Evolution of operational ALADIN applications Summer 2005

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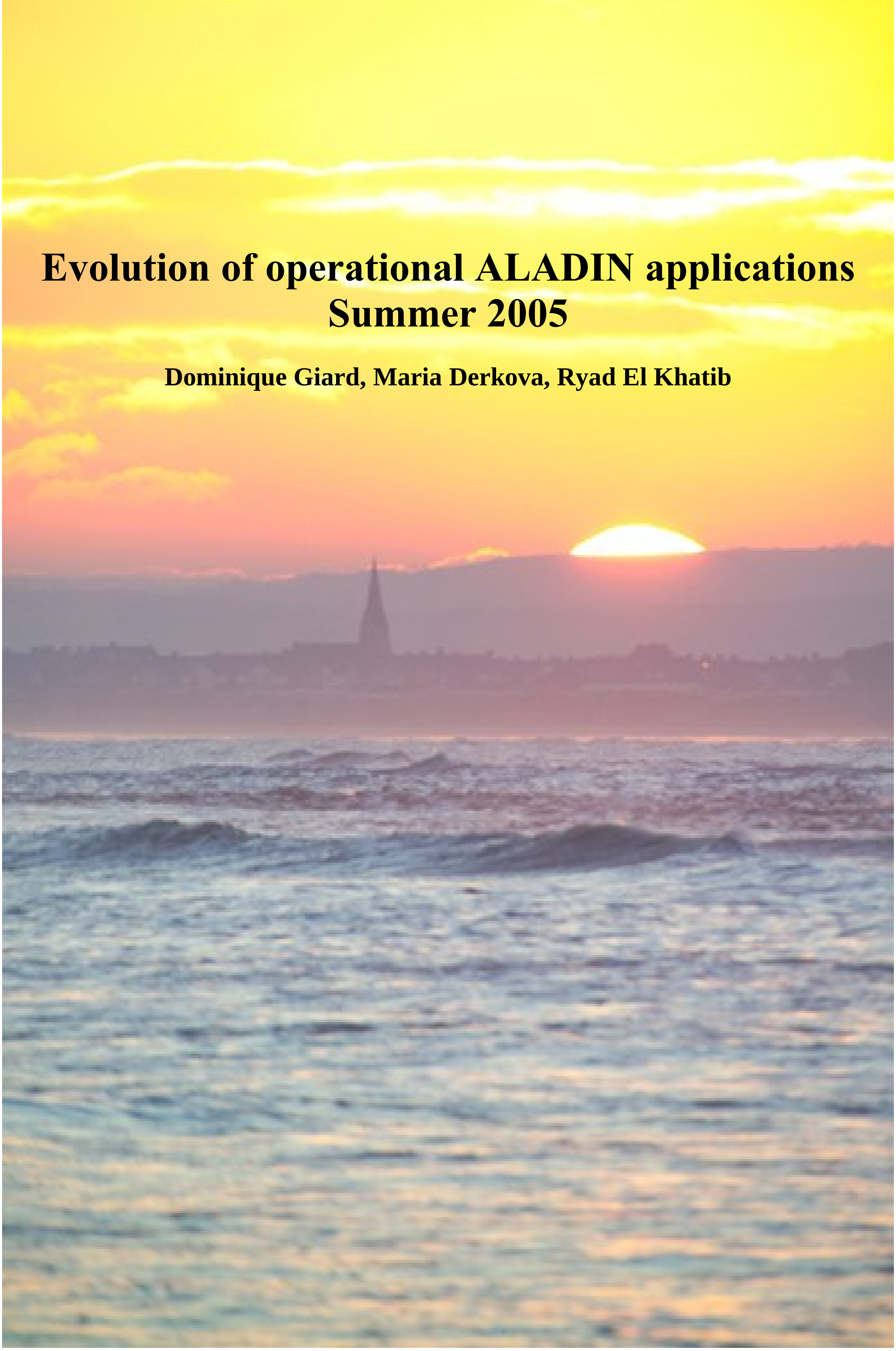


1. <u>Scheduled changes in climate and coupling files</u>

1.1 New climate files

According to several mails and as presented at the 15th ALADIN workshop, a major coordinated update of climate files and "telecom" files is scheduled for the beginning of the autumn (end of October ?).

ALADIN climate files must be anyway recomputed because the climatological snow cover was not computed consistently in e923 and c923 till the most recent version, leading to spurious snow melting in E927. Furthermore, a few ones are very very old, with still anything in the extension zone, and some partners anyway already scheduled domain changes.

Besides, new databases have been used in the ARPEGE parallel suite launched on June 30th, and expected to move to operations at the end of October : finer GTOPT030 data for the definition of orography, new, finer and more sensible, databases for climatological/ relaxation surface fields. The same must be done for ALADIN models, in order to avoid initialization problems : the distance to climatology is usually interpolated in configuration 927 for surface fields.

New scripts for configuration 923 are now available, thanks to Francoise Taillefer, and some more documentation has been sent. Most of the work can be performed by the Toulouse team, provided partners do send the required information.

1.2 New "telecom" files

The additional proposed changes in "telecom"/coupling files are the following (answers are also needed):

1. change or not in vertical resolution? which vertical grid?
   ARPEGE will switch to 46 levels in October; if nothing is done, the same 46 levels will be used for telecom files.

2. keeping or not "constant" fields in telecom files ?
   Most of them are not used at all, since read in model clim files by EE927. The required modset should be soon ready. It will allow sending 22 less 2d gridpoint fields. This will also prepare the move to SURFEX.

3. which new fields in telecom and coupling files ?
   warning index *(1 diagnostic 2d spectral field)* ?
   new snow scheme *(2 constant, 2 prognostic and 1 diagnostic 2d gridpoint fields)* ?
   ozone and aerosols *(7 constant 2d gridpoint fields)* ?
   Lopez' micro-physics *(3 prognostic and 1 diagnostic 3d gridpoint fields)* ?

1.3 Contact points : Dominique Giard and Maria Derkova

2. <u>Operational applications</u>

2.1 Notes

"hrda" stands for high-resolution dynamical adaptation hereafter; the frequency along each forecast is mentioned instead of the number of runs per day. Lagged coupling is used only for ALADIN-NORAF and ALADIN-BG. Plans are detailed in national reports, when available.

2.2 Table

Partners	Models	Coupling	Applications	per day	Details	Libraries	Computer
Austria	*"Austria"*	ARPEGE every 3 h	DFI + 48 h forecasts	2	Δt = 415 s post-processing every 1 h	25T2	SGI
Belgium	*"large"*	*"France"*+ARP every 3 h	DFI + 60 h forecasts	2	Δt = 300 s post-processing every 1 h	28T3	SGI
Bulgaria	*"BG"*	ARPEGE every 6 h	DFI + 48 h forecasts	2	Δt = 514 s post-processing every 3 h	25T1 (28T3) (29T2)	Linux PC
Croatia	*"LACE"*	ARPEGE every 3 h	DFI + 48 h forecasts	2	Δt = 514 s post-processing every 3 h		
	"Croatia"	*"LACE"* every 3 h	48 h forecasts	2	Δt = 327 s post-processing every 3 h	25T1 (28T3)	SGI
	7 domains	*"Croatia"*	hrda for wind	3 h	Δt = 60 s		
Czech R.	*"CE"*	ARPEGE every 3 h	DFI spectral + surface blending IDFI + 54/24 h forecasts diagnostic analyses	4 2 2+2 24	Δt = 360 s post-processing every 1 h	28T3	NEC
	"MFSTEP"	" "	spectral+surface blending DFI + 120 h forecasts	4 1/week	Δt = 400 s post-processing every 1 h		
France	*"France"*	ARPEGE every 3 h	3d-var assimilation DFI + 36-54 h forecasts diagnostic analyses	4 4	Δt = 415 s post-processing every 1 h	29T1 (29T2)	Fujitsu
Hungary	*"HU"*	ARPEGE every 3 h	3d-var assimilation DFI + 48 h forecasts diagnostic analyses	4 2	Δt =300 s post-processing every 1 h	28T3	IBM
	1 domain	*"HU"*	hrda for wind	2	Δt = 60 s		
Morocco	*"NORAF"*	ARPEGE every 6 h	DFI + 72 h forecasts	2	Δt = 900 s post-processing every 6 h	25T1 (28T3)	IBM
	"Maroc"	*"NORAF"* every 3 h	DFI + 72 h forecasts	2	Δt = 675 s post-processing every 3 h		
Poland		ARPEGE every 6 h	DFI + 48 h forecasts	2	Δt = s post-processing every 3 h	15	SGI
	1 domain	*"Poland"*	hrda for wind		Δt = s		
Portugal		ARPEGE every 6 h	DFI + 48 h forecasts	2	Δt =600 s post-processing every 1 h	12	DEC
Romania	*"SELAM"*	ARPEGE every 6 h	DFI + 60 h forecasts	2	Δt =900 s post-processing every 6 h		
	"Romania"	ARPEGE every 6 h	DFI + 48 h forecasts	2	Δt =450 s post-processing every 3 h	28T3	SUN
	2 domains	*"Romania"*	hrda for wind	2	Δt = 60 s		
Slovakia	*"SHMU"*	ARPEGE every 3h	DFI + 54 h forecasts	3	Δt=400 s post-processing every 1h	28T3	IBM
	1 domain	*"SHMU"*	hrda for wind	3 h	Δt =120 s		
Slovenia	*"SI"*	ARPEGE every 3h	DFI + 54 h forecasts	2	Δt=400 s post-processing every 1 h	25T1	Linux cluster
	1 domain	*"SI"*	hrda for wind+precipit.	3 h	Δt = 60 s		
Tunisia		ARPEGE every 3h	DFI + 48 h forecasts	2	Δt =568 s post-processing every 3 h	26T1 (28T3)	IBM

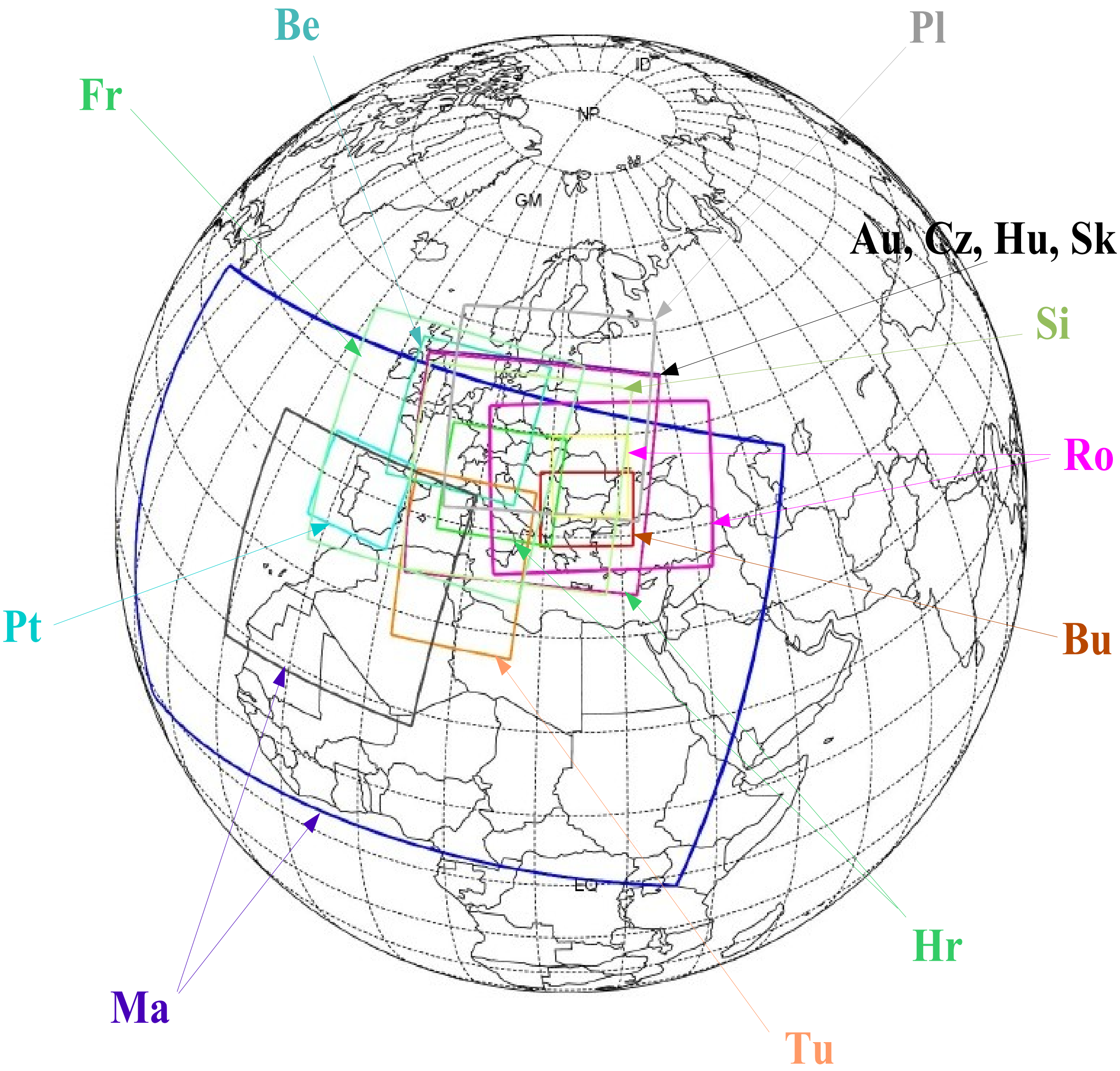
3. Main model characteristics

3.1 Warning

Horizontal characteristics are in latitude $\times$ longitude (or $y \times x$) ordering here.

For telecom domains, all grids (or truncations) are quadratic ones.
When changes are scheduled, the new domains are described in *italics*.
LACE : Au, Cz, Hr, Hu, Si, Sk
SELAM : Bu, Ro

3.2 Main forecast domains



Partner	L	Δx (km)	Number of gridpoints	Centre of domain	spectral trunc.	Grid type
Austria	45	9.64	259;289 (270;300)	46.26°N;17.00°E	89; 99	quadratic
Belgium	41	6.97	229;229 (240;240)	50.21°N; 5.62°E	79; 79	quadratic
Bulgaria	41	12.00	69; 91 (80;108)	42.75°N;25.50°E	39; 53	linear
Croatia	37	12.18	205;229 (216;240)	46.24°N;17.00°E	71; 79	quadratic
	37	8.00	149;169 (160;180)	44.60°N;13.00°E	53; 59	quadratic
	37	*8.00*	*205;229 (216;240)*	*46.00°N;15.00°E*	*71; 79*	*quadratic*
Czech R.	43	9.00	277;309 (288;320)	46.24°N;17.00°E	143;159	linear
	37	9.53	189;245 (200;256)	38.77°N; 9.00°E	99;127	linear
France	41	9.51	289;289 (300;300)	46.47°N; 2.58°E	149;149	linear
Hungary	49	7.96	309;349 (320;360)	46.10°N;17.00°E	159;179	linear
Morocco	37	31.14	189;289 (200;300)	29.00°N; 0.00°E	66; 99	quadratic
	37	16.70	169;169 (180;180)	31.56°N;-7.00°E	59; 59	quadratic
Poland	31	13.5	169;169 (180;180)	52.50°N;19.00°E	59; 59	quadratic
Portugal	31	12.7	89; 79 (100; 90)	40.10°N;-7.00°E	33; 29	quadratic
Romania	41	24.03	79;109 (90;120)	45.01°N;27.75°E	29; 39	quadratic
	41	10.00	89; 89 (100;100)	46.0°N,26.0°E	33; 33	quadratic
Slovakia	37	9.00	277;309 (288;320)	46.24°N;17.00°E	95;106	quadratic
Slovenia	37	9.50	244;258 (256;270)	45.44°N;14.86°E	84; 89	quadratic
Tunisia	41	12.50	151;117 (162;128)	36.06°N; 9.36°E	80; 63	quadratic

3.3 Telecom domains

Name	L	Δx (km)	Number of gridpoints C+I (C+I+E)	Centre of the domain	Spectral truncation	Extension (km)
Belgique	41	9.49	181;181 (192;192)	50.76°N; 3.90°E	63;63	1718;1718
LACE	37	20.68	124;139 (135;150)	46.24°N;17.00°E	44;49	2564;2874
MFSTEP	37	28.96	109;205 (120;216)	41.95°N; 9.81°E	39;71	3157;5937
NORAF	41	42.23	149;229 (160;240)	29.50°N; 0.35°E	53;79	6292;9670
Pologne	31	21.44	109;109 (120;120)	52.50°N;19.00°E	39;39	2337;2337
Portugal	31	21.30	85; 85 (96; 96)	39.99°N;-9.05°E	31;31	1810;1810
SELAM	41	24.03	79;109 (90;120)	45.01°N;27.75°E	29;39	1898;2619
Tunisie	41	24.00	97; 97 (108;108)	36.18°N; 6.00°E	35;35	2328;2328
MFSTEP	*37*	*23.97*	*85;109 (96;120)*	*38.77°N; 9.00°E*	*31;39*	*2037;2612*

3.4 Post-processing domains

Partner	Grid type	Resolution (° / km)	Size	Centre	Note
Austria	latlon	0.072;0.110	243;273	46.70°N;17.20°E	without clim
	model grid	*see above*	-	-	
Belgium	latlon	0.117;0.165	115;115	50.60°N; 3.90°E	big domain
	"	0.060;0.091	97; 97	50.53°N; 4.53°E	small domain
	"	0.122;0.184	48; 48	"	"
	"	0.244;0.368	25; 25	"	"
Bulgaria	latlon	0.100;0.100	70;121	42.65°N;25.50°E	
Croatia	latlon	0.080;0.120	126;126	44.60°N;13.00°E	without clim
Czech R.	latlon	0.100;0.167	91; 91	49.50°N;15.50°E	CE
	latlon	0.100;0.167	116;175	49.75°N;15.50°E	"
	Lambert	25.00 km	65; 75	49.00°N;15.00°E	"
	latlon	0.100;0.100	151;241	38.50°N; 9.00°E	MFSTEP
France	latlon	0.100;0.100	221;281	46.00°N; 3.00°E	
Hungary	latlon	0.100;0.100	191;291	46.50°N;16.50°E	
Morocco	latlon	0.217;0.244	189;289	24.31°N; 0.00°E	without clim
	latlon	0.142;0.153	169;169	31.09°N;-7.00°E	
Poland	model grid	*see above*			
	Lambert	10.13 km	120;120	52.50°N;19.00°E	
	latlon	0.094;0.149	180;180	52.50°N;19.00°E	
Portugal	latlon	0.110;0.135	89;79	39.95°N;-6.95°E	
Romania	latlon	0.125;0.100	78;86	45.95°N;26.01°E	without clim
	model grid	*see above*			
Slovakia	model grid	*see above*	-	-	
Slovenia	latlon	0.085;0.120	211;217	45.00°N;15.00°E	without clim
	model grid	*see above*	-	-	
Tunisia	model grid	*see above*			

3.5 Post-processing on a new grid : with or without "clim" files ?

During the horizontal interpolations the usage of auxiliary climatology datasets improves the accuracy of the resulting upperair fields (when interpolated on surface-dependent levels, like height or model levels), and of many surface fields.

The minimal option (NFPCLI=1) is to provide a climatology file on the geometry of the post-processing files, containing the orography and the land-sea mask. Then this orography will be taken into account to compute more precisely the post-processed surface pressure. Consequently the upperair fields on height and model levels, when close to the surface, will be more accurate. The land-sea mask is used to compute the weights used for the interpolation of physical surface fields (for a given post-processing point, only the neighbouring point on the model grid which are of the same nature - land or sea - are used for interpolation). When the climatology land-sea mask is not provided, the program has to create the post-processing land-sea mask by interpolating the model land-sea mask.

More complete option (NFPCLI=3) is recommended to improve as well the interpolation of most physical surface fields : in that case all, instead of a straightforward interpolation of the model fields, post-processed "climatology constants" (like albedo, emissivity ...) are copied from the climatology file ; "pseudo-historical" variables (like roughness length) are copied as well from the climatology file. Prognostic fields (like surface temperature, water contents, snow depth) are interpolated considering there departure from the climatology.

To do all that, it is then necessary to provide monthly climatology datasets of both the post-processing domain and the model one.

Note that computation of post-processed PBL fields would benefit from the improved computation of surface temperature, water contents, etc.

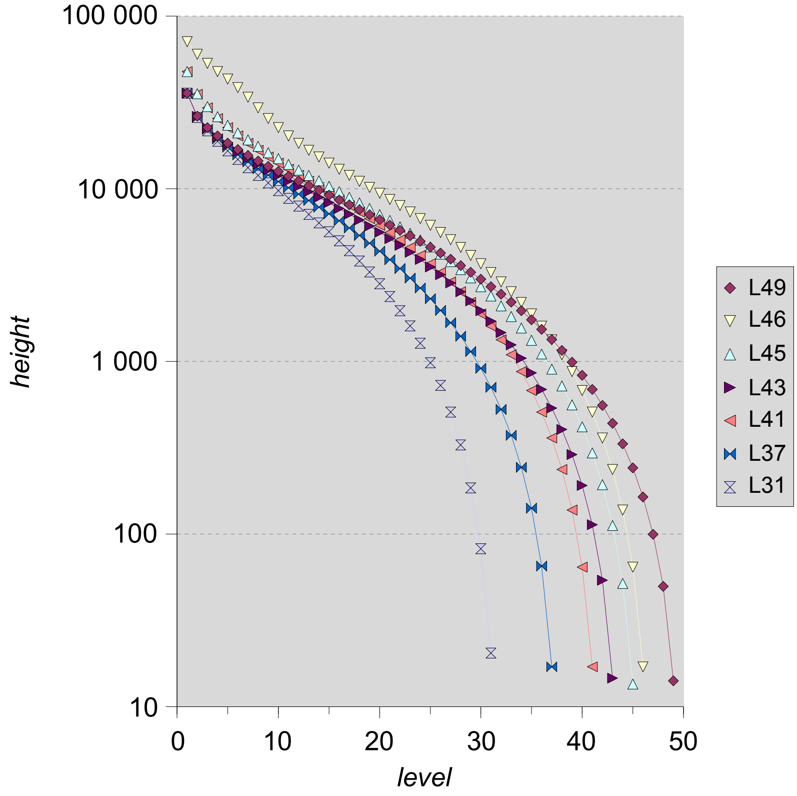
3.6 Other local domains

Partner	Application	Name	Gridpoint resolution	Number of gridpoints	Centre of domain	Trunc.
Belgium	research	small lin.	6.97 km	97;97 (108;108)	50.47°N; 4.86°E	53;53
	"	small quad.	"	"	"	35;35
Croatia	HR dyn. adapt.	Senj	2.00 km	72;72 (80;80)	45.10°N,14.20°E	26;26
	"	Maslenica	"	"	44.20°N;15.50°E	"
	"	Split	"	"	43.30°N;16.70°E	"
	"	Dubrovnik	"	"	42.70°N;18.00°E	"
	"	Karlovac	"	"	45.40°N;15.70°E	"
	"	Osijek	"	"	45.50°N;18.90°E	"
	"	Dart	"	97;72 (108;80)	41.75°N;16.00°E	35;26
Czech R.	blending	CE	9.00 km	277;309 (288;320)	46.24°N;17.00°E	42;47
	"	MFSTEP	9.53 km	189;245 (200;256)	38.77°N; 9.00°E	22;28
Hungary	parallel suite		12.18 km	205;229 (216;240)	46.24°N;17.00°E	71;79
	HR dyn. adapt.	DADA	2.37 km	169;239 (180;250)	47.35°N;19.12°E	59;83
	DADA post-p.		0.021°	161;337	47.27°N;19.50°E	
Poland	HR dyn. adapt.		2.78 km	169;169 (180;180)	50.00°N;20.00°E	59;59
Romania	HR dyn. adapt.	MARE	2.50 km	89;109 (120;100)	44.70°N;29.50°E	39;33
	"	VALE	"	89; 89 (100;100)	45.50°N;25.00°E	33;33
Slovakia	HR dyn. adapt.	sk25	2.50 km	189;289 (200;300)	48.70°N;19.70°E	66;99
Slovenia	HR dyn. adapt.	SIDA	2.50 km	108;148 (120;160)	45.80°N;14.50°E	39;49

4. Vertical discretization

Six different vertical grids are used in operations and another one (L46) is under test for ALADIN-France. The repartition of vertical levels with height for a standard atmosphere is described the figure hereafter.

The lowest level lies between 14 m (L45, 49) and 20 m (L31), while the highest one is between 13.6 hPa (L31, 37, 43, 49) and 0.1 hPa (L46).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