NCMRWF

NCUM STASH Vs Grib2

Based on UMRider Version 1.0.2

Arulalan . T

Project Scientist - C

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[Abstract: This document contains the NCMRWF-UK MetOffice Unified Model output Units with File Name, STASH code, Variable Name, IRIS Cube Index, GRIB2 Param Code (Discipline, Category, Number, type Of First Fixed Surface), Control File Short Name and grib2 variable SI units, with model output frequency, time and pre-processed before written into grib2 files information. Also included the NCMRWF Grib2 Local Table (which I created to produce grib2 files) at last page of this document.
Acknowledgement: I thank Dr. Saji Mohandas, Scientist-E who made this document initially with STASH codes Vs Variable Name along with model based Units tables.]

Introduction

NCUM model produces output files in fieldfiles or pp file format. We are able to get the STASH code information of every variables / fields from model output files.

NCUM STASH

NCUM model output STASH code and its equivalent variable cf_standard_name will be exactly same as http://puma.nerc.ac.uk/STASH_to_CF/STASH_to_CF.html

Note : For few STASH codes there may be available multiple variables cf_standard_name.

Cf_Standard_Name

All variables of cf_standard_name table v30 can be seen from below link,

V30 http://cfconventions.org/Data/cf-standard-names/30/build/cf-standard-name-table.html

NCEP-WMO Grib2

NCEP-WMO Standard Grib2 Table Parameters link,

http://www.nco.ncep.noaa.gov/pmb/docs/grib2/grib2_doc.shtml

By using all the above 3 links, we can get the **STASH Vs cf_standard_name Vs Grib2 parameter** codes.

IRIS

IRIS v1.9.2 is able to read NCUM fieldfiles/pp file format with STASH and cf_standard_name and write into NCEP-WMO standard Grib2 file format.

https://github.com/SciTools/iris

http://scitools.org.uk/iris/docs/latest/userguide/index.html

UMRider Conversion

UMRider is an in-house development of NCMRWF, which converts NCUM fieldfiles to NCEP-WMO standard Grib2 file format in parallel python.

https://github.com/NCMRWF/UMRider

Standard IRIS may not support for all the variables of NCUM. So in UMRider we included many variables (STASH, cf_standard_name, Grib2 parameter codes, cf_units) such a way that it will be able to convert the 63 out of 110 variables into grib2 format, which are all listed in this document.

But still we are facing the following three issues,

i) There is no cf_standard_name available for few STASH codes (i.e. model fields)

ii) Multiple cf_standard_name available for few (same) STASH codes

iii) There is no grib2 param code (NCEP-WMO standard) available for few model fields

At present (29-Feb-2016), we omitted the fields temporarily (47 out of 110 variables) which are all having the above issues, for NCMRWF's UM model grib2 conversion.

We already fixed the above said problem for 9 variables by creating ncmr_local_table_v1.0 (listed at end of this document).

We are working on fixing the rest of 47 UM variables to include grib2 param code for those variables in ncmr_local_table_v1.1

Fields available in the UM forecast files and grib2 files

All UM filedsfiles format files are available at **/gpfs3/home/umfcst/NCUM/fcst/<date>/00/**

All UM grib2 format files are available at **/gpfs3/home/umfcst/NCUM/post/<date>/**

Legend

Sky Blue Color - IRIS able to read fields and write into grib2 successfully

White Color - IRIS able to read fields, but we need to set grib2 parameters code to write into grib2

Yellow Color – IRIS unable to read the filed from filedsfiles / pp

Red Color – an Instantaneous prognostic fields

Green Color - Time-averaged single level diagnostics fields

Maganta Color - Time-accumulated single level diagnostics fields

Orange Color – UM Model data has been processed further while writing into grib2 files in UMRider Tool

Dark Blue Color – Need ncmr_grib2_local_table to encode grib2 files while using wgrib2 and g2ctl.pl

NCMRWF LOCAL TABLE is kept at last page of this document

Red, Green & Magenta coloured fileds are required and need to be converted from pp filedfiles format to grib2 file format.

IRIS-UMRider able to read 70 out of 110 variables from different fieldsfiles/pp file format and write into grib2 file format.

Updated by Arulalan.T (Project Scientist - C) on 26-Apr-2016.

File Name: qwqg00.pp0 (Unit-60) : Instantaneous prognostic fields

qwqg00.pp0				*Frequency* : Daily					
Sl. No	Grib Cube Index	STASH Code	Fields Name	IRIS - Grib2 Param Code				Control File Short Variable Name	Unit
				Discipline	Category	Number	Type of First Fixed Surface		
1	5	33	OROGRAPHY	2	0	7	1	MTERHsfc	m
2	4	409	SURFACE PRESSURE	0	3	0	1	PRESsfc	Pa
3	6	15242	W COMPNT (OF WIND) ON PRESSURE LEVS	0	2	9	100	DZDTprs	m s-1
4	7	15243	U WIND ON PRESSURE LEVELS	0	2	2	100	UGRDprs	m s-1

5	8	15244	V WIND ON PRESSURE LEVELS	0	2	3	100	VGRDprs	m s-1
6	2	16202	GEOPOTENTIAL HEIGHT ON P LEV	0	3	5	100	HGTprs	m
7	1	16203	TEMPERATURE ON P LEV	0	0	0	100	TMPprs	K
8	0	16222	PRESSURE AT MEAN SEA LEVEL	0	3	1	101	PRMSLsfc	Pa
9	3	16256	RH WRT WATER ON P LEV	0	1	1	100	RHprs	%

File name: umglaa_pb??? [One file per day – umglaa_pb024, umglaa_pb048, ... umglaa_pb240] (**Unit No: 61**): Instantaneous single level diagnostics

umglaa_pb???				***Frequency :* 3 Hrly**					
Sl. No	**Grib Cube Index**	**STASH Code**	**Fields Name**	**IRIS - Grib2 Param Code**				**Control File Short Variable Name**	**Unit**
				Discipline	**Category**	**Number**	**Type of First Fixed Surface**		
1	29	23	SNOW AMOUNT OVER LAND	0	1	13	1	WEASDsfc	Kg m-2
2	30	24	SURFACE TEMPERATURE	0	0	17	1	SKINTsfc	K
3	19	25	BOUNDARY LAYER DEPTH	0	3	18	1	HPBLsfc	m
4	25	30	LAND MASK(No halo)	2	0	0	1	LANDsfc	1 (or) Proportion
5	27	31	FRAC OF SEA ICE IN SEA	10	2	0	1	ICECsfc	1 (or) Proportion
6	28	32	SEA ICE DEPTH (MEAN OVER ICE)	10	2	1	1	ICETKsfc	m
7	0	326	ROUGHNESS LEN. AFTER B.L. (SEE DOC)						
8	26	3245	RELATIVE HUMIDITY AT 1.5M	0	1	1	1	RH2m	%
9	34	3247	VISIBILITY AT 1.5M	0	19	0	1	VIS2m	m
10	24	3248	FOG FRACTION AT 1.5 M	0	1	192	1	FOGsfc	%
11	23	3250	DEWPOINT AT 1.5M	0	0	6	1	DPT2m	K
12	2	3254	TL AT 1.5M						
13	3	3255	QT AT 1.5M						
14	35	3281	VIS AT 1.5M (incl precip)						
15	4	3341	LAND MEAN TEMPERATURE AT 1.5M						
16	5	3342	LAND MEAN SPECIFIC HUMIDITY AT 1.5						
17	6	3465	FRICTION VELOCITY						
18	17	5207	PRESSURE AT CONVECTIVE CLOUD BASE						

19	18	5208	PRESSURE AT CONVECTIVE CLOUD TOP						
20	7	5210	ICAO HT OF CONVECTIVE CLOUD BASE						
21	8	5211	ICAO HT OF CONVECTIVE CLOUD TOP						
22	9	5217	DILUTE CONVECTIVELY AVAIL POT E						
23	10	5231	CAPE TIMESCALE (DEEP)						
24	11	5275	MODEL FREEZING LEVEL						
25		8208	SOIL MOISTURE CONTENT						
26	23	9219	LOW CLOUD BASE (FT ASL)						
27	12	9220	LOW CLOUD TOP (FT ASL)						
28	13	15212	50 METRE WIND U-COMPONENT						
29	14	15213	50 METRE WIND V-COMPONENT						
30	15	30403	TOTAL COLUMN DRY MASS RHO GRID*	3	1	198	1	TCDAMsfc	kg m-2
31	22	30404	TOTAL COLUMN WET MASS RHO GRID*	0	1	51	1	TCWATsfc	kg m-2
32	21	30405	TOTAL COLUMN QCL RHO GRID*	0	1	69	1	TCOLWsfc	kg m-2
33	20	30406	TOTAL COLUMN QCF RHO GRID*	0	1	70	1	TCOLIsfc	kg m-2
34	31	30451	Pressure at Tropopause Level	0	3	0	7	PREStrop	Pa
35	32	30452	Temperature at Tropopause Level	0	0	0	7	TMPtrop	K
36	33	30453	Height at Tropopause Level	0	3	6	7	DISTtrop	m
37	16	30454	ICAO HT OF TROP- NEED HT,TEMP,PRESS						
38		3463	WIND GUST						
39	Calculated		PRECIPITABLE WATER CONTENT IN ATMOSPHERE	0	1	3	1	PWATsfc	kg m-2

*Special diagnostics for computation of total precipitable water (depends on the UM version)

SNOW AMOUNT OVER LAND has been multiplied with 0.1 to get water equivalent of snow amount over land.

39, PWATsfc is calculated by TCWATsfc minus TCDAMsfc minus TCOLWsfc minus TCOLIsfc

File Name: qwqg00.pp2 (Unit-62) : 24-hourly time-processed prognostics

qwqg00.pp2			
Sl No.	***STASH Code***	***Field Name***	***Frequency***
1	3236	TEMPERATURE AT 1.5M (Tmax24)	Daily
2	3236	TEMPERATURE AT 1.5M (Tmin24)	Daily

3	5226/ 4201	TOTAL PRECIPITATION AMOUNT/ LARGE SCALE RAIN AMOUNT (1.5Km only)	Daily
4	4202	LARGE SCALE SNOW AMOUNT (1.5Km only)	Daily

File name: umglaa_pd??? [One file per day – umglaa_pd024, umglaa_pd048, ... umglaa_pd240] **(Unit No: 63)** : Instantaneous multilevel prognostics

umglaa_pd???				***Frequency* : 3 Hrly**					
Sl. No	**Grib Cube Index**	**STASH Code**	**Fields Name**	**IRIS - Grib2 Param Code**				**Control File Short Variable Name**	**Unit**
				Discipline	**Category**	**Number**	**Type of First Fixed Surface**		
1	5	15242	W COMPNT (OF WIND) ON PRESSURE LEVS	0	2	9	100	DZDTprs	m s-1
2	6	15201	U WIND ON PRESSURE LEVELS	0	2	2	100	UGRDprs	m s-1
3	7	15202	V WIND ON PRESSURE LEVELS	0	2	3	100	VGRDprs	m s-1
4	2	16202	GEOPOTENTIAL HEIGHT ON P LEV	0	3	5	100	HGTprs	m
5	1	16203	TEMPERATURE ON P LEV	0	0	0	100	TMPprs	K
6	0	16205	WET BULB POTENTIAL TEMPERATURE						
7	3	16256	RH WRT WATER ON P LEV	0	1	1	100	RHprs	%
8	4	30205	SPECIFIC HUMIDITY ON P LEV/UV GRID	0	1	0	100	SPFHprs	kg/kg

File name: umglaa_pe??? [One file per day – umglaa_pe024, umglaa_pe048, ... umglaa_pe240] (**Unit No: 64**) : High frequency (hourly) diagnostics

umglaa_pe???				***Frequency* : 1 Hrly**					
Sl. No	**Grib Cube Index**	**STASH Code**	**Fields Name**	**IRIS - Grib2 Param Code**				**Ctl File Variable Name**	**Units**
				Discipline	**Category**	**Number**	**Type of First Fixed Surface**		
1	18	409	SURFACE PRESSURE	0	3	0	1	PRESsfc	Pa
2	19	3225	10 METRE WIND U-COMP	0	2	2	103	UGRD10m	m s-1
3	21	3226	10 METRE WIND V-COMP	0	2	3	103	VGRD10m	m s-1
4	6	3236	TEMPERATURE AT 1.5M	0	0	0	103	TMP2m	K
5	15	3237	SPECIFIC HUMIDITY AT 1.5M	0	1	0	103	SPFH2m	kg/kg
6	0	3229	EVAP FROM SOIL SURF: AMOUNT						

7	16	4201	LARGE SCALE RAIN AMOUNT (hourly acc)	0	1	47	1	LSWPsfc	Kg m-2
8	17	4202	LARGE SCALE SNOW AMOUNT (hourly acc)	0	1	15	1	SNOLsfc	Kg m-2
9	7	5201	CONVECTIVE RAIN AMOUNT (hourly acc)	0	1	48	1	CWPsfc	Kg m-2
10	8	5202	CONVECTIVE SNOW AMOUNT (hourly acc)	0	1	14	1	SNOCsfc	Kg m-2
11	14	5226	TOTAL PRECIPITATION AMOUNT(hourly acc)	0	1	8	1	APCPsfc	kg m-2
12	12	5233	UNDILUTE CAPE	0	7	6	1	CAPEsfc	J/kg
13	1	5234	UNDILUTE PARCEL CIN	0	7	7	1	CINsfc	J/kg
14	2	9202	VERY LOW CLOUD AMOUNT						
15	11	9203	LOW CLOUD AMOUNT	0	6	3	1	LCDCsfc	%
16	13	9204	MEDIUM CLOUD AMOUNT	0	6	4	1	MCDCsfc	%
17	10	9205	HIGH CLOUD AMOUNT	0	6	5	1	HCDCsfc	%
18	3	9216	TOTAL CLOUD AMOUNT - RANDOM OVERLAP	0	6	202	1	TCDCROsfc	%
19	4	9217	TOTAL CLOUD AMOUNT MAX/RANDOM OVERL	0	6	203	1	TCDCMROsfc	%
20	20	15243	U WIND ON PRESSURE LEVELS (DP9XX)						
21	22	15244	V WIND ON PRESSURE LEVELS (DP9XX)						
22	9	16202	GEOPOTENTIAL HEIGHT ON P LEV**DP9XX						
23	5	16222	PRESSURE AT MEAN SEA LEVEL	0	3	1	101	PRMSLsfc	Pa

DP9XX – On multiple pressure levels of 1000, 995, 990, 985, 980 & 975 mb

PRECEIPITATION, SNOW, RAINFALL AMOUNT are hourly accumulated in the model production which we converted to 6-hourly accumulation by summing proper previous 6-hours data.

File name: umglaa_pf??? [One file per day – umglaa_pf024, umglaa_pf048, ... umglaa_pf240] (**Unit No: 65**) : Time-averaged single level diagnostics & fluxes

umglaa_pf???				***Frequency* : 3 Hrly**					
Sl. No	**Grib Cube Index**	**STASH Code**	**Fields Name**	**IRIS - Grib2 Param Code**				**Control File Short Variable Name**	**Unit**
				Discipline	**Category**	**Number**	**Type of First Fixed Surface**		
1	9	238	SURFACE DOWNWARD LW RADIATION						
2	10	239	TOA - SURF UPWARD LW RADIATION						
3	0	1202	NET DOWN SURFACE SW FLUX	0	4	9	1	NSWRFsfc	W m-2
4	29	1205	OUTGOING SW RAD FLUX (TOA)	0	4	8	8	USWRFtoa	W m-2

5	26	1207	INCOMING SW RAD FLUX (TOA)	0	4	7	8	DSWRFtoa	W m-2
6	30	1209	CLEAR-SKY (II) UPWARD SW FLUX (TOA)	0	4	198	8	CSUSFtoa	W m-2
7	19	1210	CLEAR-SKY (II) DOWNWARD SURFACE SW FLUX						
8	25	1211	CLEAR-SKY (II) UP SURFACE SW FLUX						
9	1	1215	DIRECT SURFACE SW FLUX						
10	2	1216	DIFFUSE SURFACE SW FLUX						
11	18	1235	DOWNWARD SURFACE SW FLUX	0	4	7	1	DSWRFsfc	W m-2
12	3	1408	OUTGOING SW RAD FORCING (TOA)						
13	20	2201	NET DOWN SURFACE LW RAD FLUX	0	5	5	1	NLWRFsfc	W m-2
14	27	2205	OUTGOING LW RAD FLUX (TOA)	0	5	4	8	ULWRFtoa	W m-2
15	28	2206	CLEAR-SKY (II) UPWARD LW FLUX (TOA)	0	5	195	8	CSULFtoa	W m-2
16	17	2207	DOWNWARD LW RAD FLUX: SURFACE	0	5	3	1	DLWRFsfc	W m-2
17	4	2208	CLEAR-SKY (II) DOWNWARD SURFACE LW FLUX						
18	11	3201	HT FLUX THROUGH SEAICE:SEA MEAN						
19	12	3202	HT FLUX FROM SURF TO DEEP SOIL LEV						
20	23	3217	SURFACE SENSIBLE HEAT FLUX	0	0	11	1	SHTFLsfc	W m-2
21	24	3228	SFC SH FLX FROM OPEN SEA:SEA MN						
22	5	3232	EVAP FROM OPEN SEA: SEA MEAN						
23	22	3234	SURFACE LATENT HEAT FLUX	0	0	10	1	LHTFLsfc	W m-2
24	14	5214	TOTAL RAINFALL RATE: LS+CONV	0	1	65	1	RPRATEsfc	Kg m-2 s-1
25	15	5215	TOTAL SNOWFALL RATE: LS+CONV	0	1	53	1	TSRWEsfc	Kg m-2 s-1
26	13	5216	TOTAL PRECIPITATION RATE	0	1	7	1	PRATEsfc	Kg m-2 s-1
27	6	5277	DEEP CONV PRECIP RATE						
28	7	5278	SHALLOW CONV PRECIP RATE						
29	8	5279	MID LEVEL CONV PRECIP RATE						
30	21	8234	SURFACE RUNOFF RATE						

31	16	8235	SUB-SURFACE RUNOFF RATE						
32	Calculated		UPWARD SURFACE SW FLUX	0	4	8	1	USWRFsfc	W m-2
33	Calculated		UPWARD LW RAD FLUX: SURFACE	0	5	4	1	ULWRFsfc	W m-2

32, USWRFsfc is calculated by DSWRFsfc minus NSWRFsfc

33, ULWRFsfc is calculated by DLWRFsfc minus NLWRFsfc

File name: umglaa_pg??? (One file per day –Instantaneous, hybrid-level prognostics,Unit: 66)

umglaa_pg000, umglaa_pg024,...			
Sl No	***STASH Code***	***Field Name***	***Frequency***
1	2	U COMPNT OF WIND	3 Hrly
2	3	V COMPNT OF WIND	3 Hrly
3	4	THETA	3 Hrly
4	10	SPECIFIC HUMIDITY	3 Hrly
5	33	OROGRAPHY	24 Hrly
6	150	W COMPNT OF WIND	3 Hrly
7	16004	TEMPERATURE ON THETA LEVELS	3 Hrly
8	12	QCF	3 Hrly
9	253	DENSITY*R*R	3 Hrly
10	254	QCL	3 Hrly
11	255	EXTNR PRESS(rho) AFTER TIMESTEP	3 Hrly
12	256	ADVT COMPNT OF U WIND	3 Hrly
13	257	ADVT COMPNT OF V WIND	3 Hrly
14	258	ADVT COMPNT OF W WIND	3 Hrly
15	272	RAIN AFTER TIMESTEP	3 Hrly
16	407	PRESSUER AT RHO LEVELS	3 Hrly
17	408	PRESSURE AT THETA LEVELS	3 Hrly

File name: umglaa_ph??? (One file per day –Instantaneous, hybrid-level prognostics,Unit: 67)

umglaa_ph000, umglaa_ph024,...			
Sl No	***STASH Code***	***Field Name***	***Frequency***
1	211	CCA WITH ANVIL	3 Hrly
2	406	EXNER PRESSURE AT THETA LEVELS	3 Hrly
3	9222	WET BULB TEMPERATURE	3 Hrly
4	15217	PV ON MODEL THETA LEVELS	3 Hrly
5	16201	GEOPOTENTIAL HEIGHT ON THETA LEVELS	3 Hrly
6	16206	CLOUD WATER CONTENT (qc)	3 Hrly
7	16207	TOTAL SPECIFIC HUMIDITY (qT)	3 Hrly
8	17257	TOTAL DUST CONC	3 Hrly

File Name: umglaa_pi??? [One file per day – umglaa_pi024, umglaa_pi048, ... umglaa_pi240] **(Unit-68)** : Pseudo-level diagnostics

umglaa_pi???				***Frequency* : 3 Hrly**					
Sl. No	**Grib Cube Index**	**STASH Code**	**Fields Name**	**IRIS - Grib2 Param Code**				**Control File Short Variable Name**	**Unit**
				Discipline	**Category**	**Number**	**Type of First Fixed Surface**		
1	0	2422	DUST OPTICAL DEPTH (3 hourly ave) #	3	1	192, 193, 194, 195, 196, 197	1	DAOT038, DAOT044, DAOT055, DAOT067, DAOT087, DAOT102	unitless
2	1	3238	DEEP SOIL TEMPERATURE AFTER B.LAYER (Instantaneous)	2	0	25	106	VSOILM0_10cm , VSOILM10_35cm, VSOILM35_100cm, VSOILM100_200cm	K
3	2	8223	SOIL MOISTURE CONTENT IN A LAYER (Instantaneous)	2	0	3	106	TSOIL0_10cm, TSOIL10_35cm, TSOIL35_100cm, TSOIL100_200cm	m3 m-3

 # Type of Second Fixed Surface has been set to 7 (Tropopause)

SOIL MOISTURE CONTENT IN A LAYER has been converted to Volumetric by dividing each layer by its depth in mm (0 to 10cm layer depth is 100mm, 10 to 35cm layer depth is 250mm, 35 to 100cm layer depth is 650mm and 100 to 200 cm layer depth is 1000mm), so that unit from Kg/m2 has been change to m3/m3. Also whose grid values of Volumetric Soil Moisture less than 0.005 are reset to 0.0051, since Noah WRF model required the soil moisture volumetric values must not be less than 0.005.

File Name: umglaa_pj??? [One file per day – umglaa_pj024, umglaa_pj048, ... umglaa_pj240]**(Unit-69)** : Time-averaged hybrid level diagnostics & fluxes

umglaa_pj???			
Sl No	***STASH Code***	***Field Name***	***Frequency***
1	1212	DIRECT UV FLUX	3 Hrly
2	1213	UPWARD UV FLUX	3 Hrly
3	1214	NET UV FLUX	3 Hrly
4	2261	TOTAL CLOUD AMOUNT ON THETA LEVELS	3 Hrly

NCMRWF GRIB2 LOCAL TABLE

```
/* asterix (*) Indicates comment lines
*  Name : ncmr grib2 local table
*  Filename : ncmr_grib2_local_table
*  Institute : National Centre for Medium Range Weather Forecasting, India
*  Centre Code : 29, New Delhi
*  Local Table Version No : 1
*  Local Table Created By : Arulalan.T, Project Scientist - C
*  Contact : arulalan@ncmrwf.gov.in
*  Release Version : 0.3, No of Entries : 12, Updated Date : 26-Apr-2016
*  Export Command : export GRIB2TABLE=/path/to/localdir/ncmr_grib2_local_table
*  Once we exported, then wgrib2 & g2ctl.pl will be able to read these local variables properly
*  Reference Link : http://www.cpc.ncep.noaa.gov/products/wesley/wgrib2/user_grib2tables.html
*
 struct gribtable_s {
   int disc;     // Section 0 Discipline
   int mtab_set;  // Section 1 Master Tables Version Number used by set_var
   int mtab_low;  // Section 1 Master Tables Version Number low range of tables
   int mtab_high; // Section 1 Master Tables Version Number high range of tables
   int cntr;     // Section 1 originating centre, used for local tables
   int ltab;     // Section 1 Local Tables Version Number
   int pcat;     // Section 4 Template 4.0 Parameter category
   int pnum;     // Section 4 Template 4.0 Parameter number
   const char *name;
   const char *desc;
   const char *unit;
 };
* ParameterDiscipline : MasterTableVersionSet : MasterTableVersionStart : MasterTableVersionEnd :
Centre Code : LocalTablesVersion: ParameterCategory : ParameterNumber: VariableShortName :
VariableDescription : VariableUnit
*
* Comment lines end
*/
* ncmr grib2 local table entries begin
0:1:0:10:29:1:1:192:FOG:Fog Area Cover:%
0:1:0:10:29:1:4:198:CSUSF:Clear Sky Upward Solar Flux:W m-2
0:1:0:10:29:1:5:195:CSULF:Clear Sky Upward Long Wave Flux:W m-2
3:1:0:10:29:1:1:192:DAOT038:Dust Aerosol Optical Thickness at 0.38 µm:unitless
3:1:0:10:29:1:1:193:DAOT044:Dust Aerosol Optical Thickness at 0.44 µm:unitless
3:1:0:10:29:1:1:194:DAOT055:Dust Aerosol Optical Thickness at 0.55 µm:unitless
3:1:0:10:29:1:1:195:DAOT067:Dust Aerosol Optical Thickness at 0.67 µm:unitless
3:1:0:10:29:1:1:196:DAOT087:Dust Aerosol Optical Thickness at 0.87 µm:unitless
3:1:0:10:29:1:1:197:DAOT102:Dust Aerosol Optical Thickness at 1.02 µm:unitless
3:1:0:10:29:1:1:198:TCDAM:Total Column Dry Aerosols Mass:kg m-2
0:1:0:10:29:1:6:202:TCDCRO:Total Cloud Cover Assuming Random Overlap:%
0:1:0:10:29:1:6:203:TCDCMRO:Total Cloud Cover Assuming Maximum Random Overlap:%
* ncmr grib2 local table entries end
```

Copy paste the above ncmrwf local table content into text file and save as ncmr_grib2_local_table . Then do $ export GRIB2TABLE=ncmr_grib2_local_table