NCMRWF

NCUM Units Vs Entries

Version 0.1

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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.]

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 need to set grib2 param 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

Dark Blue Color – Need ncmr_grib2_local_table to encode grib2 files 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 able to read 63 variables from different pp/fieldsfiles and write into grib2 files.

Updated by Arulalan.T (Project Scientist - C) on 01-Feb-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	23	9219	LOW CLOUD BASE (FT ASL)						
26	12	9220	LOW CLOUD TOP (FT ASL)						
27	13	15245	50 METRE WIND U-COMPONENT						
28	14	15246	50 METRE WIND V-COMPONENT						
29	15	30403	TOTAL COLUMN DRY MASS RHO GRID*						
30	22	30404	TOTAL COLUMN WET MASS RHO GRID*						
31	21	30405	TOTAL COLUMN QCL RHO GRID*						
32	20	30406	TOTAL COLUMN QCF RHO GRID*						
33	31	30451	Pressure at Tropopause Level	0	3	0	7	PREStrop	Pa
34	32	30452	Temperature at Tropopause Level	0	0	0	7	TMPtrop	K
35	33	30453	Height at Tropopause Level	0	3	6	7	DISTtrop	m
36	16	30454	ICAO HT OF TROP- NEED HT,TEMP,PRESS						

*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.

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	15243	U WIND ON PRESSURE LEVELS	0	2	2	100	UGRDprs	m s-1
3	7	15244	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	13	409	SURFACE PRESSURE	0	3	0	1	PRESsfc	Pa
2	14	3209	10 METRE WIND U-COMP	0	2	2	103	UGRD10m	m s-1
3	16	3210	10 METRE WIND V-COMP	0	2	3	103	VGRD10m	m s-1
4	5	3236	TEMPERATURE AT 1.5M	0	0	0	103	TMP2m	K
5	12	3237	SPECIFIC HUMIDITY AT 1.5M	0	1	0	103	SPFH2m	kg/kg
6	11	5226	TOTAL PRECIPITATION AMOUNT(hourly acc)	0	1	8	1	APCPsfc	kg m-2
7	20	4201	LARGE SCALE RAIN AMOUNT (hourly acc)	0	1	47	1	LSWPsfc	Kg m-2
8	21	4202	LARGE SCALE SNOW AMOUNT (hourly acc)	0	1	15	1	SNOLsfc	Kg m-2
9	12	5201	CONVECTIVE RAIN	0	1	48	1	CWPsfc	Kg m-2

			AMOUNT (hourly acc)						
10	13	5202	CONVECTIVE SNOW AMOUNT (hourly acc)	0	1	14	1	SNOCsfc	Kg m-2
11	9	5233	UNDILUTE CAPE						
12	0	5234	UNDILUTE PARCEL CIN						
13	1	9202	VERY LOW CLOUD AMOUNT						
14	8	9203	LOW CLOUD AMOUNT	0	6	3	1	LCDCsfc	%
15	10	9204	MEDIUM CLOUD AMOUNT	0	6	4	1	MCDCsfc	%
16	7	9205	HIGH CLOUD AMOUNT	0	6	5	1	HCDCsfc	%
17	2	9216	TOTAL CLOUD AMOUNT - RANDOM OVERLAP						
18	3	9217	TOTAL CLOUD AMOUNT MAX/RANDOM OVERL						
19	15	15243	U WIND ON PRESSURE LEVELS (DP9XX)						
20	17	15244	V WIND ON PRESSURE LEVELS (DP9XX)						
21	4	16222	PRESSURE AT MEAN SEA LEVEL	0	3	1	101	PRMSLsfc	Pa
22	6	16202	geopotential_height						

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	10	238	SURFACE DOWNWARD LW RADIATION						
2	11	239	TOA - SURF UPWARD LW RADIATION						
3	0	1202	NET DOWN SURFACE SW FLUX						
4	35	1205	OUTGOING SW RAD FLUX (TOA)	0	4	8	8	USWRFtoa	W m-2
5	32	1207	INCOMING SW RAD FLUX (TOA)	0	4	7	8	DSWRFtoa	W m-2
6	36	1209	CLEAR-SKY UPWARD SW FLUX (TOA)	0	4	198	8	CSUSFtoa	W m-2
7	25	1210	CLEAR-SKY DOWNWARD						

			SURFACE SW FLUX						
8	31	1211	CLEAR-SKY UPWARD SURFACE SW FLUX						
9	1	1215	DIRECT SURFACE SW FLUX						
10	2	1216	DIFFUSE SURFACE SW FLUX						
11	24	1235	DOWNWARD SURFACE SW FLUX	0	4	7	1	DSWRFsfc	W m-2
12	35	1408	OUTGOING SW RAD FORCING (TOA)						
13	26	2201	NET DOWN SURFACE LW RAD FLUX	0	5	5	1	NLWRFsfc	W m-2
14	33	2205	OUTGOING LW RAD FLUX (TOA)	0	5	4	8	ULWRFtoa	W m-2
15	34	2206	CLEAR-SKY UPWARD LW FLUX (TOA)	0	5	195	8	CSULFtoa	W m-2
16	23	2207	DOWNWARD LW RAD FLUX: SURFACE	0	5	3	1	DLWRFsfc	W m-2
17	4	2208	CLEAR-SKY DOWNWARD SURFACE LW FLUX						
18	14	3201	HT FLUX THROUGH SEAICE:SEA MEAN						
19	15	3202	HT FLUX FROM SURF TO DEEP SOIL LEV						
20	29	3217	SURFACE SENSIBLE HEAT FLUX	0	0	11	1	SHTFLsfc	W m-2
21	30	3228	SFC SH FLX FROM OPEN SEA:SEA MN						
22	5	3229	EVAP FROM SOIL SURF - AMOUNT						
23	6	3232	EVAP FROM OPEN SEA: SEA MEAN						
24	28	3234	SURFACE LATENT HEAT FLUX	0	0	10	1	LHTFLsfc	W m-2
25	17	5214	TOTAL RAINFALL RATE: LS+CONV	0	1	65	1	RPRATEsfc	Kg m-2 s-1
26	18	5215	TOTAL SNOWFALL RATE: LS+CONV	0	1	53	1	TSRWEsfc	Kg m-2 s-1
27	16	5216	TOTAL PRECIPITATION RATE	0	1	7	1	PRATEsfc	Kg m-2 s-1
28	7	5277	DEEP CONV PRECIP RATE						
29	8	5278	SHALLOW CONV PRECIP RATE						
30	9	5279	MID LEVEL CONV PRECIP RATE						
31	19	8208	SOIL MOISTURE CONTENT						
32	27	8234	SURFACE RUNOFF RATE						
33	22	8235	SUB-SURFACE RUNOFF RATE						

File name: umglaa_ph??? [One file per day – umglaa_ph024, umglaa_ph048, ... umglaa_ph240] (**Unit No: 67**) : Instantaneous hybrid-level prognostics

umglaa_ph???			
Sl No	***STASH Code***	***Field Name***	***Frequency***
1	2	U COMPNT OF WIND AFTER TIMESTEP	3 Hrly
2	3	V COMPNT OF WIND AFTER TIMESTEP	3 Hrly
3	4	THETA	3 Hrly
4	10	SPECIFIC HUMIDITY	3 Hrly
5	33	OROGRAPHY (/STRAT LOWER BC)	24 Hrly
6	150	W COMPNT OF WIND AFTER TIMESTEP	3 Hrly
7	211	CCA WITH ANVIL	3 Hrly
8	406	EXNER PRESSURE AT THETA LEVELS	3 Hrly
9	407	PRESSURE AT RHO LEVELS AFTER TS	3 Hrly
10	408	PRESSURE AT THETA LEVELS	3 Hrly
11	9222	WET BULB TEMPERATURE	3 Hrly
12	15217	PV ON MODEL LEVELS(CALC PV)	3 Hrly
13	16004	TEMPERATURE ON THETA LEVELS	3 Hrly
14	16201	GEOPOTENTIAL HEIGHT ON THETA LEVELS	3 Hrly
15	16206	CLOUD WATER CONTENT (qc)	3 Hrly
16	16207	TOTAL SPECIFIC HUMIDITY (qT)	3 Hrly
17	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	None
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

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 : 28, New Delhi
*  Local Table Version No : 1
*  Local Table Created By : Arulalan.T, Project Scientist - C
*  Contact : arulalan@ncmrwf.gov.in
*  Release Version : 0.1, No of Entries : 9, Date : 21-Jan-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
0:1:0:10:28:1:1:192:FOG:Fog Area Cover:%
0:1:0:10:28:1:4:198:CSUSF:Clear Sky Upward Solar Flux:W m-2
0:1:0:10:28:1:5:195:CSULF:Clear Sky Upward Long Wave Flux:W m-2
3:1:0:10:28:1:1:192:DAOT038:Dust Aerosol Optical Thickness at 0.38 µm:None
3:1:0:10:28:1:1:193:DAOT044:Dust Aerosol Optical Thickness at 0.44 µm:None
3:1:0:10:28:1:1:194:DAOT055:Dust Aerosol Optical Thickness at 0.55 µm:None
3:1:0:10:28:1:1:195:DAOT067:Dust Aerosol Optical Thickness at 0.67 µm:None
3:1:0:10:28:1:1:196:DAOT087:Dust Aerosol Optical Thickness at 0.87 µm:None
3:1:0:10:28:1:1:197:DAOT102:Dust Aerosol Optical Thickness at 1.02 µm:None
* 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