IMPALA 4.5km & 25km diagnostic lists

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Revised 15/7/16 after Lawrence Jackson checked April 1998 output pp files.
11/08/98 Updated as now thining pr stream and archiving as pz stream for 4.5km run.
6/04/17 - 3223 was missing from list for pa stream.
13/09/17 - Added table with 25km model heights.
11/05/18 - Corrected stashcodes for w, U and V on geometric heights, PU stream.
03/09/18 - Corrected fact that 5250 & 5251 are on model levels.
06/11/18 - Extra information about PR stream and problems with pb stream data.

1 Constraints

On the supercomputer fieldsfiles can be much larger and still be read as the supercomputer uses 64 bit numbers. Files archived to mass are usually converted from fieldsfiles to pp files and to 32 bit numbers or smaller when packed. These files are potentially limited to $<$ 4.294 G bytes as any method of accessing these files using an integer address in the file is limited to 2^{32}-1. When running high resolution UM jobs over large regions it is easy to start to exceed the 4Gbytes limit and then the output may be corrupt when transferred to pp files. This problem can be avoided by having many output streams, frequently reinitialising the output streams and using packing of fields to reduce their size. Note the performance of the UM IO server is improved if there are many output streams and they are frequently reinitialised. The 4.5km run will be using the IO server to improve its speed. Use of the IO server will not help the 25km run.

2 Difference between the 4.5km and 25km diagnostic output.

The 25km model will run with the convection scheme switched on so can output diagnostics from section 5 of the UM. The 4.5km model will be run without using the climate meaning system as this is costly for large high resolution models. Instead a selection of 30 day means will be output to several different file streams. The 25km model will run with the climate meaning system on so all monthly (i.e 30 day means) will be output to one file. The 4.5km run will be using the new UM packing profile 7 for many output streams. This is designed to be suitable for use with high resolution (i.e. convection permitting) runs and is available from UM10.3. The 25km model will have 63 levels corresponding the the lowest 63 levels of the global 85 level data set. The 4.5km and 25km model don't have the same vertical levels, the 4.5km model has higher vertical resolution.

2.1 Restart dumps

Note the size of the restart dumps is large due to the number of mean diagnostics (i.e. hourly, 6 hourly, 30 day) being output during the run.

2.1.1 4.5km IMPALA run

The model will be run in 12 hour chunks with 12 hour restart dumps. Dumps will only be archived at the start of every month. Dumps having packing on to reduce their size. The 4.5km run will be using high optimisation to increase it speed so it is unlikely to give the same results if run again on a different PE configuration. Size of dumps ~ 100,565,950,464 bytes.

2.1.2 25km IMPALA run

The model will be run in 10 day chunks, with 10 day restart dumps. Dumps will be archived monthly. Size of dumps ~4,801,630,208 bytes, (without any mean diagnostics 2,348,879,872 bytes).

3 Monthly means - Streams PI , PV, PW 4.5km (climate meaning 25km)

The monthly means are split into 3 files to help the IO server.

3.1 PI stream - single level data and some of the pressure levels fields.

D1TH - bottom level wind stress.

Section	Stash Item code	description	levels	time sampling to make mean	comments
1	201	net down surface SW	single	timestep (rad)	
1	207	Incoming SW TOA	single	timestep	
1	208	outgoing SW TOA	single	timestep	
1	209	clear-sky(II) upward SW TOA	single	timestep	
1	210	clear-sky(II) down SW TOA	single	timestep	
1	211	clear-sky(II) up SW surface	single	timestep	
1	235	total downward surface SW	single	timestep	
2	201	net down surface LW	single	timestep	
2	204	total cloud amount in LW	single	timestep	
2	205	outgoing LW TOA	single	timestep	
2	206	clear-sky(II) upwards LW TOA	single	timestep	
2	207	downward LW surface	single	timestep	
2	208	clear-sky(II) down LW surface	single	timestep	
3	217	surface sensible heat flux	single	timestep	
3	219	X comp surface & BL stress	D1TH	timestep	
3	220	Y comp surface & BL stress	D1TH	timestep	
3	223	surface moisture flux	single	timestep	
3	225	10m U wind	single	timestep	
3	226	10m V wind	single	timestep	
3	227	10m wind speed	single	timestep	
3	234	* surface Latent heat flux	single	timestep	
3	236	temperature at 1.5m	single	timestep	
3	237	specific humidity at 1.5m	single	timestep	
3	245	relative humidity at 1.5m	single	timestep	
3	258	surface snowmelt heat flux	single	timestep	

3	287	evap from canopy on tiles	DTILE	timestep	
3	289	Gross primary productivity	DTILE	timestep	
3	290	* Sensible heat flux on tiles	DTILE	timestep	
3	291	Primary productivity on PFTS	DPFT	timestep	
3	292	Plant respiration on PFTS	DPFT	timestep	
3	293	soil respiration	single	timestep	
3	296	evap from soil surface	single	timestep	
3	297	evap from canopy rate	single	timestep	
3	298	sublimation from surface	single	timestep	
3	304	turbulent mixing height	single	timestep	
3	305	stable boundary layer indicator	single	timestep	
3	306	stratocum over stable BL ind	single	timestep	
3	307	well mixed BL indicator	single	timestep	
3	308	decoupled SC not over CU BL ind	single	timestep	
3	309	decoupled SC over CU BL ind	single	timestep	
3	310	cumulus capped BL ind	single	timestep	
3	321	canopy water on tiles	DTILE	timestep	
3	330	surface latent heat flux on tiles	DTILE	timestep	
3	332	TOA outgoing LW after BL	single	timestep	
3	334	land mean potential evap	single	timestep	
3	340	shear driven BL ind	single	timestep	
4	203	large-scale rainfall	single	timestep	
4	204	large-scale snowfall	single	timestep	
8	208	soil moisture content	single	timestep	
8	209	canopy water content	single	timestep	
8	223	soil moisture in a layer	DSOIL	timestep	
8	225	deep soil temp	DSOIL	timestep	
8	229	unfrozen soil temp	DSOIL	timestep	
8	230	frozen soil temp	DSOIL	timestep	
8	233	canopy throughfall rate	single	timestep	
8	234	surface runoff rate	single	timestep	
8	235	sub-surface runoff rate	single	timestep	
16	222	mean sea level pressure	single	6 hourly	
30	201	U wind on pressure levels	DP18	6 hourly	
30	202	V wind on pressure levels	DP18	6 hourly	
30	203	W wind on pressure levels	DP18	6 hourly	
30	204	temperature on pressure levels	DP18	6 hourly	
30	205	specific humidity on pressure levels	DP18	6 hourly	
30	206	relative humidity on pressure levels	DP18	6 hourly	
30	207	geoptential height on pressure levels	DP18	6 hourly	
30	208	omega on pressure levels	DP18	6 hourly	
30	428	*dry mass col int u*q per unit area	single	timestep	
30	429	*dry mass col int v*q per unit area	single	timestep	

3.2 PV stream - Prognostic monthly means

DA69TH refers to bottom 69 model levels for 4.5km run.

Section	Stash Item code	description	levels	time sampling to make mean	comments
0	12	qcf	DA69TH	timestep	
0	24	surface temperature	single	timestep	
0	25	boundary layer depth	single	timestep	
0	254	qcl	DA69TH	timestep	
0	266	bulk cloud fraction in a layer	DA69TH	timestep	
0	407	pressure on rho levels	DALLRH	timestep	
0	409	surface pressure	single	timestep	

3.3 PW - pressure level products & column integrals

Section	Stash Item code	description	levels	time sampling to make mean	comments
30	211	UU on pressure levels	DP18	6 hourly	
30	212	UV on pressure levels	DP18	6 hourly	
30	215	UQ on pressure levels	DP18	6 hourly	
30	222	VV on pressure levels	DP18	6 hourly	
30	224	VT on pressure levels	DP18	6 hourly	
30	225	VQ on pressure levels	DP18	6 hourly	
30	258	QOmega on pressure levels	DP18	6 hourly	
30	301	heavyside fn on pressure levels	DP18	6 hourly	
30	403	total column dry mass	single	timestep	
30	404	total column wet mass	single	timestep	
30	405	total column qcl	single	timestep	
30	403	total column qcf	single	timestep	
30	410	* Mountain torque	single	timestep	
30	417	pstar	single	6 hourly	

3.4 25km additional monthly means from section 5

section	stash item code	description	level info	frequency of output	time processing
5	205	convective rainfall	single	timestep	mean
5	206	convective snowfall	single	timestep	mean
5	216	total precipitation	single	timestep	mean
5	231	CAPE timescale deep	single	timestep	mean
5	232	indicator reduced CAPE timescale	single	timestep	mean
5	269	deep indicator	single	timestep	mean
5	270	shallow indicator	single	timestep	mean
5	272	mid indicator	single	timestep	mean

4 PP output streams

4.1 PA - hourly means single level data

Hourly reinitialisation. Fieldsfiles size ~4,198,227,968 bytes on 3rd hour

section	stash item code	description	level info	frequency of output	time processing
1	201	net down surface SW	single	1 hourly	timesteps
1	207	Incoming SW TOA	single	1 hourly	timesteps
1	208	outgoing SW TOA	single	1 hourly	timesteps
1	209	clear-sky(II) upward SW TOA	single	1 hourly	timesteps
1	210	clear-sky(II) down SW surface	single	1 hourly	timesteps
1	211	clear-sky(II) up SW surface	single	1 hourly	timesteps
1	215	direct surface SW flux	single	1 hourly	timesteps
1	216	diffuse surface SW flux	single	1 hourly	timesteps
1	235	total downward surface SW	single	1 hourly	timesteps
2	201	net down surface LW	single	1 hourly	timesteps
2	204	total cloud amount in LW	single	1 hourly	timesteps
2	205	TOA outgoing LW	single	1 hourly	timesteps
2	206	clear-sky(II) outgoing LW (TOA)	single	1 hourly	timesteps
2	207	downward LW surface	single	1 hourly	timesteps
2	208	clear-sky(II) down surface LW	single	1 hourly	timesteps
3	217	surface sensible heat flux	single	1 hourly	timesteps
3	223	total surface moisture flux	single	1 hourly	timesteps
3	332	TOA outgoing LW after BL	single	1 hourly	timesteps
3	234	latent heat flux	single	1 hourly	timesteps
4	203	large-scale rainfall rate	single	1 hourly	timesteps
4	204	large-scale snowfall rate	single	1 hourly	timesteps
9	203	low cloud amount	single	1 hourly	timesteps
9	204	medium cloud amount	single	1 hourly	timesteps
9	205	high cloud amount	single	1 hourly	timesteps
21	*104*	*number of lightning flashes*	*single*	*3 hourly accum*	*timesteps*
30	422	dry mass col int u*gz per unit area	single	3 hourly	timesteps
30	423	dry mass col int v*gz per unit area	single	3 hourly	timesteps
30	424	dry mass col int w*gz per unit area	single	3 hourly	timesteps
30	425	dry mass col int u*T per unit area	single	3 hourly	timesteps
30	426	dry mass col int v*T per unit area	single	3 hourly	timesteps
30	427	dry mass col int w*T per unit area	single	3 hourly	timesteps
30	428	dry mass col int u*q per unit area closest to horz. moisture flux	single	1 hourly	timesteps
30	429	dry mass col int v*q per unit area closest to horz. moisture flux	single	1 hourly	timesteps
30	430	dry mass col int w*q per unit area closest to vert moisture flux	single	1 hourly	timesteps
30	437	dry mass col int u per unit area	single	3 hourly	timesteps
30	438	dry mass col int v per unit area	single	3 hourly	timesteps
30	439	dry mass col int w per unit area Measure of vertical mass flux	single	3 hourly	timesteps

Note 21 104 is not available from the 25km run as this runs without the electric scheme and prognostic graupel.

Additional convective diagnostics in the 25km run

section	stash item code	description	level info	frequency of output	time processing
5	205	convective rainfall	single	hourly	mean
5	206	convective snowfall	single	hourly	mean
5	216	total precipitation	single	hourly	mean

4.2 PB - High frequency precip data (Not available from 25km as model timestep is 10 minutes)

Note no total precipitation diagnostic available as no convection call. Size of fieldsfile with 6 hourly reinitialisation ~ 3,234,332,672 bytes

NOTE - the future climate run used an incorrect time profile for 15minute means for the initial months. Output data is correct from 1 March 1998.

section	stash item code	description	level info	frequency of output	time processing
4	203	large-scale rainfall rate	single	15 min	mean over timesteps
4	204	large-scale snowfall rate	single	15 min	mean over timesteps

2*4*24*30 =5760 fields per month

4.3 PC - hourly instantaneous single level data

Reinitialised every 1 hour.

section	stash item code	description	level info	frequency of output	comments
0	24	surface temperature	single	1 hourly	
0	25	boundary layer depth	single	3 hourly	
0	409	surface pressure	single	hourly	
3	26	roughness length	single	1 hourly	
3	219	X comp surface & BL stress	bot lev	hourly	
3	220	Y comp surface & BL stress	bot lev	hourly	
3	225	10m u wind	single	hourly	
3	226	10m v wind	single	hourly	
3	227	10m wind speed	single	hourly	Max value from all timesteps in hour
3	236	temperature at 1.5m	single	hourly	
3	237	specific humidity at 1.5m	single	hourly	
3	245	relative humidity 1.5m	single	hourly	
3	304	Turbulent mixing height after BL	single	hourly	
3	465	Friction velocity	single	hourly	
3	476	Combined BL type	single	3 hourly	
4	203	large-scale rainfall rate	single	hourly	Max value from all timesteps in hour
4	204	large-scale snowfall rate	single	hourly	Max value from all timesteps in hour
16	222	Mean Sea Level Pressure	single	hourly	
30	403	total column dry mass rho grid	single	hourly	
30	404	total column wet mass rho grid	single	hourly	wet = q+qcl+qcf+ qrain+qgraupel
30	405	total column qcl rho grid	single	hourly	LWP? Will not include qrain
30	406	total column qcf rho grid	single	hourly	IWP? Will not include graupel

I tried 2 283 thermal tropopause height fom the LW radiation section but found out that this does not work with the configuration of the model I have. 20 26 Tropopause height (3 hourly) also tried but does not appear to work unless an operational level set is being used. Neither the 4.5km nor 25km simulations are using operational level sets.

Additional convective diagnostics in the 25km run.

section	stash item code	description	level info	frequency of output	time processing
5	205	convective rainfall	single	hourly	max in period
5	206	convective snowfall	single	hourly	max in period
5	216	total precipitation	single	hourly	max in period

4.4 PD - daily mean data or daily max/min.

Reinitialised daily. Size of fields file after ~565,092,352 bytes

section	stash item code	description	level info	frequency of output	time processing
0	23	snow amount over land	single	daily	mean
0	24	surface temperature	single	daily	mean
1	203	*Net downward SW radiation over	single	daily	mean
1	260	*Net downward SW over sea flux below 690nm	single	daily	mean
2	203	* Net downward LW over the sea	single	daily	mean
3	227	* 10m wind speed	single	daily	mean
3	228	SFC sensible heat flux open sea	single	daily	mean
3	236	temperature at 1.5m	single	daily	mean
3	236	temperature at 1.5m	single	daily	Maximum all timesteps
3	236	temperature at 1.5m	single	daily	Minimum all timesteps
3	237	specific humidity at 1.5m	single	daily	mean
3	245	relative humidity at 1.5m	single	daily	mean
3	247	visibility at 1.5m	single	daily	mean
3	247	visibility at 1.5m	single	daily	Maximum all timesteps
3	248	fog at 1.5m	single	daily	mean
3	248	fog at 1.5m	single	daily	Maximum all timesteps
3	287	evap from canopy on tiles	single	daily	mean
3	297	evap from canopy	single	daily	mean
3	304	turbulent mixing height	single	daily	mean
3	305	stable boundary layer indicator	single	daily	mean
3	306	stratocum over stable BL indicator	single	daily	mean
3	307	well mixed BL indicator	single	daily	mean
3	308	decoupled sc not over cu ind	single	daily	mean
3	309	decoupled SC over CU BL ind	single	daily	mean
3	310	cumulus capped BL ind	single	daily	mean
3	340	Shear-driven BL indicator	single	daily	mean
8	023	* Snow mass	single	daily	mean
8	223	* soil moisture content in a layer	soil lev	daily	mean
16	222	* Mean see level pressure	single	daily	mean
21	*102*	*graupel water path in electric*	*single*	*daily*	*Maximum all timesteps*

21 102 is not available from the 25km model as this runs without prognostic graupel and the electric scheme.

* extra field in output discovered later (assume they may have been in the orignal starting job and I did not remove them).

4.5 PE soil and tile info

Reinitialised hourly.

section	stash item code	description	level info	frequency of output	time processing
3	202	soil heat flux	single	hourly	mean
3	288	transpiration +soil evp tiles	tiles(9)	hourly	mean
3	290	Surface senisble heat flux tiles	tiles(9)	hourly	instantaneous
3	296	soil evaporation	single	hourly	mean
3	316	surface temp on tiles	tiles(9)	hourly	instantaneous
3	329	1.5m specific humidity over tiles	tiles(9)	hourly	instantaneous
3	330	surface latent heat flux tiles	tiles(9)	hourly	instantaneous
8	209	canopy water	single	hourly	mean
8	223	soil moisture	soil lev(4)	hourly	instantaneous
8	225	soil temperature	soil lev(4)	hourly	instantaneous
8	234	surface runoff	single	hourly	mean
8	235	sub-surface runoff	single	hourly	mean

4.6 PF - Instantaneous mainly 3 hourly pressure level data

DP18 - 18 pressure level set as give in circulated list. Level are: 1000., 950., 925., 900., 850., 800., 750., 700., 650., 600., 550., 500., 450., 400., 350., 300., 200., 100. hPa. File reinitialised every 3 hours. Size of fieldsfile every 3 hours ~ 2,940,837,888 bytes.

section	stash item code	description	level info	frequency of output
16	202	geoptential height on pressure levels	DP18	3 hourly
16	205	wet bulb potential temperature	DP18	6 hourly
30	201	U wind on pressure levels uv grid	DP18	3 hourly
30	202	V wind on pressure levels uv grid	DP18	3 hourly
30	204	temperature pressure levels uv grid	DP18	3 hourly
30	205	specific humidity pressure levels uv grid	DP18	3 hourly
30	206	* relative humidity pressure levels uv grid	DP18	3 hourly
30	208	omega on pressure levels uv grid	DP18	3 hourly

Note some fields on pressure levels are available from different sections. I have chosen mainly those from section 30 as this reduces cost and is consistent with those going to the PG stream as daily means. Section 30 diagnostics (i.e. interpolated to common grid) have zeros if below model surface so instantaneous fields don't require a heavyside function to indicate if below the surface. Section 16 diagnostics - temperature and height extrapolated below surface.

* - Not output looks as if I gave it a daily mean profile and output in PG

4.7 PG - daily mean fields on pressure levels

Reinitialised daily. Size of fieldsfile ~3,373,613,056 bytes.

section	stash item code	description	level info	frequency of output	time process-ing
30	201	U wind on pressure levels uv grid	DP18	daily	mean
30	202	V wind on pressure levels uv grid	DP18	daily	mean
30	205	specific humidity pressure levels uv grid	DP18	daily	mean
30	206	* relative humidity pressure levels	DP18	daily	mean
30	208	omega on pressure levels	DP18	daily	mean
30	215	uq on pressure levels	DP18	daily	mean
30	225	vq on pressure levels	DP18	daily	mean
30	258	omq on pressure levels	DP18	daily	mean
30	301	heavyside on pressure levels	DP18	daily	mean

For the products to be useful in calculating transient eddy diagnostics all the fields need to be from section 30 with the same time samplings and level set.

* - extra discovered later.

4.8 PH - Instantaneous cloud data on model levels

Latitude or longitude strips. Was setup to do required strips at 0, 15 and 30 E and -20., -10., 0.0, 10., & 20. N. These work if an IO server is not used. Unfortunately with an IO server anything which is not a whole grid can get corrupted. For this reason the output has been changed to the bottom 64 levels instead. Files reinitialised hourly.

section	stash item code	description	level info	time processing
0	266	Bulk cloud fraction on model levels	64 levels	1 hourly
0	267	liquid cloud fraction on model levels	64 levels	1 hourly
0	268	frozen cloud fraction on model levels	64 levels	1 hourly

4.9 PJ - Instantaneous data on model levels

40 Level set suggested by Cathryn. The model levels are terrain following so are constant height where no orography. They do not equate to constant pressure.

section	stash item code	description	level info	time processing
0	12	qcf on model levels	40 lev	3 hourly
0	254	qcl on model levels	40 lev	3 hourly
0	408	pressure on theta model levels	40 lev	3 hourly

4.10 PT - Model levels tendencies.

6 hourly reinitialisation. File size ~13,737,562,112 byte. All tendencies on the bottom 69 model levels.

section	stash item code	description	level info	time processing
1	181	dT SW radiation	model levels	6 hr acc
2	181	dT LW radiation	model levels	6 hr acc
4	181	dT from micro-physics	model levels	6 hr acc
4	182	dq from micro-physics	model levels	6 hr acc
9	181	dT from BL & cloud	model levels	6 hr acc
9	182	dq from BL & cloud	model levels	6 hr acc
12	181	dT from SL advection	model levels	6 hr acc
12	182	dq from SL advection	model levels	6 hr acc
13	181	*dT from diffusion (horiz smag)	model levels	6 hr acc
13	182	* dq from diffusion (horiz smag)	model levels	6 hr acc

No point in getting section 3 increments as either the same as section 9 or not dT and dq but dTl and dqT.

Note section 13 dT and dq appear to be zero so not capturing increments as expected.

4.11 PU - Hourly instantaneous fields to look at gravity waves

All fields on geometric heights every 5km from 5km to 30km i.e 6 levels. Reinitialisation every 1 hour.

section	stash item code	description	level info	time processing
15	108	pressure on geometric heights	6 lev	1 hourly
15	119	theta on geometric heights	6 lev	1 hourly
15	127	density on geometric heights	6 lev	1 hourly
15	142	w on geometric heights	6 lev	1 hourly
15	143	U on geometric heights	6 lev	1 hourly
16	144	V on geometric heights	6 lev	1 hourly

4.12 PR - use for fields required for crmstyle_coarse_grid output

All output instantaneous but not at same timestep. Prognostics at the start of the run with diagnostics (i.e. tendencies offset by 1 timestep). Currently output over the whole region for all model levels. I could reduced the region and possibly remove the top levels as the post processing is designed to look at convective activity. At present I am outputting the whole region to this file stream. The file size for one hour is 60,294,836,224 bytes. This data stream is packed. At present I am archiving it as it will provide w, u and v requested when users realised mass flux were not available. The output from crmstyle_coarse_grid will be archived. I have now tested out applying the program to process data on 30x30 points and 10x10 points on just the bottom 64 levels.

WARNING - do not try to access data from any archived pr stream files use the pz stream files instead. (Note the pr files were too big to archive correctly to mass using the method avaiable at the time. Some fields in the files are readable but the main prognostics ie. winds, vertical velocity, theta and moisture variables, are at the end of each file so unfortunately are the ones which are unreadable.) It is possible that the pr stream files may be deleted from mass.

section	stash item code	description	level info	frequency of output

0	2	U on model levels	model levels	hourly
0	3	V on model levels	model levels	hourly
0	4	theta on model levels	model levels	hourly
0	10	q on model levels	64 levels	hourly
0	12	qcf on model levels	64 levels	hourly
0	24	surface temperature	single	hourly
0	25	boundary layer depth	single	hourly
0	150	w on model levels	model levels	hourly
0	254	qcl on model levels	64 levels	hourly
0	272	rain on model levels	64 levels	hourly
0	273	graupel on model levels	64 levels	hourly
0	408	pressure on theta levels	model levels	hourly
0	409	surface pressure	single	hourly
1	181	temperature inc from SW	64 levels	hourly+step
2	181	temperature inc from LW	64 levels	hourly+step
3	184	qcf in from BL	64 levels	hourly+step
3	217	sensible heat flux	single	hourly+step
3	234	latent heat flux	single	hourly+step
4	181	temperature inc from micro-physics	64 levels	hourly+step
4	182	q inc from micro-physics	64 levels	hourly+step
4	183	qcl inc from micro-physics	64 levels	hourly+step
4	184	qcf inc from micro-physics	64 levels	hourly+step
4	203	large-scale rainfall rate	single	hourly+step
4	204	large-scale snowfall rate	single	hourly+step
9	181	temperature inc from BL & cld	64 levels	hourly+step
9	182	q inc from Bl & cld	64 levels	hourly+step
9	183	qcl inc from BL & cld	64 levels	hourly+step
12	181	temperature inc from advection	64 levels	hourly+step

12	182	q inc from advection	64 levels	hourly+step
12	183	qcl inc from advection	64 levels	hourly+step
12	184	qcf inc from advection	64 levels	hourly+step

4.13 PZ - thinned vesion of the PR file

Initially the PR files were being archived but these are too big for the moo put command and get corrupted when transferred to MASS so I am now thinning the files to just contain the fields really wanted. The new reduced files can be retrieved and read.

section	stash item code	description	level info	frequency of output
0	2	U on model levels	model levels	hourly
0	3	V on model levels	model levels	hourly
0	4	theta on model levels	model levels	hourly
0	10	q on model levels	64 levels	hourly
0	12	qcf on model levels	64 levels	hourly
0	150	w on model levels	model levels	hourly
0	254	qcl on model levels	64 levels	hourly
0	272	rain on model levels	64 levels	hourly
0	273	graupel on model levels	64 levels	hourly
0	408	pressure on theta levels	model levels	hourly
0	409	surface pressure	single	hourly

4.14 PI stream 25km regional run only

The 25km model will run with the 63 of the 85 levels of the N512 global driving model and use GA7 physics. It will be running with convective parametrization so diagnostics from the convection scheme can be added. The PI stream will be used in the 25km run to output extra convective diagnostics. The 52 levels are those used in global AMIP runs with 85 levels to get out fields in the troposphere for things which like convection which should not have values in the stratosphere unless the model is about to blowup. I have chosen to output this information as hourly meana so I can compare with coarse gridded data from the hourly instantaneous data in the pr stream from the 4.5km run.

section	stash item code	description	level info	frequency of output	time processing
5	181	dT from convection (+PC2)	52 lev	hourly	acc
5	182	dq from convection (+PC2)	52 lev	hourly	acc
5	185	du from convection	52 lev	hourly	acc
5	186	dv from convection	52 lev	hourly	acc
5	198	dT/dt from downdraughts	52lev	hourly	mean
5	199	dq/dt from downdraughts	52lev	hourly	mean
5	217	dilute CAPE	single	hourly	mean
5	231	CAPE timescale deep	single	hourly	mean
5	233	undilute CAPE	single	hourly	mean
5	234	undilute parcel CIN	single	hourly	mean
5	250	updraught mass flux	52 lev	hourly	mean
5	251	downdraught mass flux	52 lev	hourly	mean
5	269	deep indicator	single	hourly	mean
5	270	shallow indicator	single	hourly	mean
5	272	mid indicator	single	hourly	mean
5	319	Freq deep conv terminates at	52 lev	hourly	mean

4.15 Fields on the circulated wish list not included.

- Column integrated heating and moistening tendencies - not possible through the stash system as mass weighted vertical means. Output fields on model levels instead see files stream pt.
- w, u, v output in file stream pr hourly. These can be used to get information on winds.
- DSE, MSE convergence etc - I have included some section 30 diagnostics which provide integrals of parts of the model energy and also column integrated fluxes of moisture, see file stream pa.
- CAPE and CIN 25km only - these are not available from a model running without convection.
- Tropopause height - UM diagnostics which I tried don't work for this configuration, so this will not be available.

4.16 Model levels 4.5km

The following table gives the model level heights to the nearest metre for theta levels assuming a sea surface. The height over orography will be different.

Model level number	theta level height in (m)	UV level height in (m)
1	5.	2.5
2	20.	12.5
3	45.	32.5
4	80.	62.5
5	125.	102.5
6	180.	152.5
7	245.	212.5
8	320.	282.5
9	405.	362.5

10	500.	452.5
11	605.	552.5
12	720.	662.5
13	845.	782.5
14	980.	912.5
15	1125.	1052.5
16	1280.	1202.5
17	1445.	1362.5
18	1620.	1532.5
19	1805.	1712.5
20	2000.	1902.5
21	2205.	2102.4
22	2420.	2312.4
23	2645.	2532.4
24	2880.	2762.4
25	3125.	3002.5
26	3380.	3252.5
27	3645.	3512.5
28	3920.	3782.6
29	4205.	4062.6
30	4500.	4352.8
31	4806.	4653.
32	5121.	4963.
33	5446.	5284.
34	5782.	5614.
35	6128.	5955.
36	6483.	6306.
37	6850.	6667.
38	7226.	7038.
39	7613.	7420.
40	8010.	7812.
41	8419.	8215.
42	8838.	8628.
43	9268.	9053.
44	9708.	9488.
45	10161.	9935.
46	10624.	10392.
47	11099.	10862.
48	11587.	11343.
49	12086.	11836.
50	12598.	12343.
51	13123.	12861.
52	13662.	13393.
53	14215.	13938.
54	14782.	14498.
55	15364.	15073.
56	15962.	15663.
57	16577.	16269.
58	17208.	16893.

59	17858.	17533.
60	18528.	18193.
61	19217.	18872.
62	19928.	19572.
63	20661.	20295.
64	21419.	21040.
65	22201.	21810.
66	23012.	22607.
67	23851.	23432.
68	24721.	24286.
69	25624.	25173.
70	26562.	26093.
71	27538.	27050.
72	28553.	28046.
73	29612.	29083.
74	30716.	30164.
75	31869.	31293.
76	33075.	32472.
77	34337.	33706.
78	35659.	34998.
79	37045.	36352.
80	38500.	37772.

4.17 Model levels 25km

The 25km model is using a level identical to the global model at lower levels. This is coarser than that used for the CP4 simulation which has a much higher resolution near the surface. The following table gives the model level heights to the nearest metre for theta and UV levels assuming a sea surface. The height over orography will be different.

Model level number	theta level height in (m)	UV level height in (m)
1	20.	10.
2	53.3	36.7
3	100.	76.7
4	160.	130.0
5	233.3	196.7
6	320.	276.7
7	420.	370.0
8	533.3	476.7
9	660.	596.7
10	800.	730.0
11	953.3	876.7
12	1120.	1036.7
13	1300.	1210.0
14	1493.3	1396.7
15	1700.	1596.7
16	1920.	1810.0
17	2153.3	2036.7
18	2400.	2276.7

19	2660.	2530.0
20	2933.3	2796.7
21	3220.	3076.7
22	3520.	3370.0
23	3833.3	3676.7
24	4160.	3996.7
25	4500.	4330.0
26	4853.3	4676.7
27	5220.	5036.7
28	5600.	5410.0
29	5993.3	5796.7
30	6400.	6196.7
31	6820.	6610.0
32	7253.3.	7036.7
33	7700.	7476.7
34	8160.1	7930.0
35	8633.7	8396.9
36	9120.9	8877.3
37	9622.0	9371.4
38	10137.	9879.6
39	10667.	10402.
40	11213.	10940.
41	11775.	11494.
42	12354.	12065.
43	12954.	12654.
44	13575.	13264.
45	14221.	13898.
46	14895.	14558.
47	15602.	15249.
48	16348.	15975.
49	17137.	16742.
50	17980.	17558.
51	18884.	18432.
52	19861.	19372.
53	20923.	20392.
54	22087.	21505.
55	23369.	22728.
56	24789.	24079.
57	26371.	25580.
58	28141.	27256.
59	30130.	29135.
60	32371.	31250.
61	34903.	33637.
62	37771.	36337.
63	41022.	39397.