Common Plot Reports 2016-2017

Common Plots for COSMO year 2015-2016

season JJA 2015 up to MAM 2016

Continuous line plots

	MSLP	TCC	TEMP	TD	WS
JJA	see	see	see	see	see
SON	see	see	see	see	see
DJF	see	see	see	see	see
MAM	see	see	see	see	see

Precipitation performance diagrams 6h

	0.2		2		5		10	
	day-1	day-2	day-1	day-2	day-1	day-2	day-1	day-2
JJA	see	see	see	see	see	see	see	see
SON	see	see	see	see	see	see	see	see
DJF	see	see	see	see	see	see	see	see
MAM	see	see	see	see	see	see	see	see

Precipitation performance diagrams 24h

	0.2	2	5	10
JJA	see	see	see	see
SON	see	see	see	see
DJF	see	see	see	see
MAM	see	see	see	see

Conditional plots

Note: T (SM>=4), T (SM<2) Temperature with Soil Moisture >=4 or <2 WS(Z0 <0.1) WS(>1) Wind Speed with Roughness Length <0.1 or >1m

	T (SM>=4)	T (SM<2)	WS (Z_0<0.1)	WS (Z_0>1)
JJA	see	see	see	see

Local domain HR line plots

	MSLP	TCC	TEMP	TD	WS	PRECI 6h	PRECI 24h
JJA	see	see	see	see	see	see	see
SON	see	see	see	see	see	see	see
DJF	see	see	see	see	see	see	see
MAM	see	see	see	see	see	see	see

Conditional Soil Type Plots for T and Td

		SOIL 4	5	5< 200m	5> 800m	6	7	8
SON	T	see	see	see	see	see	see	see
	Td	see	see	see	see	see	see	see
DJF	T	see	see	see	see	see	see	see
	Td	see	see	see	see	see	see	see
MAM	T	see	see	see	see	see	see	see
	Td	see	see	see	see	see	see	see

Common soil conditional scores comparison

Note: images show conditional scores for all soil types for each model

		MODEL C-7	C-EU	C-PL	C-RU	C-GR	C-ME	C-I7	ICON-EU	ICON
SON	T	see	see	see	see	see	see	see	see	N/A
	TD	see	see	see	see	see	see	see	see	N/A
DJF	T	see	see	see	see	see	see	see	see	see
	TD	see	see	see	see	see	see	see	see	see
MAM	T	see	see	see	see	see	see	see	see	see
	TD	see	see	see	see	see	see	see	see	see

Common area scores comparison

Note: images show the differences from last year (2014/2015) for each model

	MODEL C-7	C-EU	C-PL	C-RU	C-GR	C-ME	C-I7	IFS
JJA	see	see	see	see	N/A	see	see	see

Task description

Score Production (4.2)

Preparation of input data and calculation of seasonal statistics over a common area according to the guidelines derived on an annual basis from WG5 (http://www.cosmo-model.org/content/tasks /verification.priv/common/guidelines.pdf) for each participating model. This Task includes conditional verification tests performed over this area. IFS and ICON driving model statistics have also been added.

Seasons: JJA 2014, SON 2014, DJF 2015, MAM 2015

Reporting (4.1)

Processing of data from all models for each parameter and conditional verification test in appropriate format

R scripting for production of graphs (cross model representation)

Preparation of final annual report

Commenting of significant errors or discrepancies between models

Preparation of web graphics based on DWD representation regime

Long term trend calculations

Contributions: 2015-2016

Common Plot Activity

0.2	Reporting					description	status
FTEs	Name	qrt1	qrt2	qrt3	qrt4		
0.2	Boukouvala	0.03	0.07	0.03	0.07		

0.35	Score Production					description	status
FTEs	Name	qrt1	qrt2	qrt3	qrt4		
0.05	Pflüger	0.013	0.013	0.013	0.011		
0.05	Lapillonne	0.013	0.013	0.013	0.011		
0.05	Vocino	0.013	0.013	0.013	0.011		
0.05	Tesini	0.013	0.013	0.013	0.011		
0.05	Gofa	0.013	0.013	0.013	0.011		
0.05	Linkowska	0.013	0.013	0.013	0.011		
0	Dumitrache	0	0	0.013	0.011		
0.05	Kirsanov	0.013	0.013	0.013	0.011		

4.1 Reporting

0.2 FTEs for report preparation

- D. Boucouvala, HNMS:
  graphics preparation, report writing
  Web page feeding

4.2 Score Production

0.05 FTEs per participating service/model
+0.05FTEs for ICON global
+ECMWF/IFS

Issues to be considered

- **Purpose of CP statistics** and reports; Current use
- Main focus of operational verification in each service with respect to the CP
- Maintain VERSUS as common software for the score preparation (?)
- Apply other more suitable scores or methods in CP activity (spatial, upper air, ECMWF headline scores)
- Currently only 00UTC run is tested. Add more?
- ***Conditional verification***: Can this be transferred to individual testing; Definition of a PT with WG3 support (?)
- Communication of CP-derived information to COSMO management and other WGs (Conditional Verification). Perform several individual CV tests and organize meeting with WG3 to be presented and discussed

Conditional Verification tests included in CP activity since 2011

- All weather parameters for stratifications based on station height
- 2mT with respect to cloudiness
- 2mT verification with respect to Soil water content
- Wind Speed verification with respect to Roughness length
- 2mT, Wind speed and MSLP verification with respect to subgrid scale orography variance (SSO_STDH) – LTKESSO activated or not
- 2mT, DewP, WindSp with respect to soil type (5 dominant in CA) for wet and dry conditions

Reports were prepared and disseminated to WG3 coordinators and results were presented in annual GM

Statistical scores

- **Currently:**

- Continuous parameters **over all stations** - T2m, Td, Wspeed, MSLP, TCC

Scores: ME, RMSE. Forecast Step: every 3 hours

- Dichotomic parameters **over all stations –** Precipitation

Scores: FBI, ETS, Performance Diagrams, Accumulation: 6h and 24h

- Motivation for high resolution NWP ito predict extreme values associated with dangerous weather. Extremal dependence scores that reward hits and penalize misses and false alarms and also behave much more consistently with the forecast performance measured for less rare events (EDI or SEDI). Strong advantage of being able to better distinguish the performance of models for rare binary events

Easily can be added to VERSUS

- Possibility to add some ECMWF headline scores

Upper air: ACC of the 500hPa geopotential, EPS: CRPS of 850hPa for temperature

Surface: SEEPS for precipitation (SYNOP), EPS: CRPS for precipitation (SYNOP), ROC skill score for EFI 10m wind speed (SYNOP)

Other non-headline but regularly reported: 2mT, 2m humidity, 20m windsp/dir, TCC and Precipitation, with scores: ME, RMSE, SDEV (continuous), SEEPS CRPSS, BSS, ETS, FBI for preci

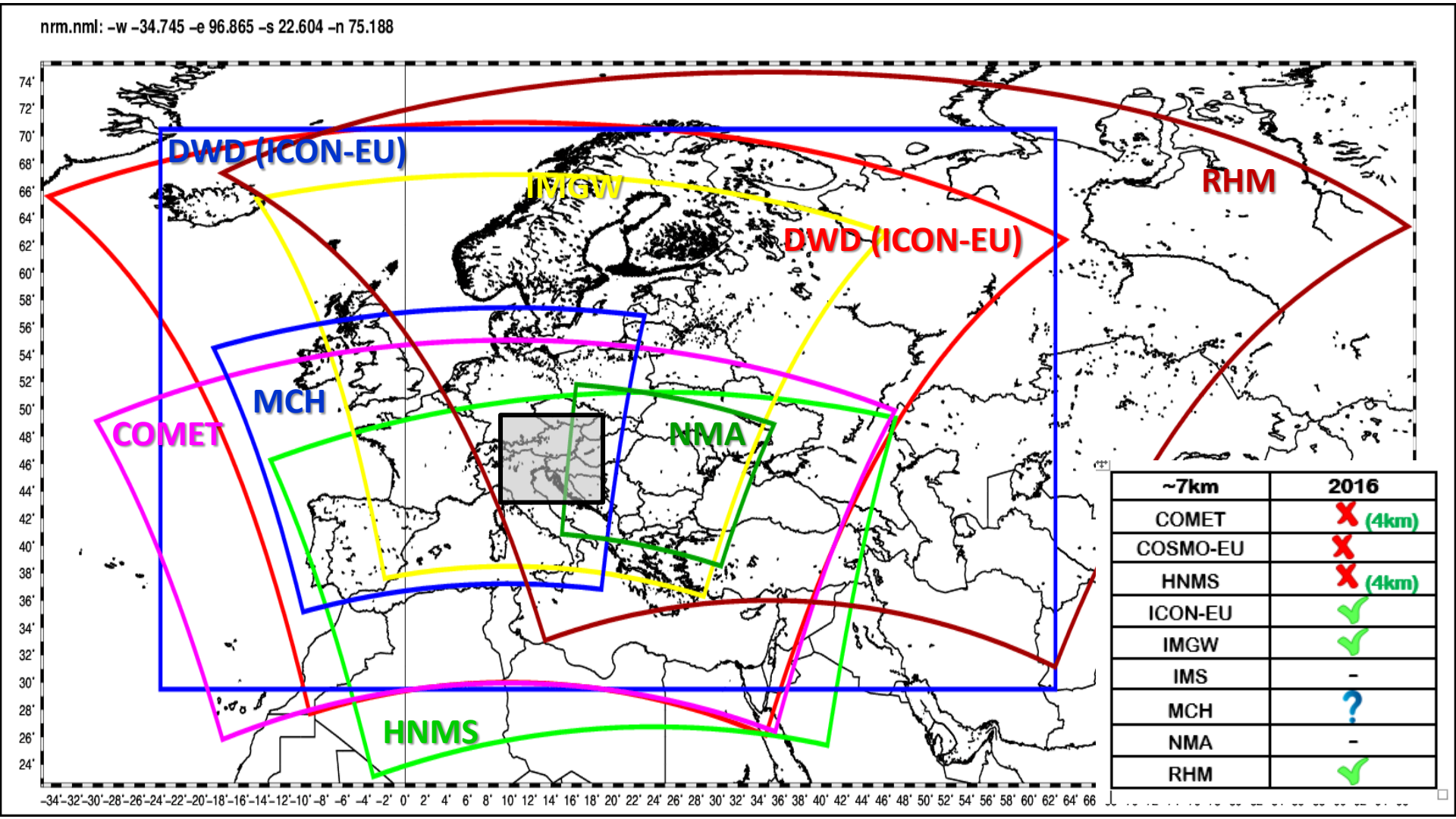
- Confidence intervals: Uncertainty in verification arises from many sources for both obs and fct while approaches generally take into account the effects of temporal correlation. Can we add CI for each participating model stats for continuous parameters?

Feedback from questionnaire

model	dlon,dlat	A (startlat)	B (startlon)	C (endlat)	D (endlon)	ie_tot	je_tot	ke_tot	ie_tot X dlon	je_tot X dlat	polelat	polelon	IC/BC	DA	cycles	fct range	Mmbs	Remarks
COSMO-PL14	0.125	-16.5	-10	3.5	10	193	161	35	24	20	32.5	-170	ICON	No	00,06,12,18UTC	78		
COSMO-RU	0.12	-30	-60	29.88	-0.12	1000	500	40	119.88	59.88	25	-90	ICON	Nudging	00,06,12UTC	99		
COSMO-PL7	0.0625	-19	-10	9.6875	18.6875	415	460	40	25.875	28.6875	32.5	-170	ICON	Nudging	00,06,12,18UTC	78		
COSMO-RU7	0.0625	-19	-19	19.6875	19.6875	700	620	40	43.6875	38.6875	35	-145	ICON	Nudging	00,06,12,18UTC	78		
COSMO-RO7	0.0625	-16.5	4	-5.5	15	201	177	40	12.5	11	32.5	-170	ICON	Nudging		78		
COSMO-EU	0.0625	-20	-18	21	23	665	657	40	41.5	41	40	-170	ICON	Nudging	00UTC /3h	78/30h		END 10/2016
ICON-EU	0.0625	29.5	-23.5	70.5	17.5	1377	657	60	41.5	41	-90	0 (geo/cal)	VAE-	ICON-EDA	00UTC /3h	120/30h		
COSMO-ME	0.0625	-13	-25.25	12	23.375	779	401	40	48.625	25	47	-170	LETKF (IC) -	LETKF	00,06,12,18UTC	72		end soon
COSMO-GR7	0.0625	-11.25	-25.25	13.25	-0.75	649	393	60	40.5	24.5	52	-156	IFS	NO	00-12UTC	72		END 09/2016
COSMO-7	0.06	-9.78	-16.32	10.44	3.9	393	338	60	23.52	20.22	43	-170	IFS	Nudging	00,06,12UTC	72		
COSMO-ME	0.045	-13.05	-25.29	12.06	23.4	1083	559	45	48.69	25.11	47	-170	LETKF (IC) -	LETKF	00,06,12,18UTC	72		operational soon
COSMO-GR4	0.04	-11	-25	13	15	1001	601	80	40	24	52	-156	IFS	NO	00-12UTC	72		
COSMO-PL2.8	0.025	-2.4	0.65	7.7	10.75	380	405	50	9.475	10.1	40	-170	COSMO-PL7	No	00,06,12,18UTC	36		
COSMO-IMS	0.025	26	25	36	35	561	401	60	14	10	90	-180	IFS	Nudging,LH	00,06,12,18UTC	54/36		
COSMO-RO3	0.025	-6.5	6	0.75	13.25	361	291	50	9	7.25	40	-170	COSMO-RO7	Nudging		30		
COSMO-DE	0.025	-5	-5	6.5	6.5	421	461	50	10.5	11.5	40	-170	Nudging/ICON-EU, 2017:KENDA-	2016:Nudging 2017:LETKF	00UTC /3h	45/27h		
COSMO-IT	0.025	-8.525	-5	6.55	10.075	542	604	65	13.525	15.075	47	-170	COSMO-ME	Nudging	00,06,12,18UTC	30		
COSMO-RU	0.02	-4.5	-3	4.88	6.38	420	470	50	8.38	9.38	35	-145	COSMO	Nudging	00,06,12,18UTC	42		
COSMO-RU	0.02	-16	-1	-6.62	8.38	420	470	50	8.38	9.38	35	-145	COSMO	Nudging	00,06,12,18UTC	42		
COSMO-RU	0.02	-8	-26	0.98	-17.02	470	450	50	9.38	8.98	25	-90	COSMO	Nudging	00,06,12,18UTC	42		
COSMO-GR3	0.02	-4	-5	4	3	501	401	60	10	8	52	-156	COSMO-GR7	NO	00-12UTC	48		END 09/2016
COSMO-1	0.01	-4.4	-6.8	3.33	0.93	1158	774	80	11.57	7.73	43	-170	IFS	Nudging	00UTC /3h	33		
COSMO-RU	0.01	-8.4	-34.7	-6.51	-32.81	190	190	50	1.89	1.89	25	-90	COSMO	Nudging	00,06,12,18UTC	36		
COSMO-GR1	0.01	-4	-5	4	5	1001	801	80	10	8	52	-156	COSMO-GR7	NO	00-12UTC	48		
COSMO-ME-EPS	0.09	-14.04	-27.54	17.1	24.3	577	347	45	51.84	31.14	47	-170	LETKF (IC) - IFS perturbed with ECMWF-	LETKF	00,12UTC	72	40+1	
COSMO-DE-EPS	0.025	-5	-5	6.5	6.5	421	461	50	10.5	11.5	40	-170	2016:BCEPS perturb, 2017:KENDA, ICON-EPS	NO	00UTC /3h	45/27h	20	
COSMO-E	0.02	-4.42	-6.82	3.36	0.96	582	390	60	11.62	7.78	43	-170	IFS	LETKF	00-12UTC	120	21	
COSMO-PL2.8-LEPS	0.025	-2.4	0.65	7.7	10.75	380	405	50	9.475	10.1	40	-170	COSMO-PL7	No	00,06,12,18UTC	36	20	
	0.0625	-16.125	-15.75	9.75	10.125	511	415	40	31.875	25.875	40	-170	ECMWF-ENS	No	12h	132	**20**	
COSMO-IT-EPS	0.02	-7.7	-3.5	5.7	9.9	545	671	65	10.88	13.4	47	-170	COSMO-ME5	KENDA(20 mbs)	3h	48	**10**	

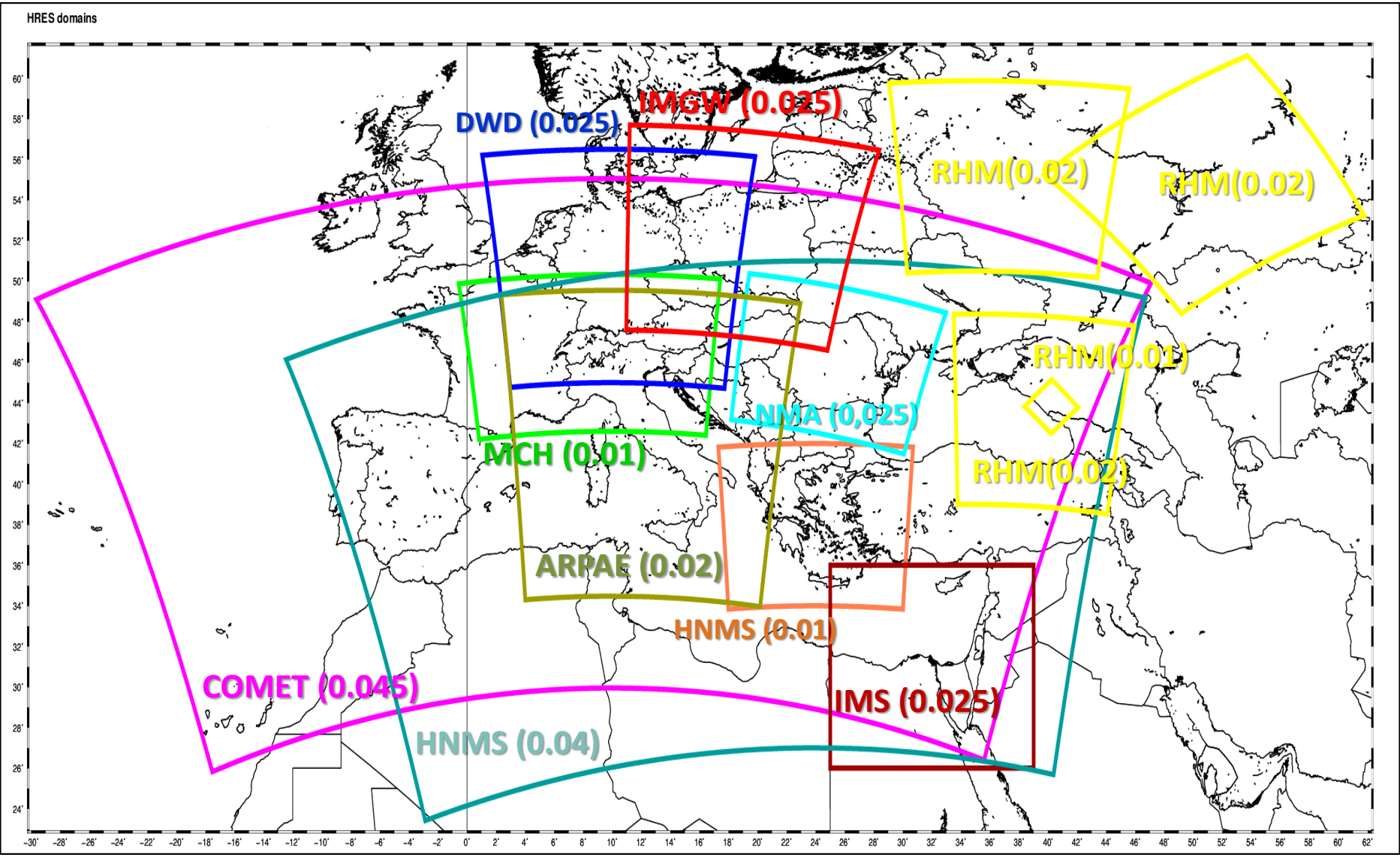
~7km **~1-4km** **EPS**

operational coarse (-7km) res models

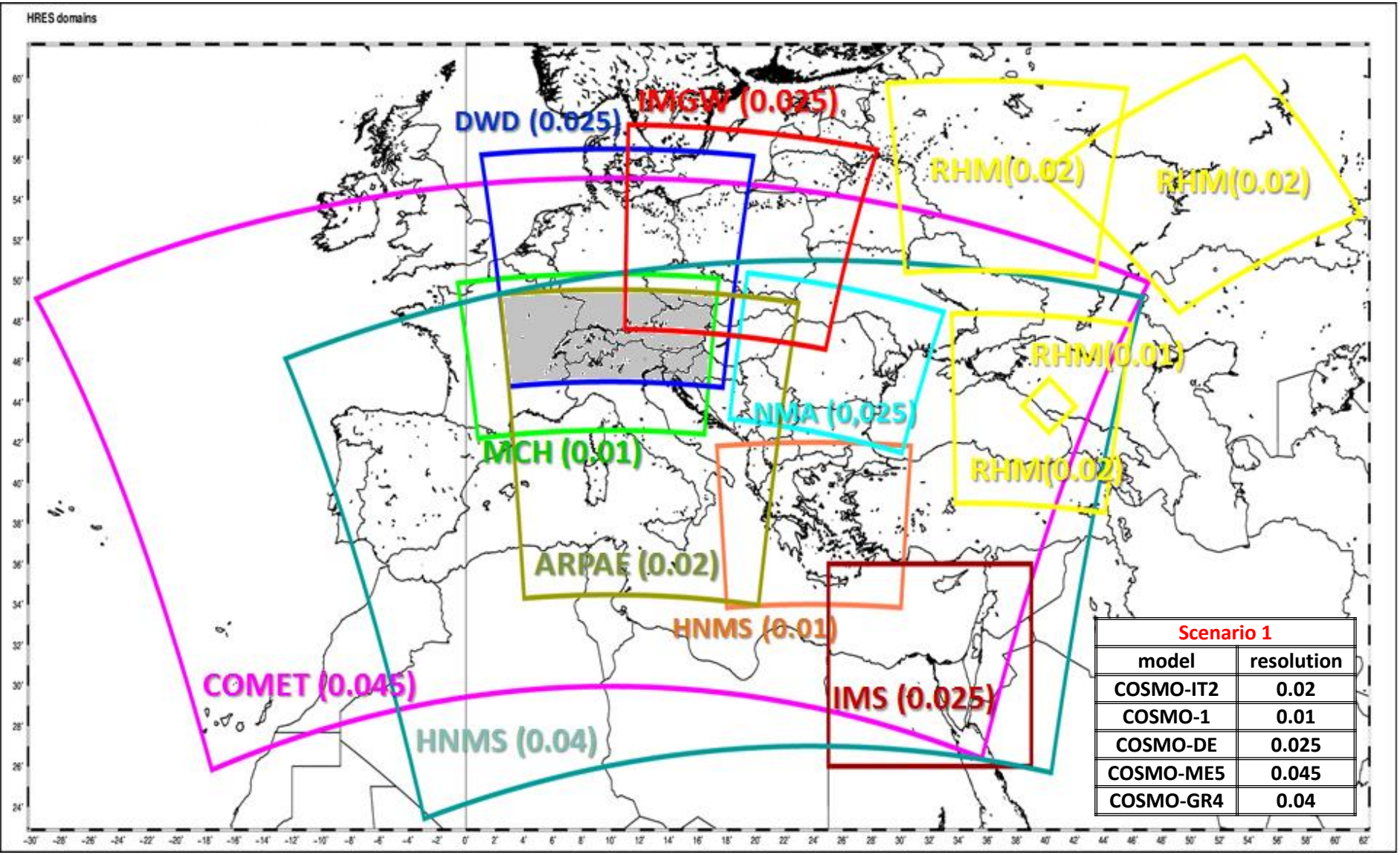


~7km	2016
COMET	✗ (4km)
COSMO-EU	✗
HNMS	✗ (4km)
ICON-EU	✓
IMGW	✓
IMS	-
MCH	?
NMA	-
RHM	✓

operational high res models (~1-4km)

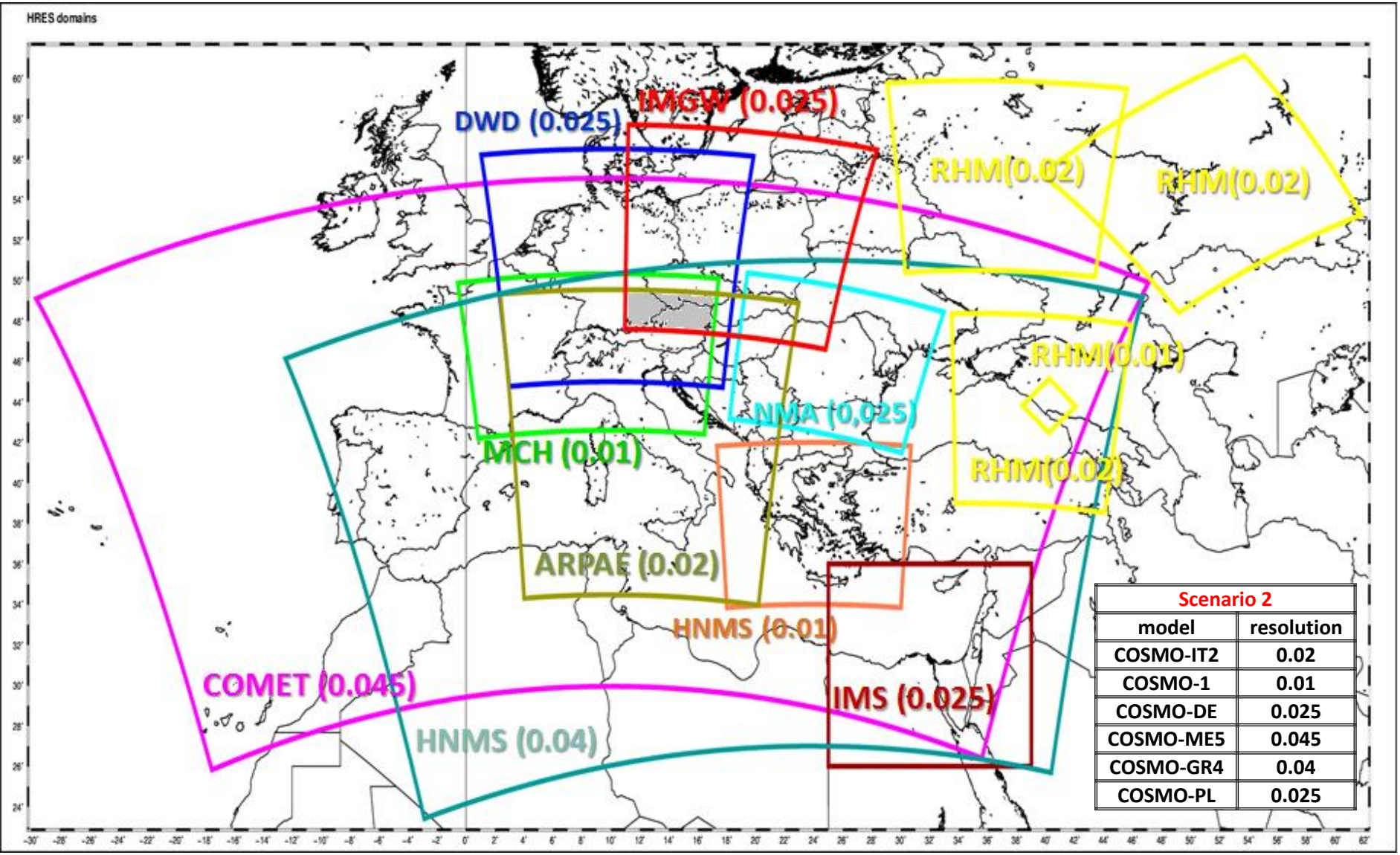


CP COSMO HRES scenario 1



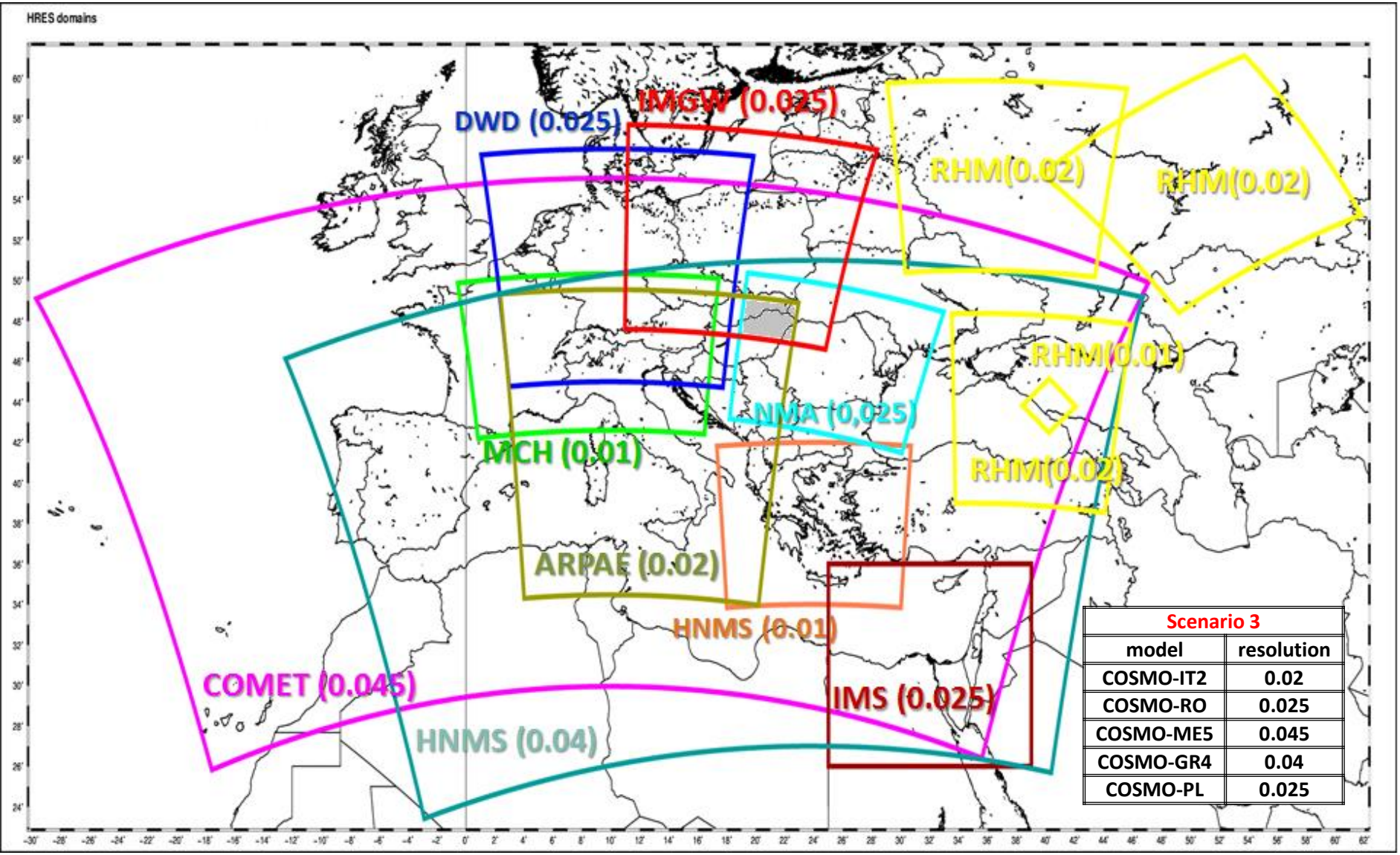
Scenario 1	
model	resolution
COSMO-IT2	0.02
COSMO-1	0.01
COSMO-DE	0.025
COSMO-ME5	0.045
COSMO-GR4	0.04

CP COSMO HRES scenario 2



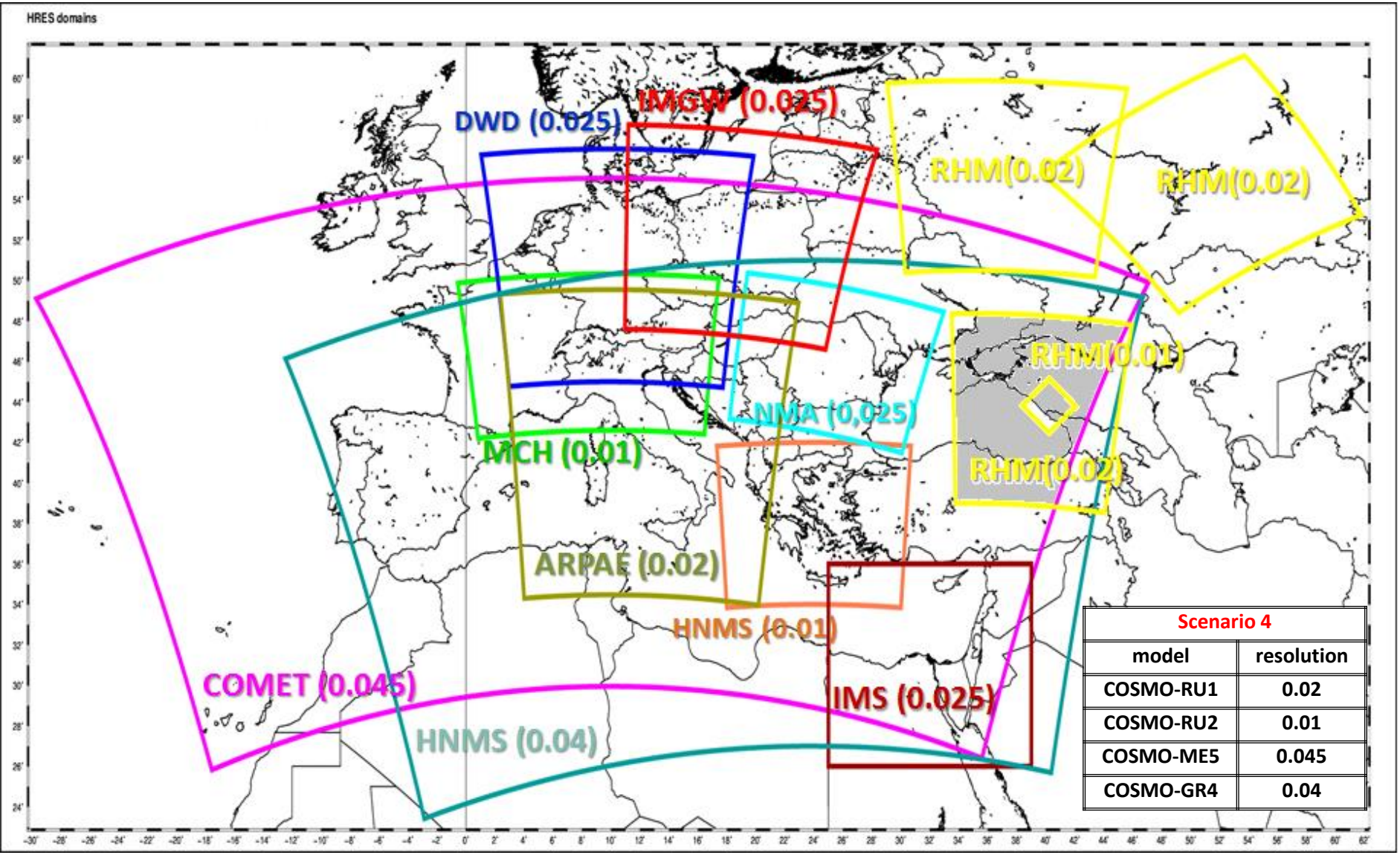
Scenario 2	
model	resolution
COSMO-IT2	0.02
COSMO-1	0.01
COSMO-DE	0.025
COSMO-ME5	0.045
COSMO-GR4	0.04
COSMO-PL	0.025

CP COSMO HRES scenario 3



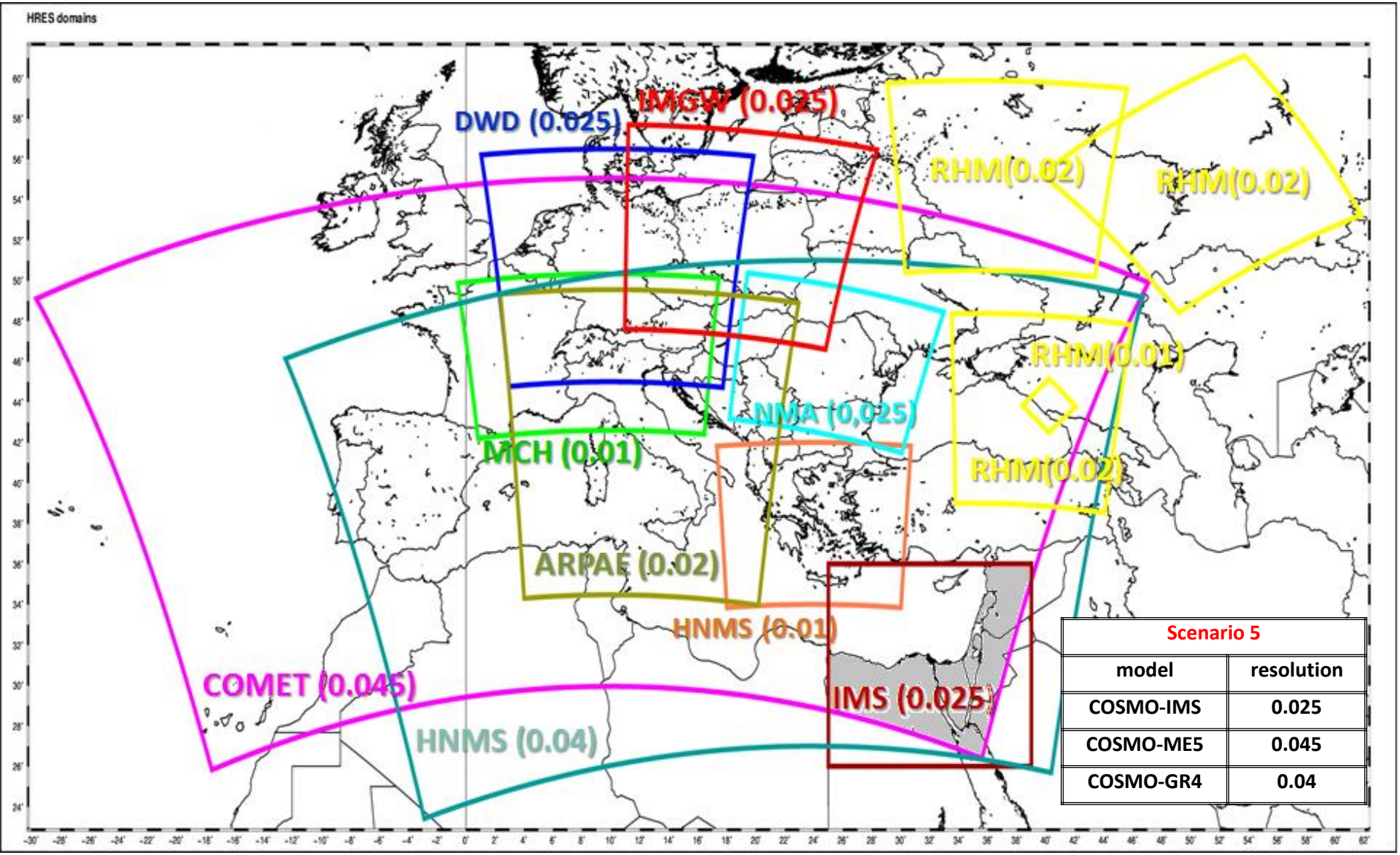
Scenario 3	
model	resolution
COSMO-IT2	0.02
COSMO-RO	0.025
COSMO-ME5	0.045
COSMO-GR4	0.04
COSMO-PL	0.025

CP COSMO HRES scenario 4



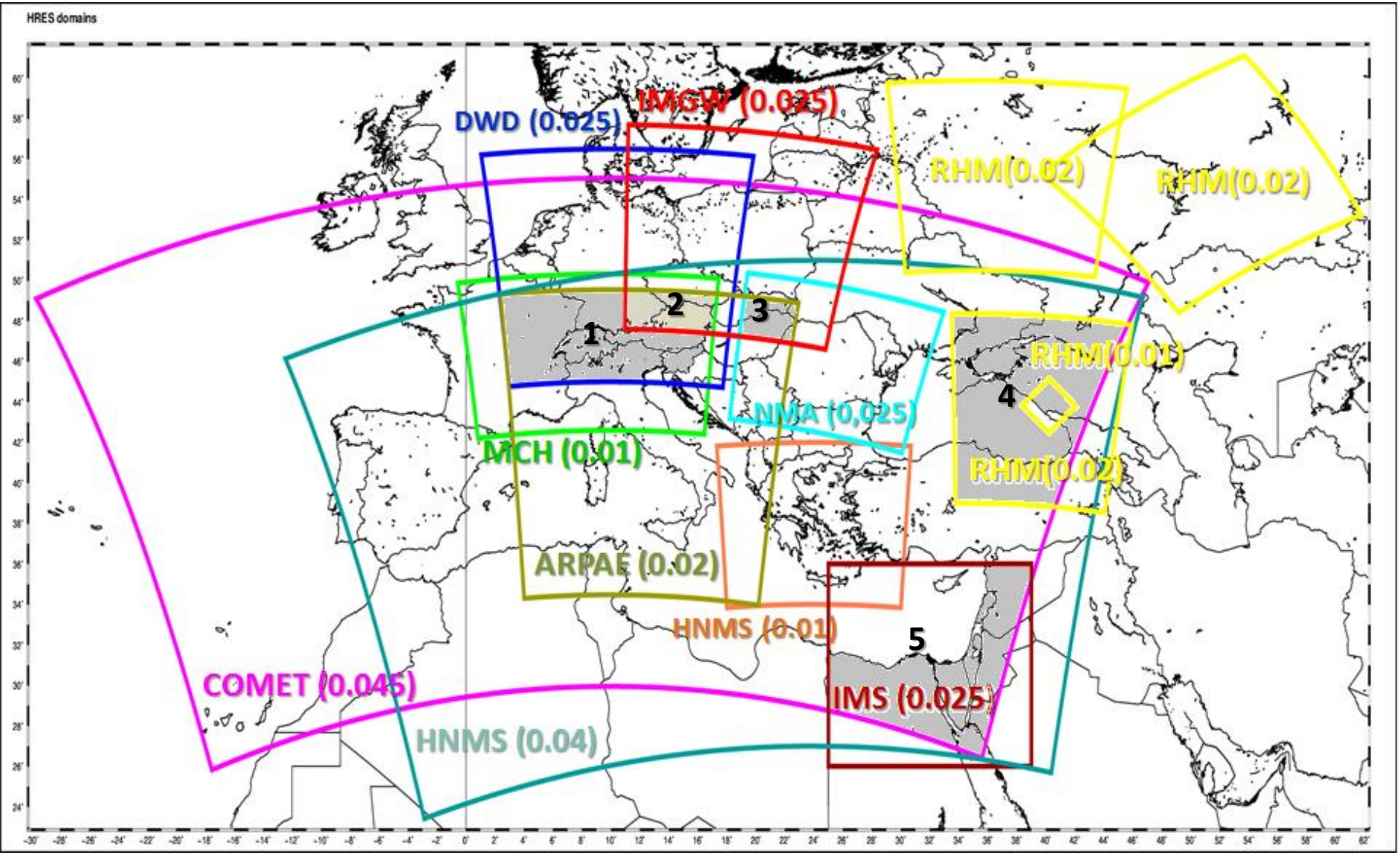
Scenario 4	
model	resolution
COSMO-RU1	0.02
COSMO-RU2	0.01
COSMO-ME5	0.045
COSMO-GR4	0.04

CP COSMO HRES scenario 5

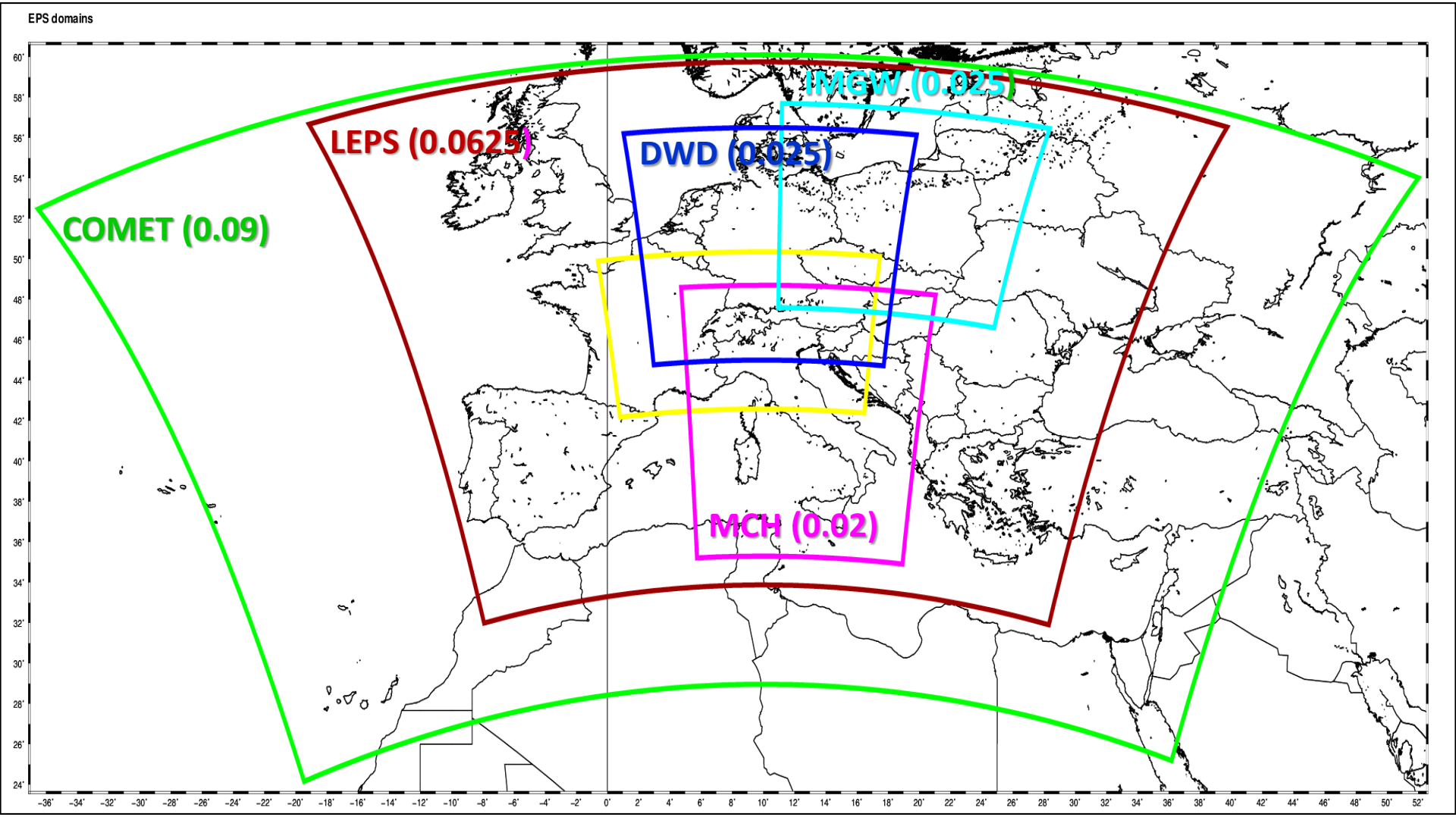


Scenario 5	
model	resolution
COSMO-IMS	0.025
COSMO-ME5	0.045
COSMO-GR4	0.04

CP COSMO HRES: all scenarios



operational COSMO EPS models



Decide on CP scenarios for 2016-2017

A. Keep present common coarse domain for an additional year either with fewer models and/or adding 4-5km (COMET,HNMS) to the list
Pros: keep long term trend
Cons: restrict participation and usability of the derived feedback

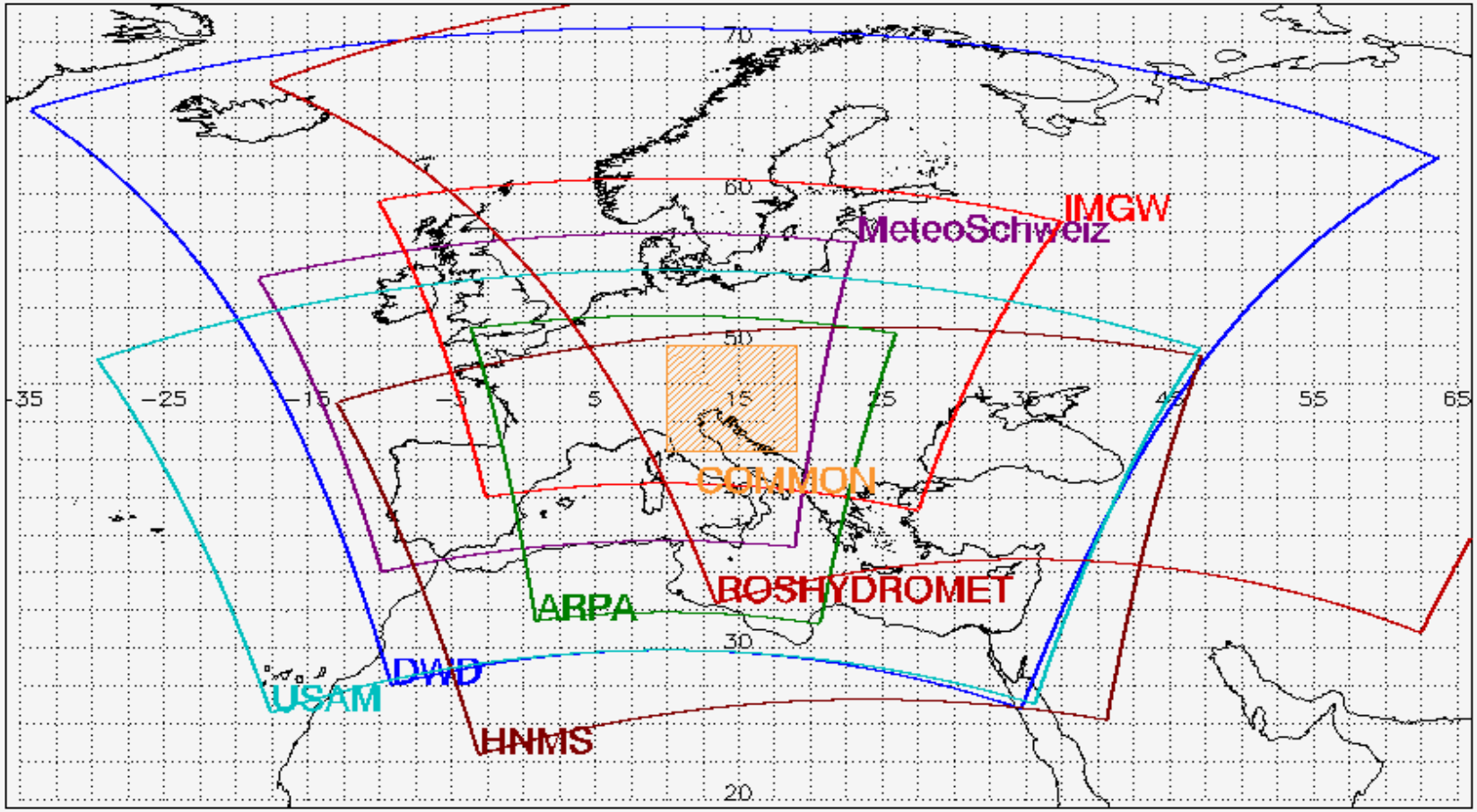
B. Substitute with HRES verification over multiple domains and varying resolution
Pros: test model performance over a variety of geographical characteristics (how many and which?), participation of more services
Cons: increase work load for score extraction, increase work load of CP analysis, loss of long term trend

C. Add HRES (one domain) to current test (A)
Pros: test model performance over a variety of geographical characteristics (how many???), participation of more services, keep long term trend
Cons: increase further work load for score extraction, increase work load of CP analysis, loss long term trend

D. Expand operational verification for CP to EPS

Availability and number of SYNOP reports for each sub-area (scenario): necessary to perform analysis (volunteer?). Scores?

Standard Verification on Common Area



FTE attribution

STC was in favor of the proposition for FTE attribution for common plots and conditional verification activities (requested by WG5 in August 2014), provided that its additional conditions are imposed, as formulated in the minutes of the STC meeting from September 2014:

- STC suggests to restrict the task to the plots on the common area, which are the ones bringing a benefit since really comparable. STC requests for a deeper analysis in the report
- STC suggests that FTE should be required to perform some additional explanation of results which will help to detect and improve outdated installations and correct model setups.
- STC decides to keep conditional verification in the task, but requests that the conditions should be decided every year new by the WG3a/b.