Discussion of Best Practice for CONFIG_PARAMETER and CONFIG_MISSION_NUMBER

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As of the latest netCDF format census (September 14th, 2016),
the Argo Program has transitioned **88**% of meta netCDF files to version 3.1

Argo Data Management Team Meeting
NMDIS, Tianjin, China
26-30 September 2016

What meta netCDF variables are we discussing?

N_CONFIG_PARAM = XX ;
N_LAUNCH_CONFIG_PARAM = YY
N_MISSIONS = UNLIMITED ;

char ***LAUNCH_CONFIG_PARAMETER_NAME*** (N_LAUNCH_CONFIG_PARAM, STRING128) ;
LAUNCH_CONFIG_PARAMETER_NAME:long_name =
"Name of configuration parameter at launch" ;
double ***LAUNCH_CONFIG_PARAMETER_VALUE*** (N_LAUNCH_CONFIG_PARAM) ;

char ***CONFIG_PARAMETER_NAME***(N_CONFIG_PARAM, STRING128) ;
CONFIG_PARAMETER_NAME:long_name =
"Name of configuration parameter" ;
double ***CONFIG_PARAMETER_VALUE***(N_MISSIONS, N_CONFIG_PARAM) ;

int ***CONFIG_MISSION_NUMBER***(N_MISSIONS) ;
CONFIG_MISSION_NUMBER:long_name =
"Unique number denoting the missions performed by the float" ;

Discussion and Question

From Argo Users Manual 3.2, Dec 29th, 2015 :

(*CONFIG_PARAMETERs)... include all applicable mandatory and highly-desirable parameters, and any other parameters that change during the life of the float....*

Are the individual LAUNCH_CONFIG_PARAMETER_NAME and CONFIG_PARAMETER_NAME strings included within the netCDF files consistent across Argo? (irrespective of float model/sensor differences)

NO

In meta netCDF V2, many “float cycle” parameters had their own variables. Now in meta netCDF V3 they are placed in the CONFIG variable. How are we doing placing this information in the file? Mandatory (if applicable), Highly desirable (if applicable)

CONFIG_ DAC	Park Time	Cycle Time	Surface TimeOut	Park Pres	Profile Pres.	AscentTo Surface TimeOut*	Descent ToPark TimeOut	Descent ToProf TimeOut
AOML (5955)	46	46	46	100	100	89	59	30
PMEL (923)	0	0	0	100	100	96	0	0
SIO (1531)	100	100	100	100	100	100	99	100
UW (1582)	0	0	0	100	100	85	35	0
WHOI (1279)	90	90	90	100	100	90	90	20
BODC (527)	0	0	0	98	96	42	42	42
CORIOLIS (1434)	0	100	44	100	100	15	15	53
CSIO (344)	0	100	3	100	100	5	5	5
CSIRO (748)	53	53	53	98	98	97	65	65
INCOIS (241)	68	93	90	100	100	7	7	8
JMA (1451)	100	100	18	98	100	56	14	14
MEDS (435)	0	0	0	100	100	100	0	0
NMDIS (15)	0	100	0	100	100	0	0	0

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AOML (5955)	46	46	46	100	100	89	59	30
PMEL (923)	0	0	0	100	100	96	0	0
SIO (1531)	100	100	100	100	100	100	99	100
UW (1582)	0	0	0	100	100	85	35	0
WHOI (1279)	90	90	90	100	100	90	90	20
BODC (527)	0	0	0	98	96	42	42	42
CORIOLIS (1434)	0	100	44	100	100	15	15	53
CSIO (344)	0	100	3	100	100	5	5	5
CSIRO (748)	53	53	53	98	98	97	65	65
INCOIS (241)	68	93	90	100	100	7	7	8
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UW (1582)	0	0	0	100	100	85	35	0
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BODC (527)	0	0	0	98	96	42	42	42
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Additional CONFIG_ that are helpful to trajectory estimation. This table is mainly comprised of parameters that are float specific.
Mandatory (if applicable), Highly desirable (if applicable)

CONFIG_ DAC	Direction	Down Time	Up Time	Ice Detection	BitMask Months	Ascent Speed	TargetAscent Speed	Ascent Speed Min
AOML (5955)	9	52	52	6	6	0	14	0
PMEL (923)	0	100	100	0	0	0	0	0
SIO (1531)	35	0	0	20	20	0	35	0
UW (1582)	0	100	100	2	2	0	0	0
WHOI (1279)	0	0	0	0	0	0	20	0
BODC (527)	0	91	90	10	0	0	0	0
CORIOLIS (1434)	93	16	16	2	2	6	0	7
CSIO (344)	100	97	97	2	0	0	0	2
CSIRO (748)	1	97	98	25	23	0	0	0
INCOIS (241)	18	75	75	0	0	0	0	7
JMA (1451)	100	72	72	3	0	3	0	0
MEDS (435)	100	0	0	0	0	0	0	0
NMDIS (15)	100	0	0	0	0	0	0	0

Discussion and Questions

Are the individual LAUNCH_CONFIG_PARAMETER_NAME and CONFIG_PARAMETER_NAME strings included within the netCDF files consistent across Argo? (irrespective of float model/sensor differences)

Should all, or a subset, of mandatory meta information be required for all float models to be filled in the meta netCDF for users to directly access? If a subset, then what is the basis for that subset?

Corrollary: Should only config values that are directly used by the float be included in the meta netCDF (e.g. If SOLOII does not use a CycleTime configuration it should not be included in the meta netCDF)

If neither of the above, then are we saying we wish to stay with the non-consistent pattern we currently have.

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WHOI (1279)	0	0	0	0	0	0	20	0
BODC (527)	0	91	90	10	0	0	0	0
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Discussion and Questions

Do different groups have different strategies in filling LAUNCH_CONFIG_PARAMETER, CONFIG_PARAMETER, and CONFIG_MISSION_NUMBER included in the netCDF?

Yes!, differences appear greater than I'd expect from 'spin up'.

> Inclusion of 'Everything' or a 'small subset' of parameters
> Inclusion of only parameters that are directly transmitted by the float (uptime, downtime but not parktime, cycletime, etc)
> Inclusion of CONFIG changes only from those parameters with large effect on trajectory estimation
> Inclusion of CONFIG changes to sensors in CONFIG_PARAMETERS
> CONFIG_MISSION_NUMBER = CYCLE_NUMBER

Group WMO	N_LAUNCH _CONFIG	N_CONFIG	N_ MISSION	N_ CYCLES	Comment
SIO 1901838 SOLOII	27	20	4	21	N_MISSION < 2-way parameter changes via post-launch commands
PMEL 1901804 NAVIS	7	6	31	31	Mission # = Cycle #, no change in CONFIG values
WHOI 1901647 S2A	3	3	1	133	Mission parameter changes in early cycles, no change N_MISSION
UW 5903616 APEX	7	6	233	233	Mission # = Cycle #, no change in CONFIG values
BODC 3901494 APEX	27	27	17	84	Mission determined by PistonPark/Profile (tech); N_LAUNCH=N_CONFIG
INCOIS 2902089 PROVOR	161	18	12	130	MISSION defined by B-sensor settings (ex. FlbbWarmUpTime)
CSIRO 5904922	17	17	27	131	26 of 27 MISSIONS exact match in CONFIG; N_LAUNCH=N_CONFIG
CORIOLIS 6901437	347	52	17	146	52 CONFIG but no ParkTime?
MEDS 4901739	4	1	2	61	Only MEDS Iridium float with MISSION>1;

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Questions for Clarification for proper use of the CONFIG family of variables

Can a non-mandatory parameter be included in CONFIG_PARAMETER if it has remained the same over the float record?

> It is not clear from the manual if this is allowed, although it is being done by many groups.

Should a setting NOT changed directly by command from the PI (such as PistonPark, PistonProfile, which reports the pumping necessary to target depth) be included in the CONFIG_PARAMETER and CONFIG_MISSION_NUMBER?

> The present definition of these variables, allows for it.

DACs/Groups are defining a 'mission' found within CONFIG_MISSION_NUMBER, in a variety of ways. Do we wish to allow/disallow some of these?

1) CONFIG_MISSION_NUMBER= CYCLE_NUMBER : Currently at the GDAC
   - ignores the contents of CONFIG_PARAMETER;
   - N_CONFIG=N_CYCLE;
   - Likely to result in skipped CONFIG_MISSION_NUMBER

2) CONFIG_MISSION_NUMBER = numerical count of cycles returned by the float;
   - ignores the contents of CONFIG_PARAMETER;
   - N_CONFIG=N_CYCLE;
   - Should result in consecutive values

3) If a DAC/group does not strictly adhere to the manual, the ADMT would prefer fillvalue instead of a non-standard procedure.

The ADMT has been unable to reach agreement on the use/definition of these variables, and that is demonstrated by the various meta netCDF uses for LAUNCH_CONFIG_PARAMETER, CONFIG_PARAMETER and CONFIG_MISSION_NUMBER?

Without such an agreement, these variables are very difficult for a user interested in using the complete Argo dataset to interpret.

Discussion on the above?

In lieu of agreement, would it be useful to add a standardized comment to the meta netCDF variables LAUNCH_CONFIG_PARAMETER, CONFIG_PARAMETER and CONFIG_MISSION_NUMBER describing the interpretation of the variables.

The End

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UW (1582)	0	100	100	2	2	0	0	0
WHOI (1279)	0	0	0	0	0	0	20	0
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MEDS (435)	100	0	0	0	0	0	0	0
NMDIS (15)	100	0	0	0	0	0	0	0

Group WMO	N_LAUNCH_CONFIG	N_CONFIG	N_MISSION	N_CYCLES	Comment
SIO 1901838	27	20	4	21	N_MISSION < parameter changes

```
Float= 8441

Cycle=  -1
 PROup=    1 |   BLOK=    1 |    PB1=   10 |    PB2= 1015 |    AV1=    2 |    AV2=   10 |
PchSec=  600 | MaxHrs= 6552 | dBarGo=   50 | ABcymn=  360 |   Cyc0=    1 |   Cyc1=    3 |
  Cyc2= 9999 |  Ztar0= 1000 |  Ztar1= 1000 |  Ztar2= 1000 |  Zpro0= 1100 |  Zpro1= 1500 |
 Zpro2= 2000 | Tlast0=  247 | Tlast1=  247 | Tlast2=  247 |  Rise0=  180 |  Rise1=  500 |
 Rise2=  600 |  Fall0=  300 |  Fall1=  400 |  Fall2=  400 | SAMmn0=    0 | SAMmn1=   60 |
SAMmn2=  188 |  Nsam0=    0 |  Nsam1=    7 |  Nsam2=   70 | Pwait0=    0 | Pwait1=  120 |
Pwait2=  330 | PmpBtm=   74 | Pmpslo=   25 | MinRis=   10 |  MxHiP=  600 | VlvDly=    0 |
 MxSfP=  240 | GPSsec=  600 | IRIsec= 1200 |  dTadZ= 2530 |  dTsdZ= 1900 | FuseMd=    0 |
dTfldZ= 1900 | mxSeek=   60 |  Nseek=    2 | STLmin=  120 |  MnSfP=  150 | Ventsc=   10 |
Ventop=   25 | SkSLsc= 1200 | AsSLsc= 2000 | Ndives= 9999 |  TDofZ=    1 | SrfDft=    0 |
SrfLon=    0 | SrfLat=    0 | SrfMxN=    0 | SrfInt= 1200 |  BinMod=   0 | UNBINd=    0 |
UBZmax=  100 |    UBn=  300 | DrfDat=    1 | Ice_Pd=   40 | Ice_Ps=   20 | Ice_Mn=    0 |
Ice_Tc= -165 | Ice_Sc=   30 |    XP0=    0 |    XP1=    0 |    XP2=    0 | XPdly=     0 |

Cycle=   4
 SGain= 5000 |   SOff=  -25 |
SAMmn2=   60 |  Nsam2=  220 |
 MxHiP=  900 | PmpBtm=   50 | PmpSLo=   25
 MxSfP=  190 |
BinMod=    2 |
UNBINd=    1 | UNZmax=    5 |    UBn=   50 |

Cycle=   6
BinMod=    0 |

Cycle=   8
 MxHiP=  900 | PmpBtm=   43 | PmpSLo=   32

Cycle=  11
Pmpslo=   33 |

Cycle=  16
PmpBtm=   40 |
PmpBtm=   40 |

Cycle=  17
 dTsdZ= 2380 |
Tlast2=  242 |
```

66 modifiable CONFIGS

Serial= 8441 WMO= 1901838

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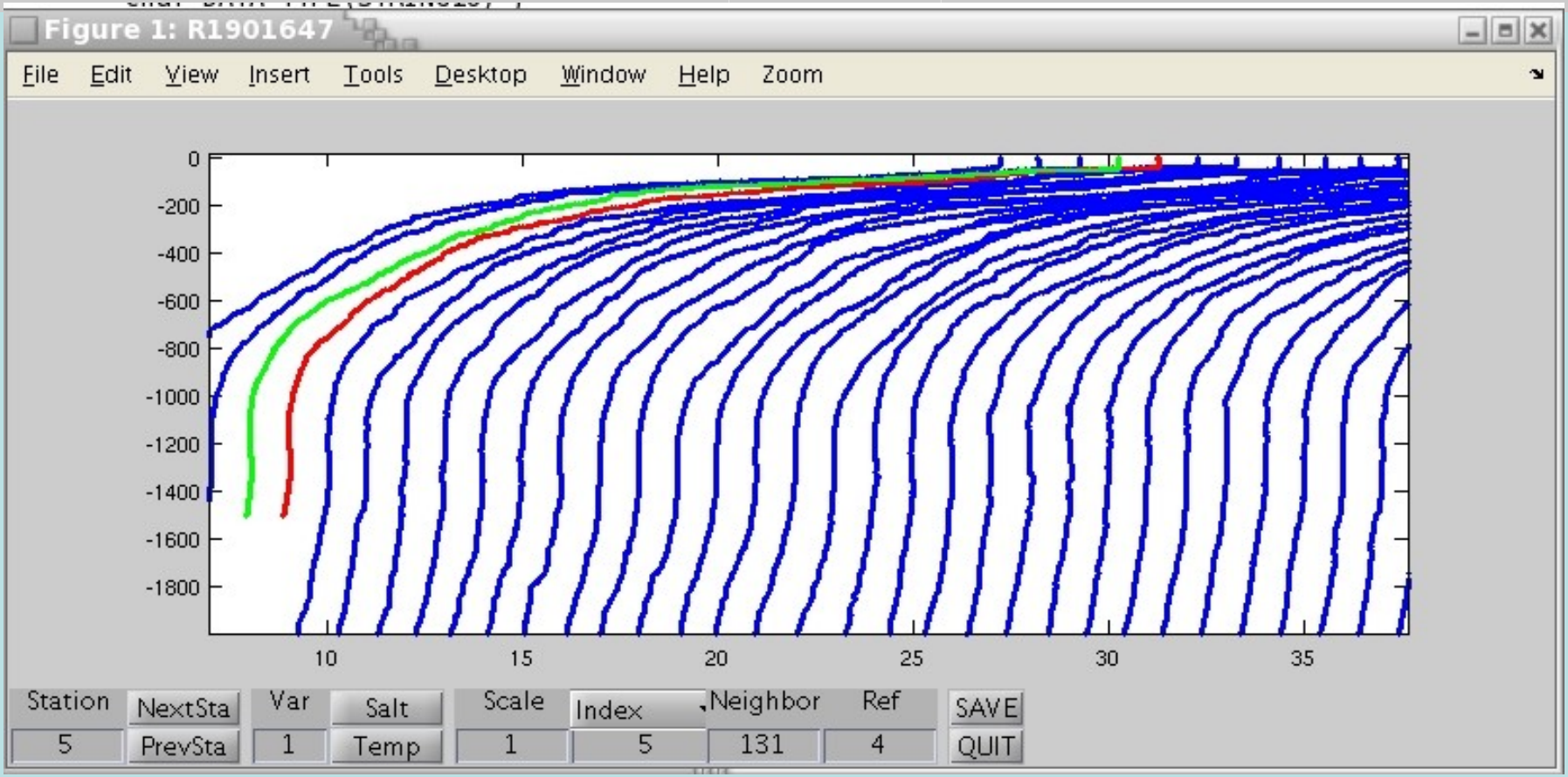
Cyc	Decoder Version	Profile PRES (db)	Drift PRES (db)	Max Rise Time (hrs)	Max Fall Time to Drift (hrs)	Max Fall Time to Profile (hrs)	Target Drift Time (hrs)	Min Ascent Rate (cm/s)	# of Seeks (count)	Seek Period (hrs)	Target Surface Time (hrs)	Max Cycle Time (days)	Ice Avoid (hex)	Max Extra Surface Time (hrs)	Strategic Pump XP0 (s)	Argo Mission (count)
21	0.2.1	2000	1000	10.00	6.67	5.50	220.00	10	2	2.00	0.719	10.10	0	0.000	0	4
20	0.2.1	2000	1000	10.00	6.67	5.50	220.00	10	2	2.00	0.719	10.10	0	0.000	0	4
19	0.2.1	2000	1000	10.00	6.67	5.50	220.00	10	2	2.00	0.719	10.10	0	0.000	0	4
18	0.2.1	2000	1000	10.00	6.67	5.50	220.00	10	2	2.00	0.719	10.10	0	0.000	0	4
17	0.2.1	2000	1000	10.00	6.67	5.50	220.00	10	2	2.00	0.719	10.10	0	0.000	0	4
16	0.2.1	2000	1000	10.00	6.67	5.50	220.00	10	2	2.00	0.719	10.10	0	0.000	0	4
15	0.2.1	2000	1000	10.00	6.67	5.50	220.00	10	2	2.00	0.719	10.10	0	0.000	0	4
14	0.2.1	2000	1000	10.00	6.67	5.50	220.00	10	2	2.00	0.719	10.10	0	0.000	0	4
13	0.2.1	2000	1000	10.00	6.67	5.50	220.00	10	2	2.00	0.719	10.10	0	0.000	0	4
12	0.2.1	2000	1000	10.00	6.67	5.50	220.00	10	2	2.00	0.719	10.10	0	0.000	0	4
11	0.2.1	2000	1000	10.00	6.67	5.50	220.00	10	2	2.00	0.719	10.10	0	0.000	0	4
10	0.2.1	2000	1000	10.00	6.67	5.50	220.00	10	2	2.00	0.719	10.10	0	0.000	0	4
9	0.2.1	2000	1000	10.00	6.67	5.50	220.00	10	2	2.00	0.719	10.10	0	0.000	0	4
8	0.2.1	2000	1000	10.00	6.67	5.50	220.00	10	2	2.00	0.719	10.10	0	0.000	0	4
7	0.2.1	2000	1000	10.00	6.67	5.50	220.00	10	2	2.00	0.719	10.10	0	0.000	0	4
6	0.2.1	2000	1000	10.00	6.67	5.50	220.00	10	2	2.00	0.969	10.11	0	0.000	0	3
5	0.2.1	2000	1000	10.00	6.67	5.50	220.00	10	2	2.00	0.969	10.11	0	0.000	0	3
4	0.2.1	1500	1000	8.33	6.67	2.00	7.00	10	2	2.00	0.733	1.02	0	0.000	0	2
3	0.2.1	1500	1000	8.33	6.67	2.00	7.00	10	2	2.00	0.733	1.02	0	0.000	0	2
2	0.2.1	1500	1000	8.33	6.67	2.00	7.00	10	2	2.00	0.733	1.02	0	0.000	0	2
1	0.2.1	1100	1000	3.00	5.00	0.00	0.00	10	2	2.00	0.733	0.53	0	0.000	0	1
0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Group/ WMO	N_LAUNCH _CONFIG	N_CONFIG	N_ MISSION	N_ CYCLES	
WHOI/ 1901647	3	3	1	133	Clear mission changes in early cycles



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