 YELL A 5 D -1.2 -0.2 -2.8 YSSK A 2 D -2.1 -0.6 3.3 ZIMM A 2 D -0.1 -0.5 5.5				-0.9	-0.3	8.8
RABT A 1 D -0.6 -1.2 -2.7 RAMO A 3 D -0.1 0.0 6.9 REYK A 3 D -0.1 0.0 6.9 REYK A 3 D -0.1 0.0 6.9 REYK A 1 D -0.4 -1.1 -1.4 SANT A 3 D -0.1 -0.1 3.1 SCH2 A 1 D -0.2 -2.9 -3.9 SEY1 A 2 D -1.1 1.3 -0.5 SFER A 5 D -2.0 -2.1 5.7 STJO A 4 D 0.9 0.1 -7.4 SUTH A 1 D 0.3 -1.1 -0.4 SYOG A 1 D 2.1 1.3 -8.3 THTI A 1 D -0.6 -1.9 -8.5 THU3 A 1 D -0.6 -1.9 -8.5 THU3 A 1 D -1.6 -0.4 12.9 TIXI A 1 D -1.1 0.5 8.5 TOW2 A 1 D -1.1 1.5 3.8 TROW2 A 1 D -1.0 -0.2 0.0 -7.2 TRAB A 1 D -1.0 1.5 2.7 TRAB A 1 D -0.2 0.0 -0.1 12.4 TROM A 1 D -0.1 -0.5 7.1 TSKB A 2 D -0.6 0.3 -2.0 ULAB A 1 D -0.1 -0.5 7.1 TSKB A 2 D -0.6 0.3 -2.0 ULAB A 1 D -0.1 -0.5 8.5 VILL A 5 D -0.2 0.0 -2.1 WESS A 9 D 0.2 -0.6 -10.7 WEST A 1 D -0.8 -0.4 0.2 USNO A 1 D -0.9 -0.9 -1.9 WILL A 1 D -1.7 -0.8 -0.4 VILL A 5 D -0.2 0.0 -2.1 WEST A 1 D -0.2 -0.4 5.1 WEST A 3 D -0.2 -0.4 5.1 WHIT A 1 D -0.7 -0.9 -1.9 WILL A 1 D -1.7 -0.3 -1.5 WSRT A 1 D -0.7 -0.9 -1.9 WILL A 5 D -0.2 -0.4 5.1 WHIT A 1 D -0.6 -0.9 -1.9 WILL A 5 D -0.2 -0.3 5.9 WUHN A 4 D -2.1 -0.5 5.9 WUHN A 4 D -2.1 -0.6 3.3 TYSIM A 2 D -1.0 -0.4 2.3 YELL A 5 D -1.2 -0.2 -2.8 YSSK A 2 D -2.1 -0.6 3.3 ZIMM A 2 D -1.3 -0.5 7.0			1 D	-0.2	-0.6	8.1
RABT A 1 D -0.6 -1.2 -2.7 RAMO A 3 D -0.1 0.0 6.9 REYK A 3 D -0.1 0.0 6.9 REYK A 3 D -0.1 0.0 6.9 REYK A 1 D -0.4 -1.1 -1.4 SANT A 3 D -0.1 -0.1 3.1 SCH2 A 1 D -0.2 -2.9 -3.9 SEY1 A 2 D -1.1 1.3 -0.5 SFER A 5 D -2.0 -2.1 5.7 STJO A 4 D 0.9 0.1 -7.4 SUTH A 1 D 0.3 -1.1 -0.4 SYOG A 1 D 2.1 1.3 -8.3 THTI A 1 D -0.6 -1.9 -8.5 THU3 A 1 D -0.6 -1.9 -8.5 THU3 A 1 D -1.6 -0.4 12.9 TIXI A 1 D -1.1 0.5 8.5 TOW2 A 1 D -1.1 1.5 3.8 TROW2 A 1 D -1.0 -0.2 0.0 -7.2 TRAB A 1 D -1.0 1.5 2.7 TRAB A 1 D -0.2 0.0 -0.1 12.4 TROM A 1 D -0.1 -0.5 7.1 TSKB A 2 D -0.6 0.3 -2.0 ULAB A 1 D -0.1 -0.5 7.1 TSKB A 2 D -0.6 0.3 -2.0 ULAB A 1 D -0.1 -0.5 8.5 VILL A 5 D -0.2 0.0 -2.1 WESS A 9 D 0.2 -0.6 -10.7 WEST A 1 D -0.8 -0.4 0.2 USNO A 1 D -0.9 -0.9 -1.9 WILL A 1 D -1.7 -0.8 -0.4 VILL A 5 D -0.2 0.0 -2.1 WEST A 1 D -0.2 -0.4 5.1 WEST A 3 D -0.2 -0.4 5.1 WHIT A 1 D -0.7 -0.9 -1.9 WILL A 1 D -1.7 -0.3 -1.5 WSRT A 1 D -0.7 -0.9 -1.9 WILL A 5 D -0.2 -0.4 5.1 WHIT A 1 D -0.6 -0.9 -1.9 WILL A 5 D -0.2 -0.3 5.9 WUHN A 4 D -2.1 -0.5 5.9 WUHN A 4 D -2.1 -0.6 3.3 TYSIM A 2 D -1.0 -0.4 2.3 YELL A 5 D -1.2 -0.2 -2.8 YSSK A 2 D -2.1 -0.6 3.3 ZIMM A 2 D -1.3 -0.5 7.0					0.1	
REYK A 3 D -0.1 0.0 6.9  RIOG A 1 D -0.4 -1.1 -1.4  SANT A 3 D -0.1 -0.1 3.1  SCH2 A 1 D -0.3 -0.5 -6.0  SCUB A 1 D -0.2 -2.9 -3.9  SEY1 A 2 D -1.1 1.3 -0.5  SFER A 5 D -2.0 -2.1 5.7  STJO A 4 D 0.9 0.1 -7.4  SUTH A 1 D 0.3 -1.1 -0.4  SYOG A 1 D 2.1 1.3 -8.3  THTI A 1 D 0.6 -1.9 -8.5  THU3 A 1 D -0.6 -1.9 -8.5  THU3 A 1 D 1.6 -0.4 12.9  TIXI A 1 D -1.1 0.5 8.5  TOW2 A 1 D -1.0 1.5 2.7  TRAB A 1 D -1.0 1.5 2.7  TRAB A 1 D -0.2 0.0 -7.2  TROM A 4 D -0.0 -0.1 12.4  TROM A 1 D -0.1 -0.5 7.1  TSKB A 2 D -0.6 0.3 -2.0  ULAB A 1 D -0.1 -0.5 7.1  TSKB A 2 D -0.6 0.3 -2.0  ULAB A 1 D -0.1 -0.5 8.5  VILL A 5 D -0.2 -1.0 -8.6  VILL A 5 D -0.2 -1.0 -8.6  VILL A 5 D -0.2 -0.6 -10.7  WESS A 9 D 0.2 -0.6 -10.7  WHIT A 1 D -1.7 -0.3 -1.5  WRST A 1 D -2.0 -0.9 -1.9  WILL A 5 D -0.2 -0.4 5.1  WINTER A 3 D -0.2 -0.4 5.1  WHIT A 1 D -2.0 -0.9 -1.9  WILL A 5 D -0.2 -0.3 5.9  WUHN A 4 D -2.1 -1.5 -10.8  YSSK A 2 D -2.1 -0.6 3.3  YELL A 5 D -1.2 -0.2 -2.8  YSSK A 2 D -2.1 -0.6 3.3  ZIMM A 2 D -0.5 5.5			1 D	-0.6	-1.2	-2.7
REYK A 3 D -0.1 0.0 6.9  RIOG A 1 D -0.4 -1.1 -1.4  SANT A 3 D -0.1 -0.1 3.1  SCH2 A 1 D -0.3 -0.5 -6.0  SCUB A 1 D -0.2 -2.9 -3.9  SEY1 A 2 D -1.1 1.3 -0.5  SFER A 5 D -2.0 -2.1 5.7  STJO A 4 D 0.9 0.1 -7.4  SUTH A 1 D 0.3 -1.1 -0.4  SYOG A 1 D 2.1 1.3 -8.3  THTI A 1 D 0.6 -1.9 -8.5  THU3 A 1 D -0.6 -1.9 -8.5  THU3 A 1 D 1.6 -0.4 12.9  TIXI A 1 D -1.1 0.5 8.5  TOW2 A 1 D -1.0 1.5 2.7  TRAB A 1 D -1.0 1.5 2.7  TRAB A 1 D -0.2 0.0 -7.2  TROM A 4 D -0.0 -0.1 12.4  TROM A 1 D -0.1 -0.5 7.1  TSKB A 2 D -0.6 0.3 -2.0  ULAB A 1 D -0.1 -0.5 7.1  TSKB A 2 D -0.6 0.3 -2.0  ULAB A 1 D -0.1 -0.5 8.5  VILL A 5 D -0.2 -1.0 -8.6  VILL A 5 D -0.2 -1.0 -8.6  VILL A 5 D -0.2 -0.6 -10.7  WESS A 9 D 0.2 -0.6 -10.7  WHIT A 1 D -1.7 -0.3 -1.5  WRST A 1 D -2.0 -0.9 -1.9  WILL A 5 D -0.2 -0.4 5.1  WINTER A 3 D -0.2 -0.4 5.1  WHIT A 1 D -2.0 -0.9 -1.9  WILL A 5 D -0.2 -0.3 5.9  WUHN A 4 D -2.1 -1.5 -10.8  YSSK A 2 D -2.1 -0.6 3.3  YELL A 5 D -1.2 -0.2 -2.8  YSSK A 2 D -2.1 -0.6 3.3  ZIMM A 2 D -0.5 5.5					0.6	-3.4
RIOG A 1 D -0.4 -1.1 -1.4  SANT A 3 D -0.1 -0.1 3.1  SCH2 A 1 D -0.2 -0.5 -6.0  SCUB A 1 D -0.2 -2.9 -3.9  SEY1 A 2 D -1.1 1.3 -0.5  SFER A 5 D -2.0 -2.1 5.7  STJO A 4 D 0.9 0.1 -7.4  SYOG A 1 D 0.3 -1.1 -0.4  SYOG A 1 D -0.6 -1.9 -8.5  THTI A 1 D -0.6 -1.9 -8.5  THU3 A 1 D 1.6 -0.4 12.9  TIDB A 2 D 0.9 0.5 -2.2  TINI A 1 D -1.1 0.5 8.5  TOW2 A 1 D -1.1 0.5 8.5  TOW2 A 1 D -1.0 1.5 2.7  TRAB A 1 D -0.2 0.0 -7.2  TRAB A 1 D -0.2 0.0 -7.2  TROM A 1 D -0.6 0.3 -2.0  USNO A 1 D -0.1 -0.5 7.1  TSKB A 2 D -0.6 0.3 -2.0  ULAB A 1 D -0.1 -0.5 7.1  TSKB A 2 D -0.6 0.3 -2.0  USNO A 1 D -2.4 -0.1 -6.6  UNSA A 1 D -0.2 -0.6 0.3 -2.0  WESL A 1 D 1.1 0.5 8.6  VILL A 5 D -0.2 0.0 -2.1  WES2 A 9 D 0.2 -0.6 -10.7  WHIT A 1 D -0.2 -0.0 -2.1  WES2 A 9 D 0.2 -0.6 -10.7  WHIT A 1 D -0.2 -0.9 -1.9  WILL A 1 D -1.7 -0.3 5.9  WUHN A 4 D -2.1 -1.5 -10.8  WSRT A 1 D -0.2 -0.4 5.1  WTZR A 3 D -0.2 -0.6 3.3  YELL A 5 D -1.2 -0.2 -2.8  YSSK A 2 D -1.1 -0.5 3.3  ZIMM A 2 D -1.3 -2.7 7.0  Obs. Mean  Mean Std. 1.5 1.3 10.3	REYK			-0.1	0.0	6.9
SCH2 A 1 D -0.3 -0.5 -6.0 SCUB A 1 D -0.2 -2.9 -3.9 SEY1 A 2 D -1.1 1.3 -0.5 SFER A 5 D -2.0 -2.1 5.7 STJO A 4 D 0.9 0.1 -7.4 SUTH A 1 D 0.3 -1.1 -0.4 SYOG A 1 D 2.1 1.3 -8.3 THII A 1 D -0.6 -1.9 -8.5 THU3 A 1 D 1.6 -0.4 12.9 TIDB A 2 D 0.9 0.5 -2.2 TIXI A 1 D -1.1 0.5 8.5 TOW2 A 1 D -1.1 0.5 8.5 TOW2 A 1 D -1.0 1.5 2.7 TRAB A 1 D -0.0 -0.1 15 2.7 TRAB A 1 D -0.0 -0.1 12.4 TROM A 1 D -0.1 -0.5 7.1 TSKB A 2 D 0.9 0.5 -2.2 UNNO A 1 D -0.6 0.1 -0.5 7.1 ULAB A 1 D -0.6 0.1 -0.5 7.1 ULAB A 1 D -0.6 0.1 -0.5 8.6 UNSA A 1 D -0.2 0.0 -6.6 UNSA A 1 D -0.2 -0.6 0.3 -2.0 ULAB A 1 D -0.2 -1.0 -8.6 VESL A 1 D 1.1 0.5 18.6 VILL A 5 D -0.2 0.0 -2.1 WHIT A 1 D -2.0 -0.9 -1.9 WILL A 1 D -1.7 -0.3 -1.5 WES2 A 9 D 0.2 -0.6 -10.7 WHIT A 1 D -2.0 -0.6 -10.7 WHIT A 1 D -2.0 -0.6 5.1 WTZR A 3 D -0.2 -0.4 2.3 YESK A 2 D -2.1 -0.6 3.3 ZIMM A 2 D -1.3 -2.7 7.0  Obs. Mean Mean Std. 1.5 1.3 10.3				-0.4	-1.1	-1.4
SCUB A 1 D -0.2 -2.9 -3.9  SEY1 A 2 D -1.1 1 3 -0.5  SFER A 5 D -2.0 -2.1 5.7  STJO A 4 D 0.9 0.1 -7.4  SYOG A 1 D 0.3 -1.1 -0.4  SYOG A 1 D 2.1 1.3 -8.3  THTI A 1 D -0.6 -1.9 -8.5  THU3 A 1 D 1.6 -0.4 12.9  TIDB A 2 D 0.9 0.5 -2.2  TIXI A 1 D -1.0 1.5 8.5  TOW2 A 1 D -1.0 1.5 8.5  TOW2 A 1 D -1.0 1.5 2.7  TRAB A 1 D -0.2 0.0 -7.2  TROM A 1 D -0.1 -0.5 7.1  TSKB A 2 D 0.9 0.5 -2.0  USNO A 1 D -0.1 -0.5 7.1  TSKB A 2 D -0.6 0.3 -2.0  ULAB A 1 D -0.1 -0.5 7.1  TSKB A 2 D -0.6 0.3 -2.0  ULAB A 1 D -2.4 -0.1 -6.6  UNSA A 1 D -0.2 -0.0 -0.1 12.4  WESL A 1 D 1.1 0.5 18.6  VILL A 5 D -0.2 0.0 -2.1  WHIT A 1 D -2.0 -0.6 -10.7  WHIT A 1 D -2.0 -0.9 -1.9  WILL A 1 D -1.7 -0.3 5.9  WHIN A 4 D -2.1 -0.5 5.9  WUHN A 4 D -2.1 -1.5 -10.8  WSRT A 1 D -0.2 -0.4 5.1  WTZR A 3 D -0.2 -0.4 5.1  WTZR A 3 D -0.2 -0.4 5.1  WTZR A 3 D -0.2 -0.6 3.3  YELL A 5 D -1.2 -0.2 -2.8  YSSK A 2 D -1.1 -0.6 3.3  ZIMM A 2 D -1.3 -2.7 7.0  Obs. Mean -0.3 -0.0 -0.5				-0.1	-0.1	-6.0
SEYI A 2 D -1.1 1.3 -0.5 SFER A 5 D -2.0 -2.1 5.7 STJO A 4 D 0.9 0.1 -7.4 SUTH A 1 D 0.3 -1.1 -0.4 SYOG A 1 D 2.1 1.3 -8.3 THTI A 1 D -0.6 -1.9 -8.5 THU3 A 1 D D 1.6 -0.4 12.9 TIDB A 2 D 0.9 0.5 -2.2 TIXI A 1 D -1.1 0.5 8.5 TOW2 A 1 D -1.1 0.5 8.5 TOW2 A 1 D -1.0 1.5 2.7 TRAB A 1 D -0.2 0.0 -7.2 TROM A 4 D -0.0 -0.1 12.4 TROM A 1 D -0.1 -0.5 7.1 TSKB A 2 D -0.6 0.3 -2.0 ULAB A 1 D -0.1 -0.5 7.1 TSKB A 2 D -0.6 0.3 -2.0 ULAB A 1 D -0.1 -6.6 ULAB A 1 D -0.2 -0.6 1.3 -2.0 ULAB A 1 D -0.8 -0.4 0.2 USNO A 1 D -0.2 -1.0 -8.6 VILL A 5 D -0.2 0.0 -2.1 WESZ A 9 D 0.2 -0.6 -10.7 WHIT A 1 D -2.0 -0.9 -1.9 WHIT A 1 D -2.0 -0.9 -1.9 WILL A 1 D -1.7 -0.3 -1.5 WSRT A 1 D -0.7 -0.9 -1.9 WILL A 1 D -1.7 -0.3 -1.5 WSRT A 1 D -0.2 -0.4 5.1 WHITA A 2 D -1.0 -0.4 2.3 YELL A 5 D -1.2 -0.2 -2.8 YSSK A 2 D -2.1 -0.6 3.3 ZIMM A 2 D -1.3 -2.7 7.0 Obs. Mean Mean Std. 1.5 1.3 10.3	SCUB	A	1 D	-0.2	-2.9	-3.9
STJO A 4 D 0.9 0.1 -7.4 SYOG A 1 D 0.3 -1.1 -0.4 SYOG A 1 D 2.1 1.3 -8.3 THTI A 1 D -0.6 -1.9 -8.5 THU3 A 1 D 1.6 -0.4 12.9 TIDB A 2 D 0.9 0.5 -2.2 TIXI A 1 D -1.1 0.5 8.5 TOW2 A 1 D -1.0 1.5 2.7 TRAB A 1 D -0.2 0.0 -7.2 TRAB A 1 D -0.2 0.0 -7.2 TROI A 4 D -0.0 -0.1 12.4 TROM A 1 D -0.1 -0.5 7.1 TSKB A 2 D -0.6 0.3 -2.0 ULAB A 1 D -0.2 -0.6 0.3 -2.0 ULAB A 1 D -0.2 -0.6 0.3 8.5 TSKB A 2 D -0.6 0.3 -2.0 USNO A 1 D -0.2 -1.0 -8.6 UNSA A 1 D -0.2 -1.0 -8.6 VILL A 5 D -0.2 0.0 -2.1 WESZ A 9 D 0.2 0.6 -10.7 WHIT A 1 D -2.0 -0.9 -1.9 WILL A 1 D -1.7 -0.3 -1.5 WILL A 1 D -1.7 -0.3 -1.5 WILL A 1 D -0.2 -0.4 5.1 WITZR A 3 D -0.2 -0.6 3.3 YELL A 5 D -1.2 -0.2 -2.8 YSSK A 2 D -2.1 -0.6 3.3 ZIMM A 2 D -1.3 -2.7 7.0 Obs. Mean Mean Std. 1.5 1.3 10.3				-1.1 -2.0	1.3	-0.5 5.7
SUTH A         1 D         0.3         -1.1         -0.4           SYOG A         1 D         2.1         1.3         -8.3           THTI A         1 D         -0.6         -1.9         -8.5           THU3 A         1 D         1.6         -0.4         12.9           TIDB A         2 D         0.9         0.5         -2.2           TIXI A         1 D         -1.1         0.5         8.5           TOW2 A         1 D         -1.0         1.5         2.7           TRAB A         1 D         -0.2         0.0         -7.2           TROI A         4 D         -0.0         -0.1         12.4           TROM A         1 D         -0.1         -0.5         7.1           TSKB A         2 D         0.0         -0.1         -0.5         7.1           TSKB A         2 D         0.0         0.3         -2.0           ULAB A         1 D         -0.1         -0.5         7.1           USNO A         1 D         -0.2         -0.4         0.2           USNO A         1 D         0.1         0.5         18.6           VELL A         5 D         -0.2         0.0<				0.9	0.1	-7.4
THUS A 1 D 1.6 -0.4 12.9  TIDB A 2 D 0.9 0.5 -2.2  TIXI A 1 D -1.1 0.5 8.5  TOW2 A 1 D -1.0 1.5 2.7  TRAB A 1 D -0.2 0.0 -7.2  TRO1 A 4 D -0.0 -0.1 12.4  TROM A 1 D -0.1 -0.5 7.1  TSKB A 2 D -0.6 0.3 -2.0  ULAB A 1 D -2.4 -0.1 -6.6  UNSA A 1 D -0.8 -0.4 0.2  USNO A 1 D -0.2 -1.0 -8.6  VESL A 1 D 1.1 0.5 18.6  VILL A 5 D -0.2 0.0 -2.1  WHIT A 1 D -2.0 -0.9 -1.9  WILL A 1 D -1.7 -0.3 -1.5  WHIT A 1 D -0.2 -0.6 -10.7  WHIT A 1 D -0.2 -0.4 5.1  WIZER A 3 D -0.2 -0.4 5.1  WIZER A 3 D -0.2 -0.4 5.1  WIZER A 3 D -0.2 -0.4 2.3  YELL A 5 D -1.0 -0.4 2.3  YELL A 5 D -1.0 -0.4 2.3  YELL A 5 D -1.1 -0.6 3.3  ZIMM A 2 D -1.1 -0.6 3.3  Mean Std. 1.5 1.3 10.3				0.3	-1.1	-0.4
THUS A 1 D 1.6 -0.4 12.9  TIDB A 2 D 0.9 0.5 -2.2  TIXI A 1 D -1.1 0.5 8.5  TOW2 A 1 D -1.0 1.5 2.7  TRAB A 1 D -0.2 0.0 -7.2  TRO1 A 4 D -0.0 -0.1 12.4  TROM A 1 D -0.1 -0.5 7.1  TSKB A 2 D -0.6 0.3 -2.0  ULAB A 1 D -2.4 -0.1 -6.6  UNSA A 1 D -0.8 -0.4 0.2  USNO A 1 D -0.2 -1.0 -8.6  VESL A 1 D 1.1 0.5 18.6  VILL A 5 D -0.2 0.0 -2.1  WHIT A 1 D -2.0 -0.9 -1.9  WILL A 1 D -1.7 -0.3 -1.5  WHIT A 1 D -0.2 -0.6 -10.7  WHIT A 1 D -0.2 -0.4 5.1  WIZER A 3 D -0.2 -0.4 5.1  WIZER A 3 D -0.2 -0.4 5.1  WIZER A 3 D -0.2 -0.4 2.3  YELL A 5 D -1.0 -0.4 2.3  YELL A 5 D -1.0 -0.4 2.3  YELL A 5 D -1.1 -0.6 3.3  ZIMM A 2 D -1.1 -0.6 3.3  Mean Std. 1.5 1.3 10.3				-0.6		-8.5
TIXI A 1 D -1.1 0.5 8.5  TOW2 A 1 D -1.0 1.5 2.7  TRAB A 1 D -0.2 0.0 -7.2  TRO1 A 4 D -0.0 -0.1 12.4  TROM A 1 D -0.1 -0.5 7.1  TSKB A 2 D -0.6 0.3 -2.0  ULAB A 1 D -2.4 -0.1 -6.6  UNSA A 1 D -2.4 -0.1 -6.6  UNSA A 1 D -0.2 -1.0 -8.6  VESL A 1 D -1.1 0.5 18.6  VILL A 5 D -0.2 0.0 -2.1  WHIT A 1 D -2.0 0.0 -2.1  WHIT A 1 D -1.7 -0.3 -1.5  WHIT A 1 D -0.2 -0.6 -10.7  WHIT A 1 D -0.2 -0.3 5.9  WILL A 3 D -0.2 -0.4 5.1  WIZER A 3 D -0.2 -0.3 5.9  WHAN A 4 D -2.1 -1.5 -10.8  YESK A 2 D -1.0 -0.4 2.3  YELL A 5 D -1.2 -0.2 -2.8  XYSK A 2 D -2.1 -0.6 3.3  ZIMM A 2 D -1.3 -2.7 7.0  Obs. Mean -0.3 -0.0 -0.5  Mean Std0.5	THU3	A	1 D	1.6	-0.4	12.9
TOW2 A 1 D -1.0 1.5 2.7 TRAB A 1 D -0.2 0.0 -7.2 TRO1 A 4 D -0.0 -0.1 12.4 TROM A 1 D -0.1 -0.5 7.1 TSKB A 2 D -0.6 0.3 -2.0 ULAB A 1 D -2.4 -0.1 -6.6 UNSA A 1 D -0.8 -0.4 0.2 USNO A 1 D -0.2 -1.0 -8.6 VESL A 1 D 1.1 0.5 18.6 VILL A 5 D -0.2 0.0 -2.1 WHIT A 1 D -2.0 -0.6 -10.7 WHIT A 1 D -1.7 -0.3 -1.5 WILL A 1 D -1.7 -0.3 -1.5 WILL A 1 D -1.7 -0.3 5.9 WIHN A 4 D -2.1 -1.5 -10.8 YEAL A 2 D -2.1 -0.6 3.3 TELL A 5 D -1.2 -0.2 -2.8 YSSK A 2 D -2.1 -0.6 3.3 TELL A 5 D -1.3 -2.7 7.0  Obs. Mean -0.3 -0.0 -0.5 Mean Std. 12.4				0.9	0.5	
TRAB A 1 D -0.2 0.0 -7.2 TRO1 A 4 D -0.0 -0.1 12.4 TROM A 1 D -0.1 -0.5 7.1 TSKB A 2 D -0.6 0.3 -2.0 ULAB A 1 D -2.4 -0.1 -6.6 UNSA A 1 D -0.8 -0.4 0.2 USNO A 1 D -0.8 -0.4 0.2 USNO A 1 D -0.2 -1.0 -8.6 VILL A 5 D -0.2 0.0 -2.1 WESZ A 9 D 0.2 -0.6 -10.7 WHIT A 1 D -2.0 -0.9 -1.9 WILL A 1 D -1.7 -0.3 -1.5 WILL A 1 D -1.7 -0.3 -1.5 WITZR A 3 D -0.2 -0.4 5.1 WTZR A 3 D -0.2 -0.4 5.1 WTZR A 3 D -0.2 -0.4 5.1 WTZR A 3 D -0.2 -0.4 2.3 YELL A 5 D -1.0 -0.4 2.3 YELL A 5 D -1.0 -0.4 2.3 YELL A 5 D -1.2 -0.2 -2.8 YSSK A 2 D -2.1 -0.6 3.3 ZIMM A 2 D -1.1 -0.6 3.3 TIMM A 2 D -1.3 -2.7 7.0 Obs. Mean -0.3 -0.0 -0.5 Mean Std. 1.5 1.3 10.3	TOW2			-1.0		2.7
TSKB A 2 D -0.6 0.3 -2.0 ULAB A 1 D -2.4 -0.1 -6.6 UNSA A 1 D -2.4 -0.1 -6.6 UNSA A 1 D -0.8 -0.4 0.2 USNO A 1 D -0.2 -1.0 -8.6 VILL A 5 D -0.2 0.0 -2.1 WES2 A 9 D 0.2 -0.6 -10.7 WHIT A 1 D -2.0 -0.9 -1.9 WILL A 1 D -1.7 -0.3 -1.5 WILL A 1 D -1.7 -0.3 -1.5 WILL A 1 D -0.2 -0.4 5.1 WILL A 1 D -0.2 -0.4 5.1 WILL A 1 D -2.1 -1.5 -10.8 WILL A 1 D -2.1 -1.5 -10.8 YAR1 A 2 D -2.1 -1.5 -10.8 YAR1 A 2 D -2.1 -0.6 3.3 YELL A 5 D -1.2 -0.2 -2.8 YSSK A 2 D -2.1 -0.6 3.3 ZIMM A 2 D -1.3 -2.7 7.0 Obs. Mean 0.3 -0.0 -0.5 Mean Std. 1.5 1.3 10.3				-0.2	0.0	-7.2
TSKB A 2 D -0.6 0.3 -2.0 ULAB A 1 D -2.4 -0.1 -6.6 UNSA A 1 D -2.4 -0.1 -6.6 UNSA A 1 D -0.8 -0.4 0.2 USNO A 1 D -0.2 -1.0 -8.6 VILL A 5 D -0.2 0.0 -2.1 WES2 A 9 D 0.2 -0.6 -10.7 WHIT A 1 D -2.0 -0.9 -1.9 WILL A 1 D -1.7 -0.3 -1.5 WILL A 1 D -1.7 -0.3 -1.5 WILL A 1 D -0.2 -0.4 5.1 WILL A 1 D -0.2 -0.4 5.1 WILL A 1 D -2.1 -1.5 -10.8 WILL A 1 D -2.1 -1.5 -10.8 YAR1 A 2 D -2.1 -1.5 -10.8 YAR1 A 2 D -2.1 -0.6 3.3 YELL A 5 D -1.2 -0.2 -2.8 YSSK A 2 D -2.1 -0.6 3.3 ZIMM A 2 D -1.3 -2.7 7.0 Obs. Mean 0.3 -0.0 -0.5 Mean Std. 1.5 1.3 10.3				-0.0	-0.1	7.1
USNO A 1 D -0.2 -1.0 -8.6  VESL A 1 D 1.1 0.5 18.6  VILL A 5 D -0.2 0.0 -2.1  WESZ A 9 D 0.2 -0.6 -10.7  WHIT A 1 D -2.0 -0.9 -1.9  WILL A 1 D -1.7 -0.3 -1.5  WSRT A 1 D -0.2 -0.4 5.1  WTZR A 3 D -0.2 -0.3 5.9  WHNN A 4 D -2.1 -1.5 -10.8  YARI A 2 D -1.0 -0.4 2.3  YELL A 5 D -1.2 -0.2 -2.8  ZIMM A 2 D -2.1 -0.6 3.3  ZIMM A 2 D -1.3 -2.7 7.0  Obs. Mean -0.3 -0.0 -0.5  Mean Std. 1.5 0.0 1.3	TSKB	A	2 D	-0.6		
USNO A 1 D -0.2 -1.0 -8.6 VESL A 1 D 1.1 0.5 18.6 VILL A 5 D -0.2 0.0 -2.1 WES2 A 9 D 0.2 -0.6 -10.7 WHIT A 1 D -2.0 -0.9 -1.9 WILL A 1 D -1.7 -0.3 -1.5 WSRT A 1 D -0.2 -0.4 5.1 WTZR A 3 D -0.2 -0.4 5.1 WTZR A 3 D -0.2 -0.3 5.9 WUHN A 4 D -2.1 -1.5 -10.8 YARI A 2 D -1.0 -0.4 2.3 YELL A 5 D -1.2 -0.2 -2.8 YSSK A 2 D -2.1 -0.6 3.3 ZIMM A 2 D -1.3 -2.7 7.0 Obs. Mean Std0.3 -0.0 -0.5 Mean Std. 1.5 1.3 10.3				-2.4	-0.1 -0.4	-6.6
VILL A 5 D -0.2 0.0 -2.1 WES2 A 9 D 0.2 -0.6 -10.7 WHIT A 1 D -2.0 -0.9 -1.9 WILL A 1 D -1.7 -0.3 -1.5 WTZR A 3 D -0.2 -0.4 5.1 WTZR A 3 D -0.2 -0.3 5.9 WUHN A 4 D -2.1 -1.5 -10.8 YAR1 A 2 D -1.0 -0.4 2.3 YELL A 5 D -1.2 -0.2 -2.8 YSSK A 2 D -2.1 -0.6 3.3 ZIMM A 2 D -1.3 -2.7 7.0  CDbs. Mean -0.3 -0.0 -0.5 Mean Std. 1.5 1.3 10.3				-0.2	-1.0	
WES2 A 9 D 0.2 -0.6 -10.7 WHIT A 1 D -2.0 -0.9 -1.9 WILL A 1 D -1.7 -0.3 -1.5 WSRT A 1 D -0.2 -0.4 5.1 WTZR A 3 D -0.2 -0.4 5.1 WTZR A 3 D -0.2 -0.3 5.9 WUHN A 4 D -2.1 -1.5 -10.8 YAR1 A 2 D -1.0 -0.4 2.3 YELL A 5 D -1.2 -0.2 -2.8 YSSK A 2 D -2.1 -0.6 3.3 ZIMM A 2 D -1.3 -2.7 7.0  Obs. Mean -0.3 -0.0 -0.5 Mean Std. 1.5 1.3 10.3						
WHIT A 1 D -2.0 -0.9 -1.9 WILL A 1 D -1.7 -0.3 -1.5 WSRT A 1 D -0.2 -0.4 5.1 WTZR A 3 D -0.2 -0.3 5.9 WUHN A 4 D -2.1 -1.5 -10.8 YAR1 A 2 D -1.0 -0.4 2.3 YELL A 5 D -1.2 -0.2 -2.8 YSSK A 2 D -2.1 -0.6 3.3 ZIMM A 2 D -1.3 -2.7 7.0 Obs. Mean -0.3 -0.0 -0.5 Mean Std. 1.5 1.3 10.3						-10 7
WILL A 1 D -1.7 -0.3 -1.5 WSRT A 1 D -0.2 -0.4 5.1 WTZR A 3 D -0.2 -0.3 5.9 WUHN A 4 D -2.1 -1.5 -10.8 YAR1 A 2 D -1.0 -0.4 2.3 YELL A 5 D -1.2 -0.2 -2.8 YSSK A 2 D -2.1 -0.6 3.3 ZIMM A 2 D -1.3 -2.7 7.0 Obs. Mean -0.3 -0.0 -0.5 Mean Std. 1.5 1.3 10.3	WHIT	A	1 D	-2.0	-0.9	-1.9
WUHN A 4 D -2.1 -1.5 -10.8 YAR1 A 2 D -1.0 -0.4 2.3 YELL A 5 D -1.2 -0.2 -2.8 YSSK A 2 D -2.1 -0.6 3.3 ZIMM A 2 D -1.3 -2.7 7.0 Obs. Mean -0.3 -0.0 -0.5 Mean Std. 1.5 1.3 10.3				-1.7 -0.2	-0.3 -0.4	-1.5
WUHN A 4 D -2.1 -1.5 -10.8 YAR1 A 2 D -1.0 -0.4 2.3 YELL A 5 D -1.2 -0.2 -2.8 YSSK A 2 D -2.1 -0.6 3.3 ZIMM A 2 D -1.3 -2.7 7.0 Obs. Mean -0.3 -0.0 -0.5 Mean Std. 1.5 1.3 10.3	WTZR	A	3 D	-0.2	-0.3	5.9
YSSK A 2 D -2.1 -0.6 3.3 ZIMM A 2 D -1.3 -2.7 7.0 Obs. Mean -0.3 -0.0 -0.5 Mean Std. 1.5 1.3 10.3				-2.1	-1.5	
YSSK A 2 D -2.1 -0.6 3.3 ZIMM A 2 D -1.3 -2.7 7.0 Obs. Mean -0.3 -0.0 -0.5 Mean Std. 1.5 1.3 10.3				-1.0 -1.2	-0.4	
Obs. Mean -0.3 -0.0 -0.5 Mean Std. 1.5 1.3 10.3	YSSK	A	2 D	-2.1	-0.6	3.3
Mean Std. 1.5 1.3 10.3	ZIMM	A	2 D	-1.3	-2.7	7.0
The fellowing parties						10.3
	The f	11	.na	+:	v	

The following section compares the proposed realization with a recent cumulative solution.  $% \left( \frac{1}{2}\right) =\frac{1}{2}\left( \frac{1}{2}\right) +\frac{1}{2}\left( \frac{1}{2}\right) +\frac{1}{$ 

# 3) IGS05 - IGS cumulative solution:

The proposed IGS05 realization was also compared to the cumulative solution (IGS06P34.snx) at GPS week 1390 (06/08/30 - 06:242:00000). Absolute phase center corrections are used in both solutions. The differences (IGS05 - IGS06P34.snx) are:

Code	Рt	Soln	d	d. Lat	d. Lon	d. Hei	d.VLat	d.VLon	d.VHei
ALGO	Α	7	d	-0.1	-0.0	0.6	0.2	0.2	-0.0
ALIC	A	1	d	-0.6	0.0	1.8	0.6	0.2	-1.1
ALRT	Α	1	d	-1.6	0.7	2.6	-1.0	0.4	0.9
AMC2	Α	4	d	-0.7	0.4	-2.2	0.2	0.4	-1.0
ARTU	Α	3	d	-0.2	-0.7	-1.0	0.4	-0.7	-0.7
ASC1	Α	1	d	0.4	-0.1	-0.3	0.5	-0.4	-0.9
ASPA	Α	1	d	-1.1	-0.3	-1.7	0.7	0.4	-2.0
BAHR	Α	1	d	-0.5	-0.7	-2.1	0.5	-0.6	-1.2
BILI	Α	4	d	0.9	0.2	-1.6	1.1	0.3	-1.3
BJFS	Α	1	d	-1.0	-0.7	-1.6	0.7	-0.3	-1.1
BOR1	Α	2	d	-0.0	-0.4	-1.8	0.2	-0.6	-0.7
BRAZ	Α	1	d	0.6	1.0	1.7	0.7	-0.1	-0.4
BRUS	Α	2	d	-0.6	-0.1	-1.9	-0.1	-0.5	-0.7
CAGL	Α	3	d	-0.4	-0.3	-2.3	0.1	-0.5	-1.1
CAS1	Α	3	d	-0.9	-0.3	-0.6	-0.1	0.3	-2.0
CEDU	A	1	d	-0.3	-0.2	3.2	0.6	0.2	-0.8
CHAT	Α	1	d	-0.4	-0.3	1.8	0.7	0.3	-1.2

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CHPI A COCO A CONZ A COCOZ A CONZ A COCOZ A CONZ A DAEJ A DAEJ A DARA A DRAO A DRAO A DRAO A DRAO A GLES A GLES A GLES A GOLD A GOLD A GOLD A GOLD A HARA A HLEX A HHILC A HHILC A HHILC A HHILC A HIRT A LABI A JABI A JOZE A KOKB A KELY B KERG A KIT3 A KOKB A KELY B KERG A KIT3 A KOKB A KELY B KERG A KIT3 A KOKB A KARR A KELY B KERG A KARR A MADO1 A	1 4 3 2 1 1 1 1 1 2 3 4 6 2 1 1 1 2 2 7 3 4 1 1 1 1 1 2 2 2 1 1 1 1 2 2 2 1 1 1 2 2 2 1 1 1 2 2 2 1 1 1 3 3 1	0.0 -0.5 -3.2 0.9 -0.5 -0.0 -1.2 -0.8 -1.9 0.3 -0.5 -1.7 -0.6 -3.1 1.3 -0.5 -1.7 -0.6 -3.1 1.3 -0.9 -3.1 1.3 -0.9 -3.1 1.3 -0.9 -3.1 1.3 -0.9 -3.1 1.3 -0.9 -0.9 -0.3 -0.9 -0.3 -0.9 -0.	1.0 0.2 1.1 0.3 -0.5 -0.2 0.0 -0.4 -1.4 0.4 0.5 1.6 -0.6 0.9 1.6 0.9 1.6 0.1 0.2 -1.7 0.8 0.1 -1.5 -0.8 0.1 -0.5 -0.8 0.1 -0.5 -0.8 0.1 -0.9 -	4.6 -0.2 1.3 0.2 0.8 -2.0 -0.0 0.2 1.1 1.9 6.3 2.7 1.4 -6.2 -2.0 0.3 3.2 -4.7 0.2 -2.9 -1.8 -0.1 0.1 -4.6 0.8 2.8 -0.2 -8.3 0.1 0.1 -4.6 0.8 2.7 -0.4 2.2 -0.3 -4.6 15.0 0.7 1.6 0.1 -0.4 1.1 0.6 -1.3 0.5	0.6 -0.1 -2.4 1.5 0.4 1.0 0.6 -0.3 -1.0 0.5 0.3 1.3 0.1 0.2 -0.2 -0.4 0.3 0.1 0.2 -0.2 -0.4 0.0 1.4 0.3 0.2 1.0 0.6 0.6 0.6 0.7 0.0 0.6 0.7 0.7 0.2 0.4 10.4 0.3 0.7 0.2 0.4 10.4 0.3 0.7 0.1 0.0 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1	0.1 1.1 -0.4 -0.1 0.2 0.0 -1.4 0.6 0.5 0.5 0.6 -0.7 -0.0 0.3 0.5 0.6 -0.7 -0.0 0.5 0.1 0.7 -0.0 0.0 0.5 0.1 0.0 0.5 0.5 0.6 -0.7 -0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	1.1 -1.2 0.1 -1.1 -1.2 -1.5 -1.8 0.7 0.2 3.5 -0.7 -0.1 1.4 -3.5 -0.7 -0.1 1.4 -3.5 -0.7 -0.6 -6.2 1.8 0.7 -0.6 -6.2 1.8 -1.8 0.7 -0.6 -1.8 -1.8 0.7 -0.6 -1.8 -1.8 -1.8 -1.8 -1.8 -1.8 -1.8 -1.8
POLV A POLV A POTS A QAQ1 A QUIN A RABT A RAMO A REUN A REVK A RIOG A SCH2 A SCUB A SCH2 A SCH2 A SCH2 A STJO A SFER A STJO A THU3 A TIDB A TIDB A TIDB A TINI A TOW2 A TRAB A TINI A TOW2 A TRAB A VILL A WILL A WISST A WITT A WILL A WITT A WITT A WILL A WITT A W	1 1 3 3 1 3 1 3 1 3 1 1 2 5 4 1 1 1 1 1 2 1 4 1 2 1 1 1 1 1 5 9 1 1 1 1 1 3 4 2 5 2 2	0.0 -0.2 0.4 1.8 0.7 0.1 1.8 0.7 0.1 -0.3 0.0 -1.6 -1.2 0.1 0.3 -0.6 -1.2 0.1 0.3 -0.6 -1.2 0.1 0.3 -0.6 -1.2 0.1 0.3 -0.6 -1.2 0.1 0.3 -0.6 -1.2 0.1 0.3 0.5 0.0 -0.6 -0.8	-0.4 -0.4 -0.3 0.1 0.0 -3.5 -0.1 1.1 0.0 0.3 -1.4 0.9 0.1 0.3 -1.4 -0.3 -1.4 -0.3 -1.4 -0.3 -1.4 -0.1 0.3 0.1 0.4 -0.3 -0.1 0.4 -0.3 -0.1 0.4 -0.0 -0.3 -0.1 0.4 -0.0 -0.3 -0.0 -0.0	-4.2 -1.3 -2.3 4.1 -0.2 -3.2 3.6 -1.9 -1.2 -0.1 -0.4 -7.1 -3.8 1.4 0.0 1.7 -2.2 -1.5 2.4 -1.8 -5.2 -0.2 -1.7 -0.3 -0.7 1.1 -1.3 -0.2 -1.5 -0.5 0.2 -1.5 -0.5 -1.4 -0.1	0.3 0.1 1.0 0.7 0.3 1.6 0.7 0.1 0.5 0.8 0.0 0.0 0.0 0.8 0.0 0.0 0.8 0.0 0.0	-0.6 -0.6 -0.6 -0.2 0.4 -2.5 0.0 0.1 -0.4 -0.2 -0.1 -0.4 -0.0 0.0 0.0 0.8 -0.4 -0.3 -0.4 -0.2 -0.3 -0.4 -0.2 -0.3 -0.6 -1.8 -0.1 -0.6 -1.8 -0.1 -0.6 -0.5 -0.5 -0.5 -0.5 -0.5 -0.5 -0.5 -0.5	-1.8 -0.4 -0.9 -2.2 0.7 0.3 -1.9 -1.4 -0.1 -0.5 -2.0 0.1 -2.3 -1.7 -1.2 -0.6 -0.9 -1.0 -1.0 -1.0 -1.0 -1.0 -1.0 -1.0 -1.0
Mean Std. R.M.S.		1.3	0.9	3.2	2.2	0.8	2.2

Stations PETP, HYDE, MAC1 were removed from the statistics due to larger residuals. Those large residuals were traced back to short time series  $\frac{1}{2}$ 

< 2 years for the segment. Since no condition is currently imposed on the velocity in the cumulative solution, short segments can have unreliable velocity estimates.</p>
Velocity conditions are imposed in ITRF solution.
As was done in the earlier "preliminary" realizations of ITRF, the coordinates/velocity were extracted directly from ITRF rather that the IGS cumulative solution. This should address some legitimate concern that ITRF should whenever possible be used directly. The above statistics suggest that we have probably reached this time to switch back to a more direct connection with ITRF.

### 4) IGb00 - IGS05:

The transformation parameters between the currently official realization (IGb00) and the proposed realization (IGS00) are important to connect the IGS products. The estimated transformation parameters are available in section 4-1) and the corresponding residuals are available in the section 4-2.

The official transformation parameters between ITRF2000 - ITRF2005

are provided by (http://itrf.ensg.ign.fr/ITRF solutions/2005/tp 05-00.php)

### IGb00 - IGS05 Transformation: 4-1)

The (14) transformation parameters were estimated using a subset of 60 stations from the proposed IGS05 to the current IGS realization (IGb00). The results are below, along with the official ITRF estimates (epoch 2000.0). To ensure consistency between IGb00 and IGS05, the latter did not include the relative to absolute phase center correction for the estimation of the transformation parameters.

( Epoch 2000.0	)	IGS	ITRF	IGS-ITRF
R X (mas)	:	-0.0224	0.0000	-0.0224
R Y (mas)	:	0.0341	0.0000	0.0341
R Z (mas)	:	-0.0099	0.0000	-0.0099
T X (m)	:	0.0000	0.0001	-0.0001
T Y (m)	:	-0.0017	-0.0008	-0.0009
T Z (m)	:	-0.0053	-0.0058	0.0005
SCL (ppb)	:	0.8473	0.4000	0.4473
d R X (mas/y)	:	0.0033	0.0000	0.0033
d R Y (mas/y)	:	-0.0001	0.0000	-0.0001
d R Z (mas/y)	:	-0.0161	0.0000	-0.0161
d T X (m/y)	:	-0.0004	-0.0002	-0.0002
d T Y (m/y)	:	0.0007	0.0001	0.0006
d T Z (m/y)	:	-0.0018	-0.0018	0.0000
d SCL (ppb/y)	:	0.1748	0.0800	0.0848

The more significant difference at the reference epoch is with the scale (and rate) (0.5ppb  $\,\sim$  3.3mm) followed by the X&Y rotations (0.03mas  $\sim$  0.9mm at the equator).

#### Residuals: 4-2)

The residuals after the transformation (IGS05-IGb00) at epoch 2000.0 are:

Code	Pt S	oln	d	d. Lat	d. Lon	d. Hei	d.VLat	d.VLon	d.VHei
				(mm)	(mm)	(mm)	(mm/y)	(mm/y)	(mm/y)
ALGO	A -		D	-0.8	0.3	2.4	0.1	-0.3	-2.1
ALIC	A -		D	0.0	-0.4	2.7	0.4	0.3	-1.4
ARTU	A -		D	-0.6	0.6	1.1	0.4	-0.1	0.4
ASC1	A -		D	-0.0	-1.1	-0.7	-0.1	0.3	0.8
BAHR	A -		D	-0.1	-0.7	0.1	0.2	0.6	-0.0
BOR1	Α -		D	-0.1	1.7	-1.2	0.2	-0.5	1.1
BRUS	Α -		D	-1.7	1.5	1.4	0.9	-0.8	-0.2
CAS1	Α -		D	0.7	0.7	-2.8	-0.1	-0.3	0.7
CEDU	Α -		D	0.3	-0.5	2.5	0.2	0.3	-1.2
CHAT	Α -		D	-0.3	-0.3	-1.0	0.6	0.4	1.4
CHUR				2.4	2.7	3.8	0.2	-0.4	-1.5
CRO1				-0.8	-0.2	-3.8	-0.1	0.5	2.7
DARW				-2.0	0.4	1.0	1.0	-0.0	-0.5
DAV1				0.3	0.7	1.0	-0.0	-0.5	-0.7
DRAO				-1.2	0.5	1.8	0.2	-0.4	-1.3
FLIN				-1.8	0.6	2.4	0.3	-0.4	-1.4
GLSV				-0.3	0.3	-0.5	0.5	0.1	0.7
GODE				-0.5	0.8	-0.8	-0.2	-0.8	-1.0
GOLD				1.3	-5.6	-2.5	0.4	1.4	-0.7
GUAM	A	2		0.5	-1.1	1.3	0.2	0.8	-0.1
HOB2				-2.4	2.7	-3.8	0.1	0.3	-0.9
HRAO				1.2	0.0	-1.6	-0.9	0.1	1.1
IRKT			_	0.5	0.1	-0.4	0.0	0.1	-0.1
KARR				-0.2	-0.1	2.3	0.5	0.1	-1.0
KELY				-1.3	2.5	1.5	0.3	-1.1	0.5
KERG				0.2	0.4	2.0	-0.0	-0.3	-1.3
KIT3				0.4	-0.3	0.9	0.3	0.3	0.4
LPGS				0.3	0.4	0.5	-0.4	-0.3	1.6
MALI				2.1	-3.3	-2.1	-1.0	1.5	0.8
MAS1				-0.2	-1.0	0.0	-0.4	0.3	-0.5
MATE				-1.4	2.6	-0.2	0.5	-0.9	0.2
MAW1				-0.1	0.3	-0.7	0.2	-0.2	0.6
MCM4				-1.0	-2.3	0.3	0.6	0.9	-1.3
MKEA				0.1	2.5	3.7	0.4	-0.8	-2.1
NICO				-0.2	-1.1	3.7	0.1	0.5	-1.3
NKLG				0.4	-0.2	-0.1	-0.5	0.1	0.6
NLIB				-2.8	-1.5	-0.6	0.6	-0.3	-1.8
NOUM				0.5	-1.1	0.6	-0.2	1.0	-0.2
NRC1				-0.8	0.1	2.0	0.2	-0.2	-1.5
ONSA				0.4	-0.1	-4.5	-0.2	0.1	2.5
PERT				-4.8	-0.6	-2.6	0.1	0.3	-0.7
PIE1				-0.5	0.9	0.0	0.7	-0.9	-0.8
POL2				0.2	0.3	0.6	0.7	0.2	0.9
POTS				-0.0	0.1	0.0	0.1	0.2	0.9
RIOG				-0.0	-0.1	-1.6	-0.2	0.0	2.1
SANT				0.1	-0.2	-1.3	-0.2	-0.1	1.5
SCH2				-0.8	-0.1	2.0	-0.5	-0.5	-2.1
STJO				-0.7	-0.5	0.6	0.4	-0.1	-0.6
SYOG				-0.1	0.7	1.1	0.1	-0.4	-0.6
THTI				-1.5	0.7	-0.7	1.2	-0.4	1.1
TIDB				0.3	-0.2	0.1	-0.2	0.0	-0.7
TIXI				0.0	0.5	-3.2	-0.2	-0.2	2.3
TOW2				-0.0	0.3	0.0	0.4	-0.2	0.3
TRAB				-0.0	0.4	0.0	0.4	-0.2	-0.3
TSKB				0.1	-0.1	-0.2	-0.4	-0.2	1.4
UNSA				0.1	0.4	-4.5	-0.4	-0.4	2.2
VESL				-0.8	-0.3	-4.5	0.4	0.1	0.8
VESL	м -		D	-0.8	-0.3	-0.7	0.4	0.1	0.0

WSRT A D	-0.2	0.1	0.4	0.2	-0.1	-0.2
WTZR A D	-0.4	-0.0	-2.1	0.2	0.2	0.8
YELL A D	-0.7	0.5	0.3	0.1	-0.2	-0.4
Obs. Mean	-0.3	0.1	-0.0	0.1	-0.0	0.0
Mean Std.	1.1	1.3	1.9	0.4	0.5	1.2
R.M.S.	1.1	1.3	1.9	0.4	0.5	1.2

#### 4 - 4) Scale:

Comparison of the scale factor for GPS weeks 1385-9 show the

```
following change cod co2 emr em2 gfz gf2 mit mi2 sio si2
               2.71 -0.77 4.47 -0.60 2.22 -0.68 3.58 -0.31 3.37 0.27 2.71 -0.73 4.47 -0.53 2.26 -0.70 3.48 -0.50 3.22 0.20 2.91 -0.73 4.50 -0.45 2.29 -0.69 3.41 -0.42 3.39 0.37 2.86 4.63 -0.23 2.32 -0.64 3.45 -0.50 3.12 0.35 2.90 -0.72 4.52 -0.40 1.97 -0.80 3.44 -0.51 3.26 0.18
1386
1387
1389
Avg. 2.82 -0.74 4.52 -0.44 2.21 -0.70 3.47 -0.45 3.27 0.20
```

The average scale factor goes from 3.26 (IGb00 & relative antenna phase center) to -0.41 (IGS05 & absolute antenna phase center). This indicates a significant improvement of the IGS scale, which was one of the important objective of the receiver antenna phase center

#### 4-5) Apparent geocenter:

```
Avg.
  -1 0 0 3
     4.6 4.4
         -87 32
```

The apparent geocenter X&Y coordinates indicates little changes. However in the Z component there is a shift of about 12mm in the right direction. The transformation parameters (Sect. 4-1) suggest a shift of  $\sim 5\,\mathrm{mm}$ . If we disregard GPS week 1387 (24.8mm) the Z shift is about 6.5mm.

```
ERP's:
```

The effect of the Reference Frame and phase center changes can be inferred from the rotational components of the transformation parameters (Sect. 4-1). A reference frame rotation (RX, RY) has a direct effect on the pole position (dXp, dYp) ; thus:  $RX - dXp = 0 \qquad \& RY - dXp = 0$ 

The rotation component of the transformation at GPS week ~1387 can be estimated with (and Sect. 4-1): RX = RXO + dRX \* dt & RY = RYO + dRY \* dt

```
RX = -0.006 \text{ mas}
                      & RY = 0.033 mas
```

Comparison of the daily pole position between the solutions using the available test solutions using IGS05 and the official results using the official products (using IGb00) between GPS weeks 1385-1389 results in the average pole position differences ( Official - new ): dXp = 0.028 mas & dYp = -0.005 mas

```
RX - dYp = -0.006 + 0.005 \text{ mas} = -0.001 \text{ mas}
RY - dXp = 0.033 - 0.028 \text{ mas} = 0.005 \text{ mas}
```

The observed pole position differences and the predictions using the estimates transformations are consistent to better than 0.01mas for t

### 5) Other changes:

## 5.1) Discontinuities:

All the "confirmed" and "probable" discontinuities are included as part

All the "confirmed" and "probable" discontinuities are included as of the weekly combination. All the soln # in the weekly and cumulative solutions are now consistent with the latest discontinuity table. The most significant change appears in the cumulative solution where all relevant discontinuities are now included.

### 5.2) Satellite phase center:

The satellite phase center estimates provided by the ACs are included in the combined in the weekly solutions. The weekly combination residual file includes a table of the residuals of the adjustment for these new parameters. A new section has been added in the summary report for these parameters.

### Stations Antenna phase center + Cumulative Solution

To consistently continue accumulating the igs weekly combined solutions to the cumulative solution; the latter one has been corrected for the phase center switch using the information derived from the parallel runs. In the cases where corrections could not be derived directly from the parallel runs, averages for antenna types were used. In the case where no corrections were available, the stations were deleted to avoid mixing relative and absolute antenna phase centers in one solution.
Stations deletion is generally limited to older sites.

```
Parallel solutions:
```

Combinations used in the analysis above have also been posted at: ftp macs.geod.nrcan.gc.ca
cd /pub/requests/sinex/
cd xxxx\_IGS05 xxxx=GPS week
Those and more will be updated/added as they become available.

Best regards, Remi,

- Prev by Date: [IGSMAIL-5446]: New Secretary for IGS Central Bureau
   Next by Date: [IGSMAIL-5448]: site OBET decommission
   Previous by thread: [IGSMAIL-5446]: New Secretary for IGS Central Bureau
   Next by thread: [IGSMAIL-5448]: site OBET decommission
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  - o <u>Date</u>
  - Thread