FIRST CORDEX WRF workshop & CORWES/WRF4G hands-on tutorial

EURO-CORDEX regional climate simulations: Hindcast 1990-2009

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Research projects

EC, FP6, Central and Eastern Europe Climate Change Impact and Vulnerability Assessment, (**CECILIA**), 2006-2009

Climate-chemistry simulations over Europe to study the effects of climate change on air quality (RegCM3/CAMx - 50 Km).

Published work:

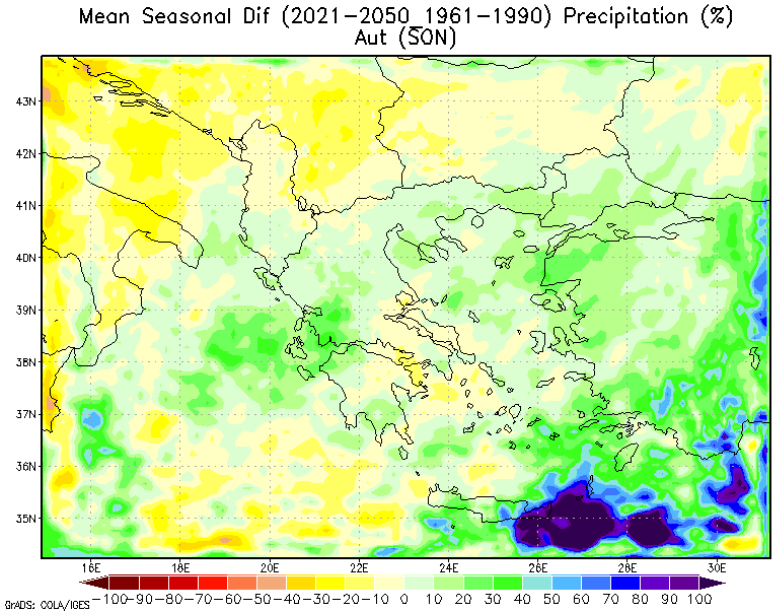
- Katragkou et al., Decadal regional air quality simulations over Europe in present climate: near surface ozone sensitivity to external meteorological forcing, *Atmospheric Chemistry and Phys*ics, 10, 11805-11821, 2010
- Katragkou et al., Future climate change impacts on summer surface ozone from regional climate-air quality simulations over Europe, *Journal of Geophysical Research, 116, D22307,* doi:10.1029/2011JD015899, 2011
- Zanis et al., Evaluation of near surface ozone in air quality simulations forced by a regional climate model over Europe for the period 1991-2000, *Atmospheric Environment*, 45 (36), pp. 6489-6500, 2011
- Juda-Rezler et al., On the effect of climate change on regional air quality over central-eastern Europe: concept, evaluation and future projections, *Climate Research, 53: 179-203,doi: 10.3354/cr01072, 2012.*
- Huszar et al., Effets of climate change on ozone and particulate matter over Central and Eastern Europe, *Climate Research,* 50: 51–68, doi: 10.3354/cr01036, 2011

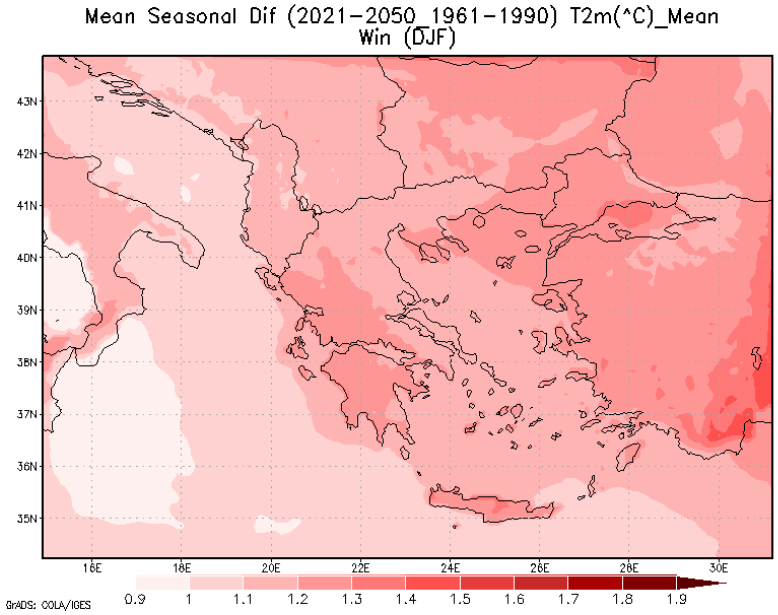
Research projects

NSRF, Development of a climate geographical information system (**ΓΕΩΚΛΙΜΑ**), 2011 – 2014 (www. geoklima.eu), 2007-2013

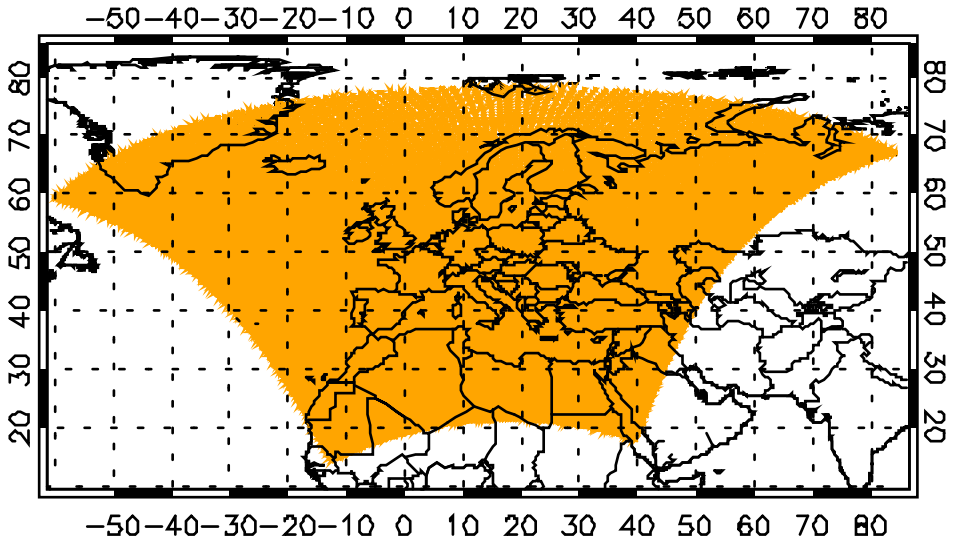
Climate simulations (RegCM3 10 Km) over south-eastern Mediterranean, 1960-2100.

On-going work.





CORDEX EUR-0.44 simulations

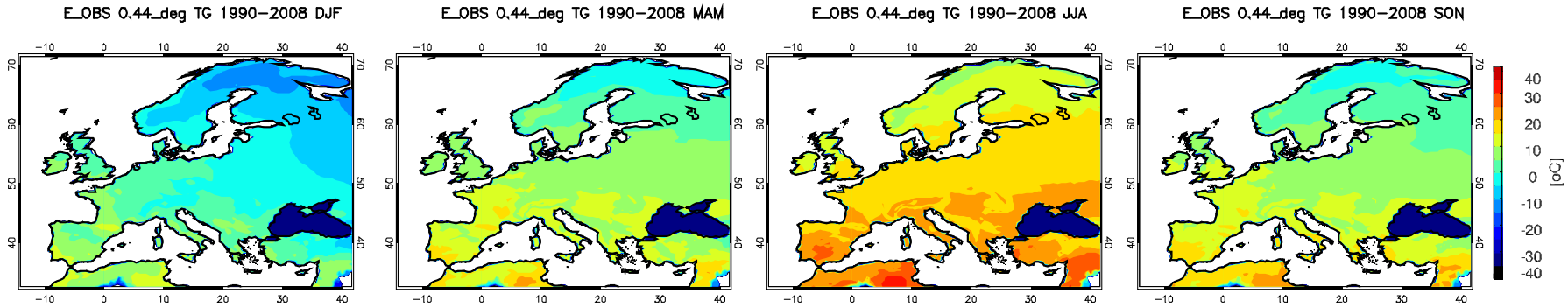


Physical/Dynamical Options	Scheme
Microphysics	WRF-single moment 6-class
Radiation (SW/LW)	CAM
Surface Layer	MM5-Similarity
Land surface	NOAH LSM
Planetary BL	Yonsei University
Cumulus paramet	Kain-Fritsch

- **ERA-Interim forcing (6 hour - 0.75º) WRF3.3.1**
- **30 vertical layers (50 hPa)**
- **Simulation 1989-2009 (3 hour)**
- **Hindcast analysis 1990-2009 (20 years)**

Temperature: EOBS & ERAint/WRF [1990-2008]

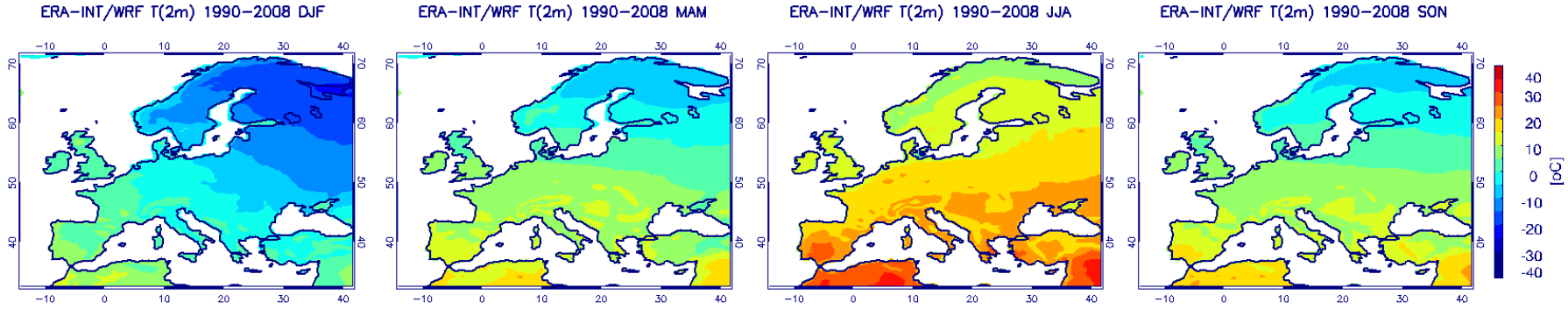
Winter **Spring** **Summer** **Autumn**



EOBS V7.0

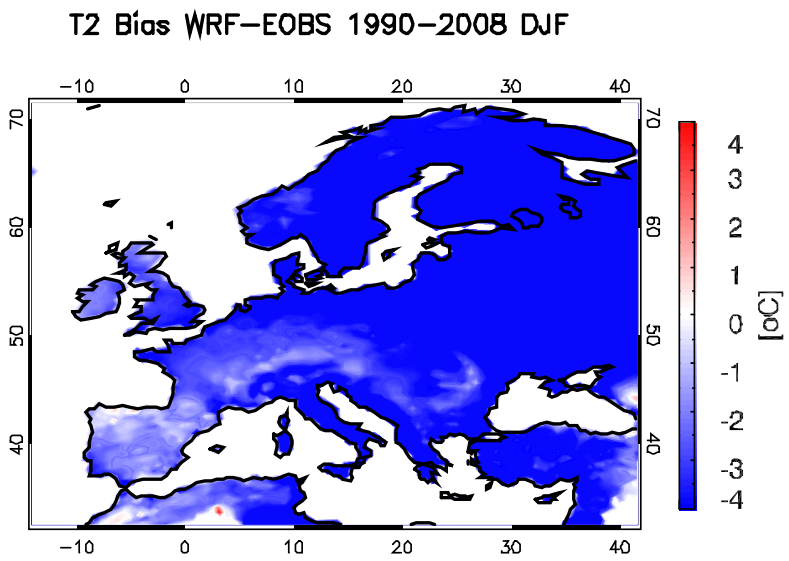
[oC]

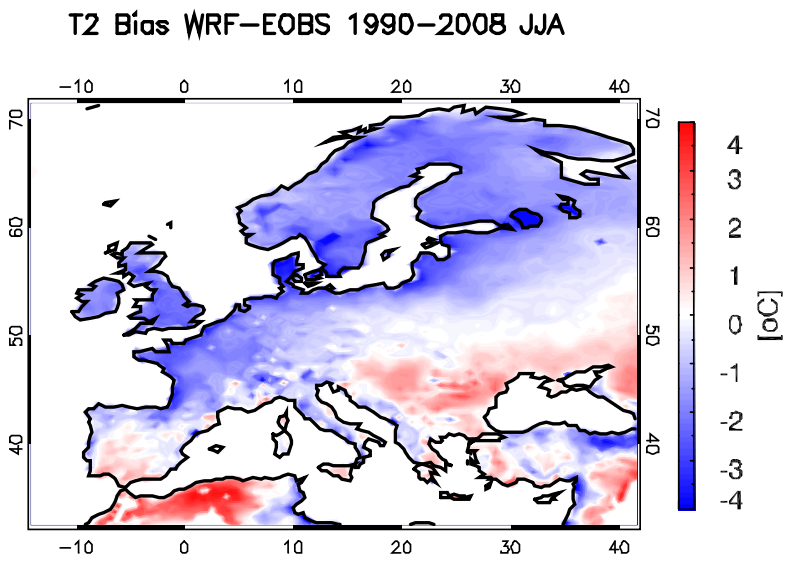
-40 -30 -20 -10 0 10 20 30 40

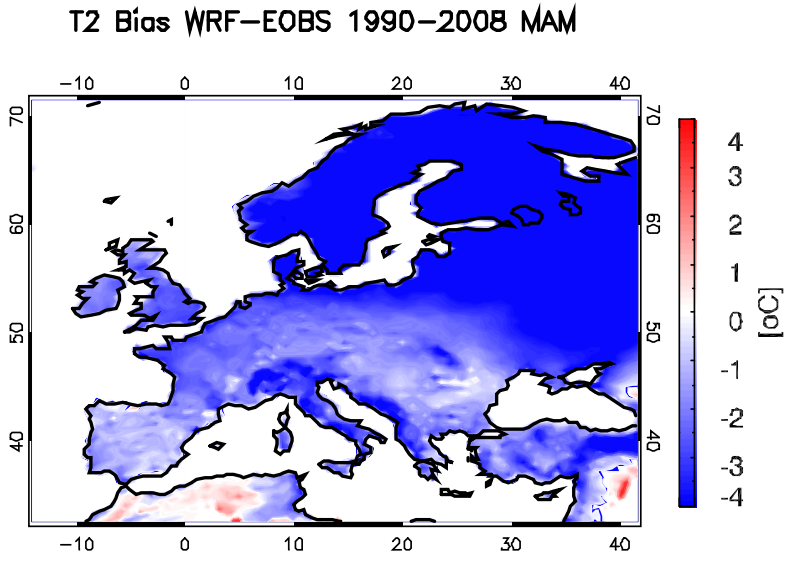


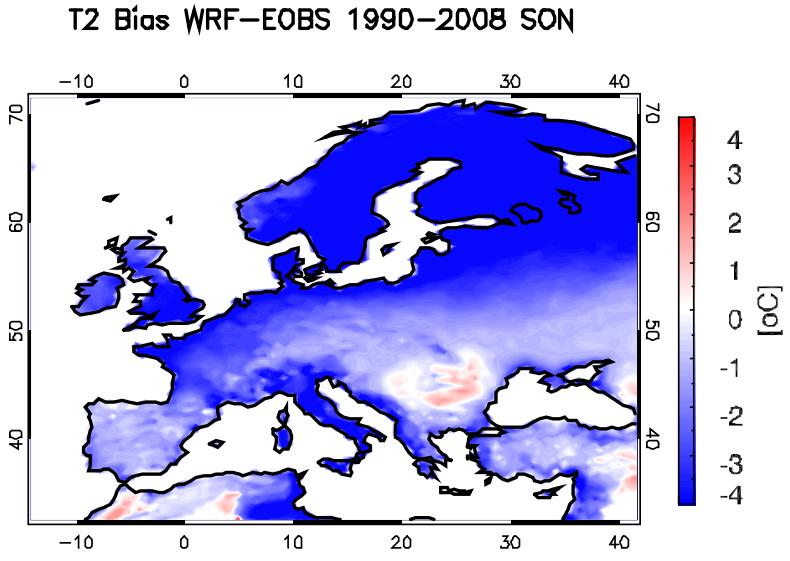
ERA-INT/WRF

Temperature Bias: WRF-EOBS [1990-2008]



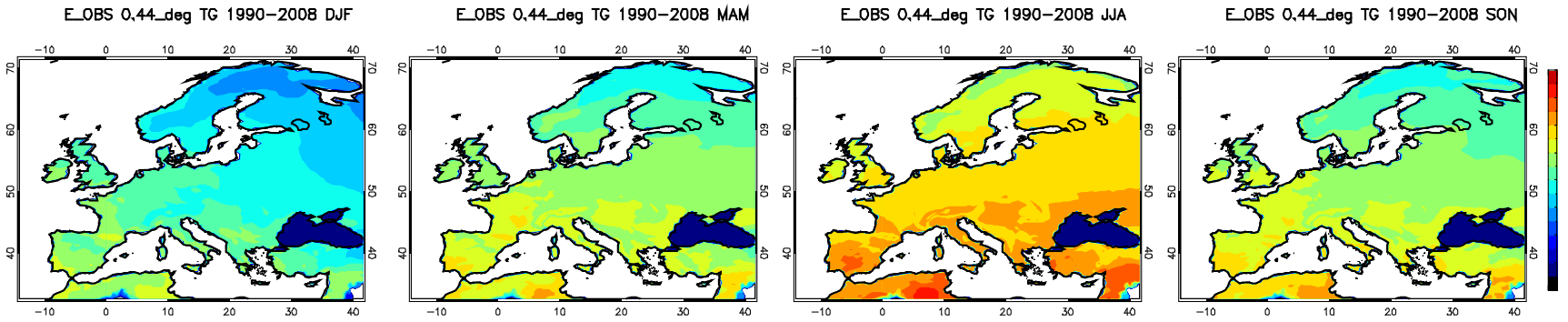






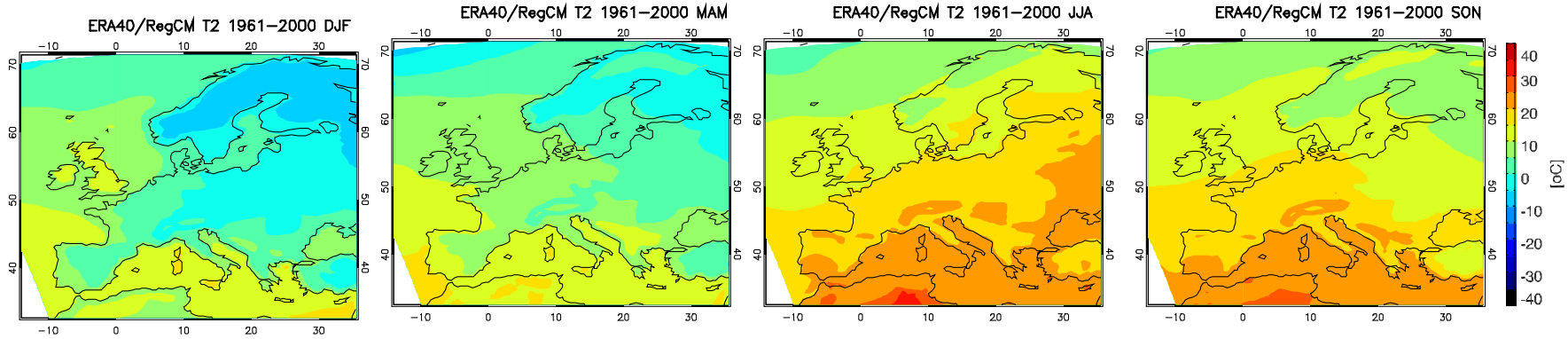
Temperature: EOBS ;ERA40-RegCM3 climatology; ERAint-WRF

Winter **Spring** **Summer** **Autumn**

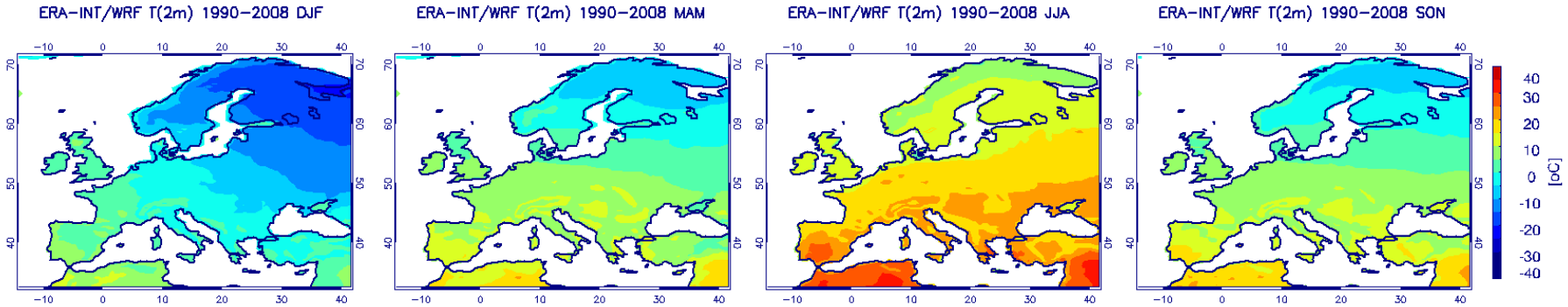


EOBS V7.0

ERAint/WRF



ERA40/RegCM3



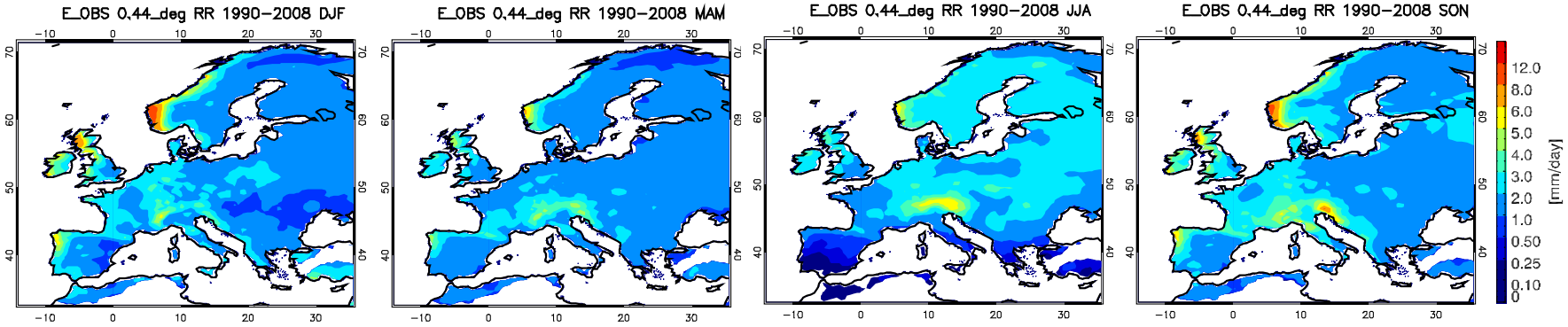
Precipitation 1990-2008

Winter

Spring

Summer

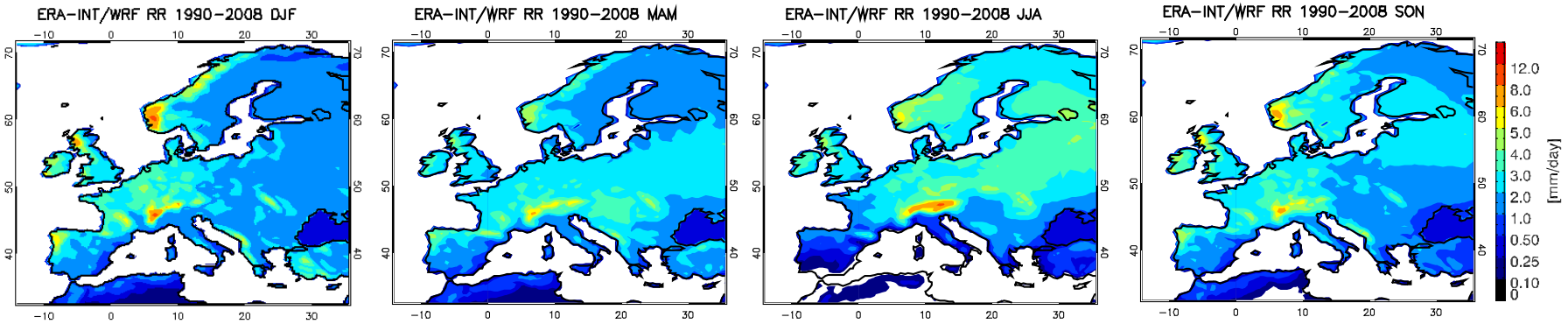
Autumn



EOBS V7.0

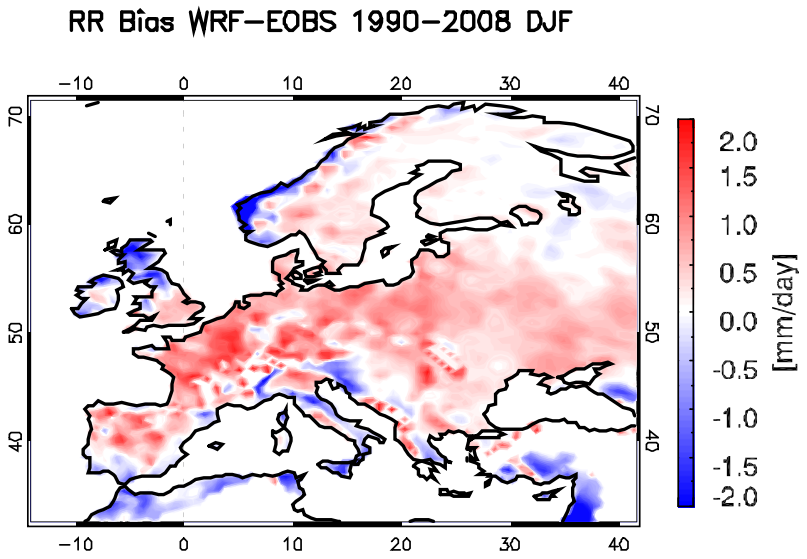
[mm/day]

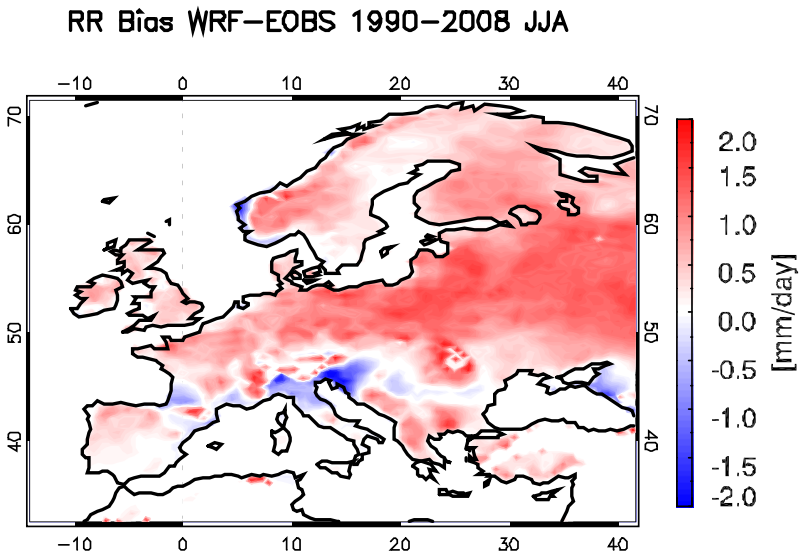
0 0.1 0.25 0.5 1.0 2.0 3.0 4.0 5.0 6.0 8.0 12.0

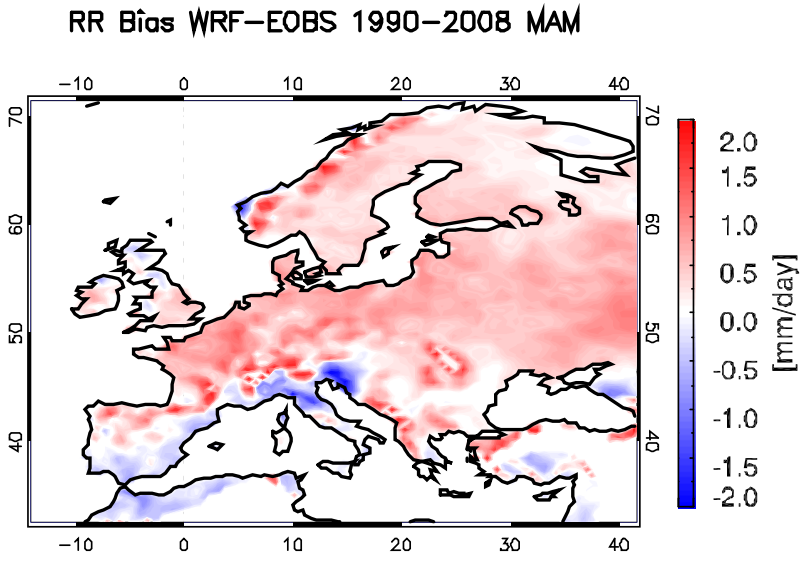


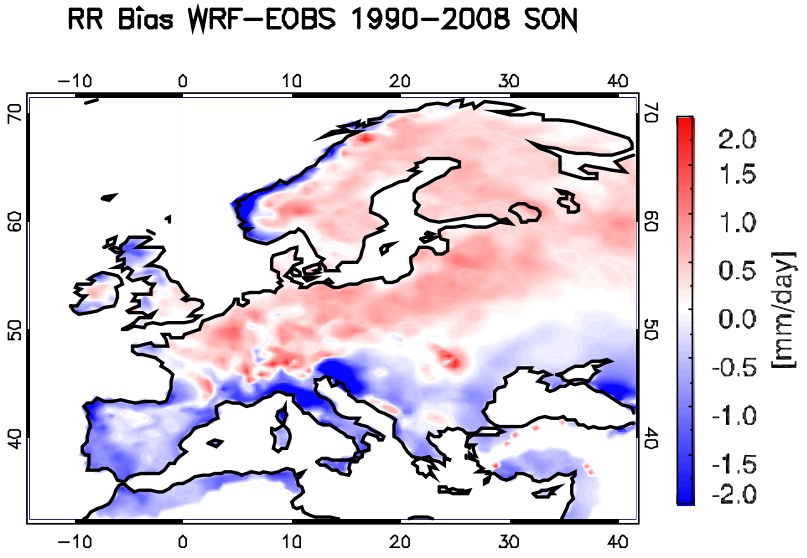
ERA-INT/WRF

Precipitation Bias: WRF-EOBS [1990-2008]

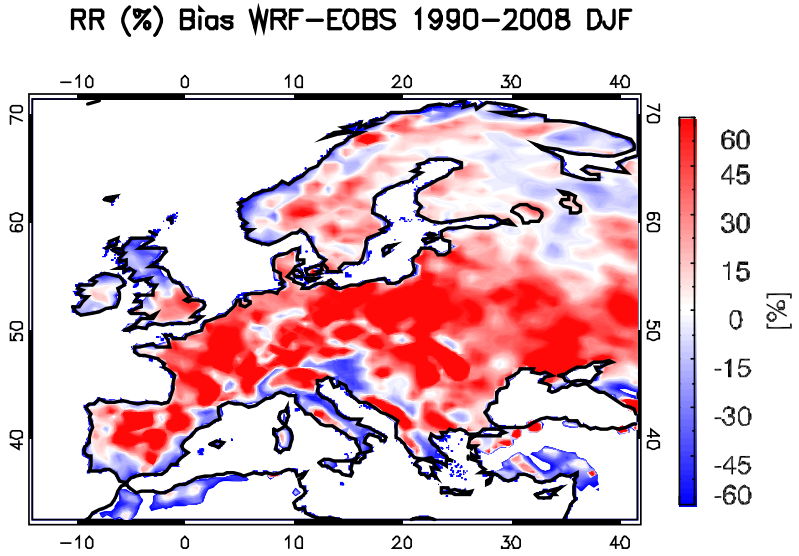


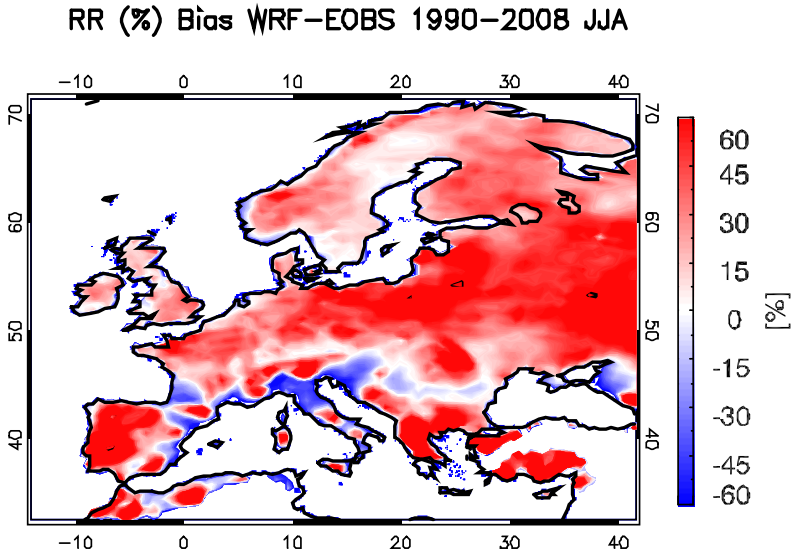


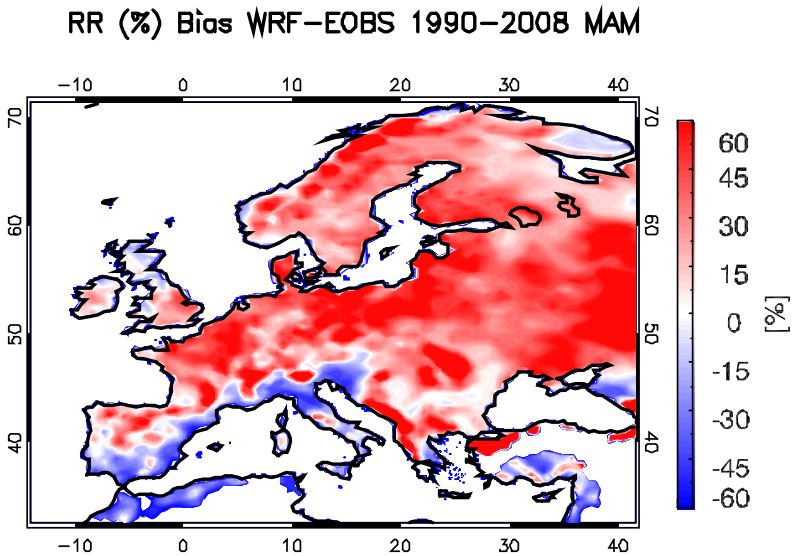


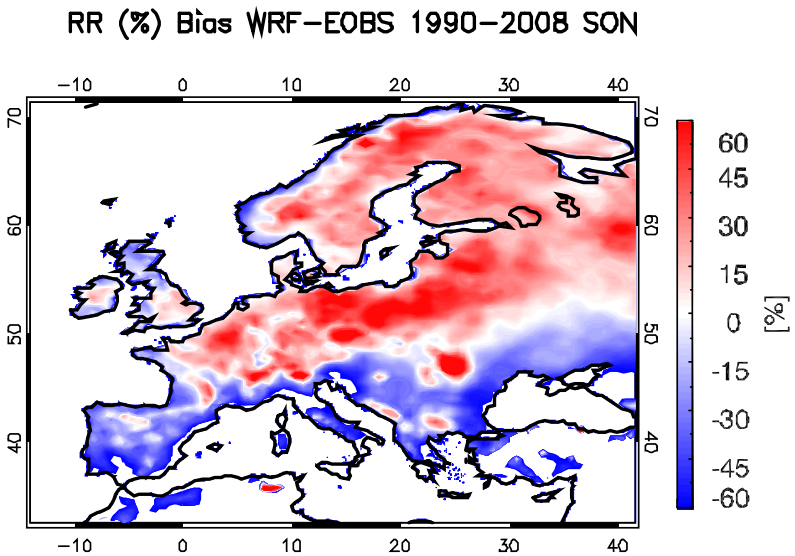


Precipitation Bias %: WRF-EOBS [1990-2008]





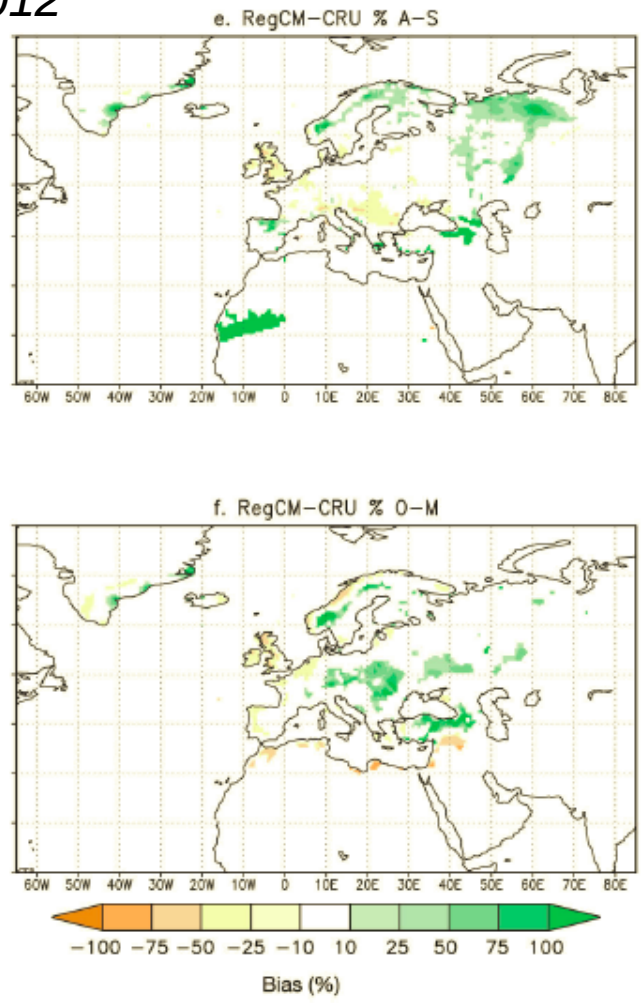




ERA-int/RegCM4 EURO-CORDEX simulations

Giorgi et al., RegCM4: model description and preliminary tests over multiple CORDEX domains, Climate research, 2012

Europe (Expt 1)	MAB A–S	MAB O–M	BIAS A–S	BIAS O–M	COR A–S	COR O–M
Precipitation						
Northern	39.3	30.6	–1.6	–5.8	0.79	0.80
Southern	21.0	31.0	–5.6	0.7	0.46	0.66
Whole	27.7	30.8	–4.15	–2.3	0.78	0.71
Temperature						
Northern	1.20	1.37	–0.06	–0.20	0.94	0.94
Southern	0.83	1.40	0.54	–1.27	0.98	0.97
Whole	1.02	1.38	–0.23	–0.51	0.97	0.98



Mean precipition (%) compared to CRU

Future work

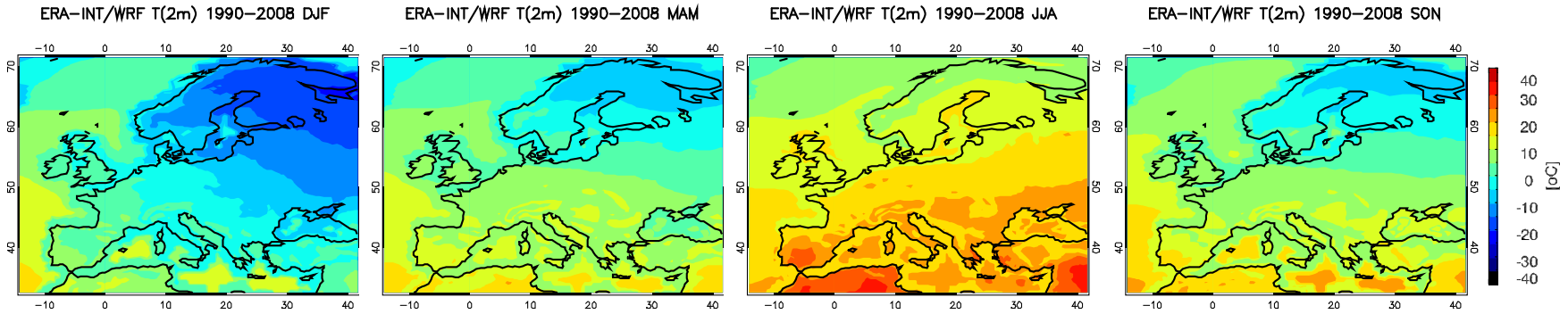
- Further analysis of hindcast simulation including additional parameters (SLP, GH, wind etc)
- Extensive evaluation (Extremes, annual cycles, sub-regional analysis, calculation of skill scores etc)
- Publishing work
- Preparation for the control and scenario runs
- Proposal writing

Thank you!

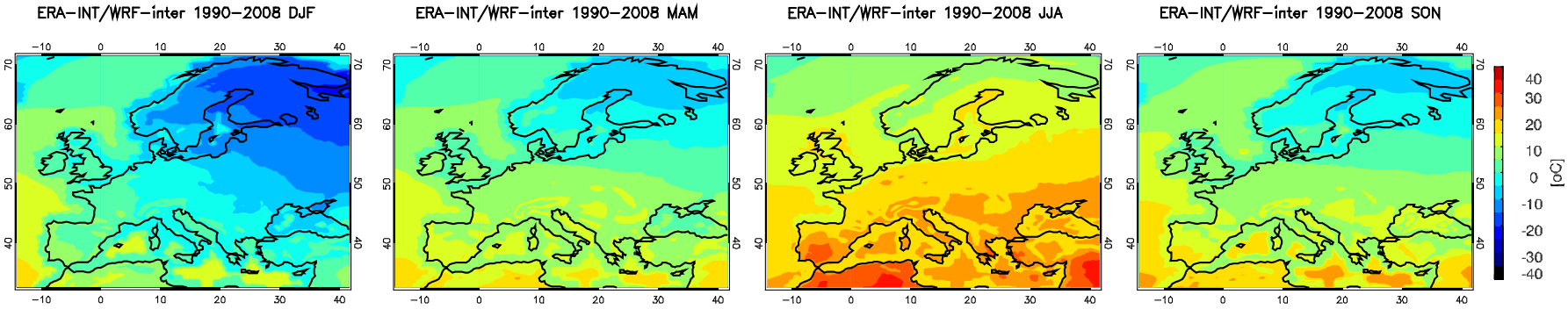
email: katragou@auth.gr

ANNEX:
WRF interpolation to EOBS grid

Winter **Spring** **Summer** **Autumn**



ERA-INT/WRF original grid : before interpolation to EOBS grid



ERA-INT/WRF-interpolated: after interpolation to EOBS grid

ANNEX:
WRF interpolation to EOBS grid

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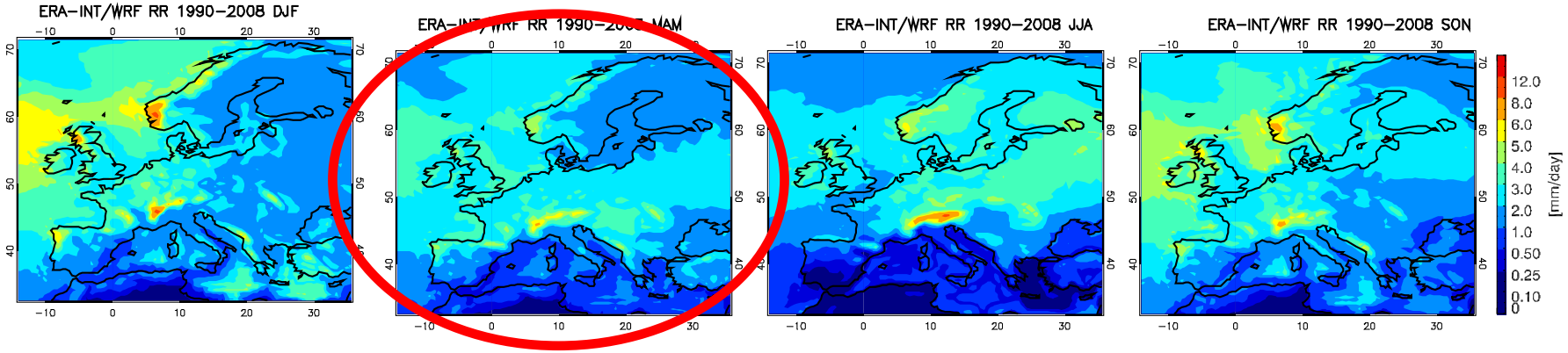
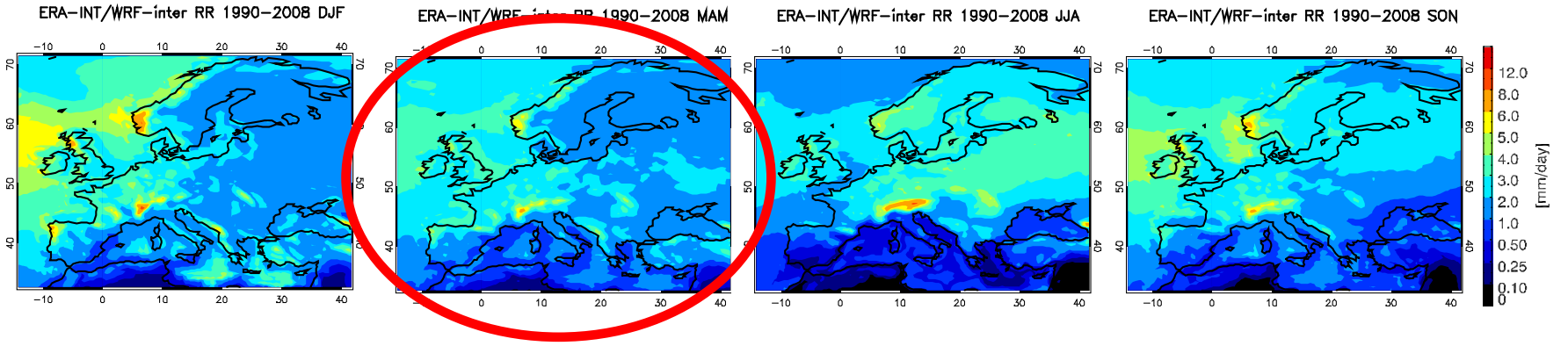


ERA-INT/WRF original grid : before interpolation to EOBS grid



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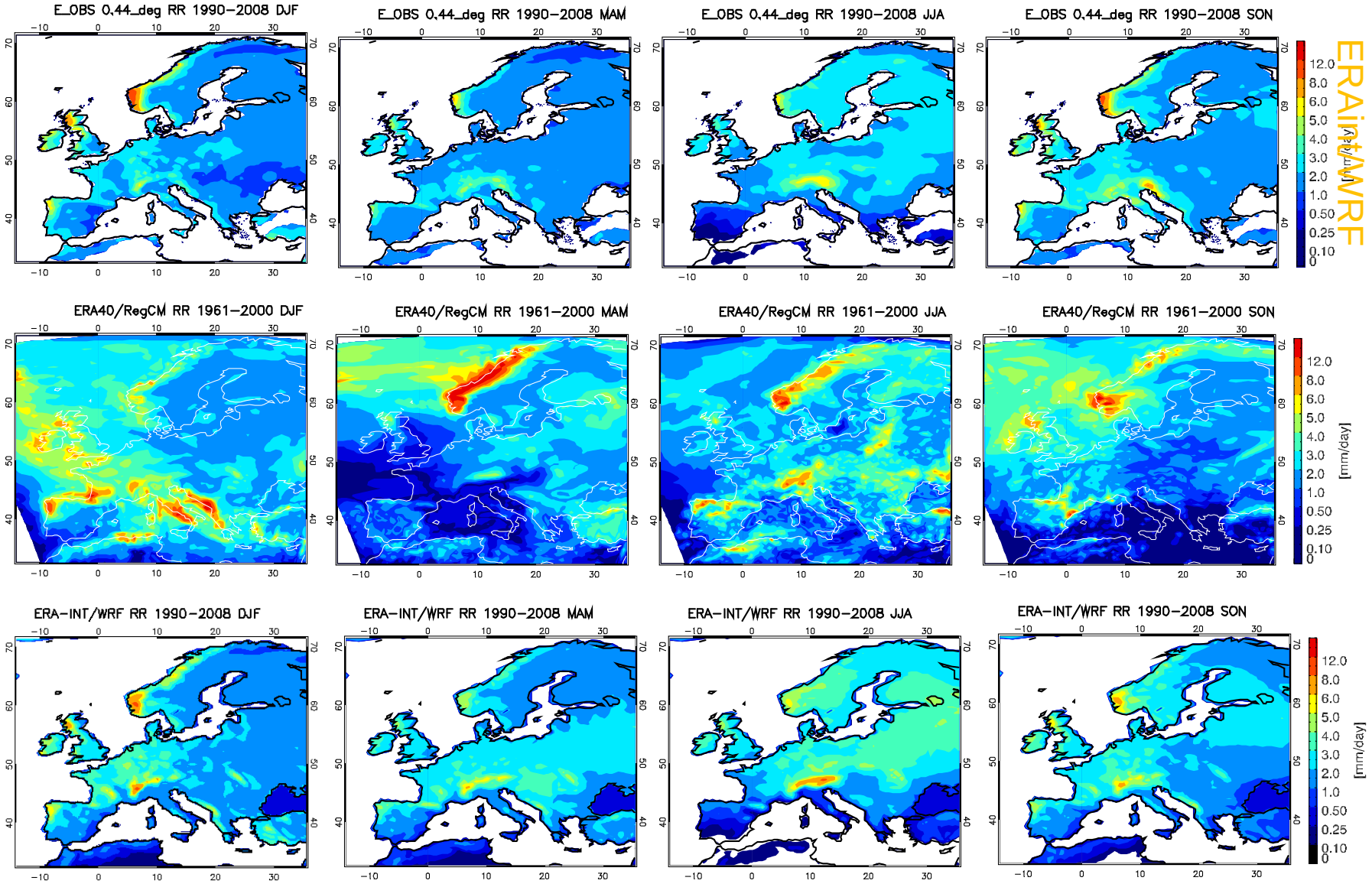
Precipitation EOBS ;ERA40-RegCM3 climatology; ERAint-WRF



EOBS V7.0

ERAint/WRF

ERA40/RegCM