Deutscher Wetterdienst
Wetter und Klima aus einer Hand

Running a Boundary Condition Ensemble

Benefits from Interoperability

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Deutscher Wetterdienst

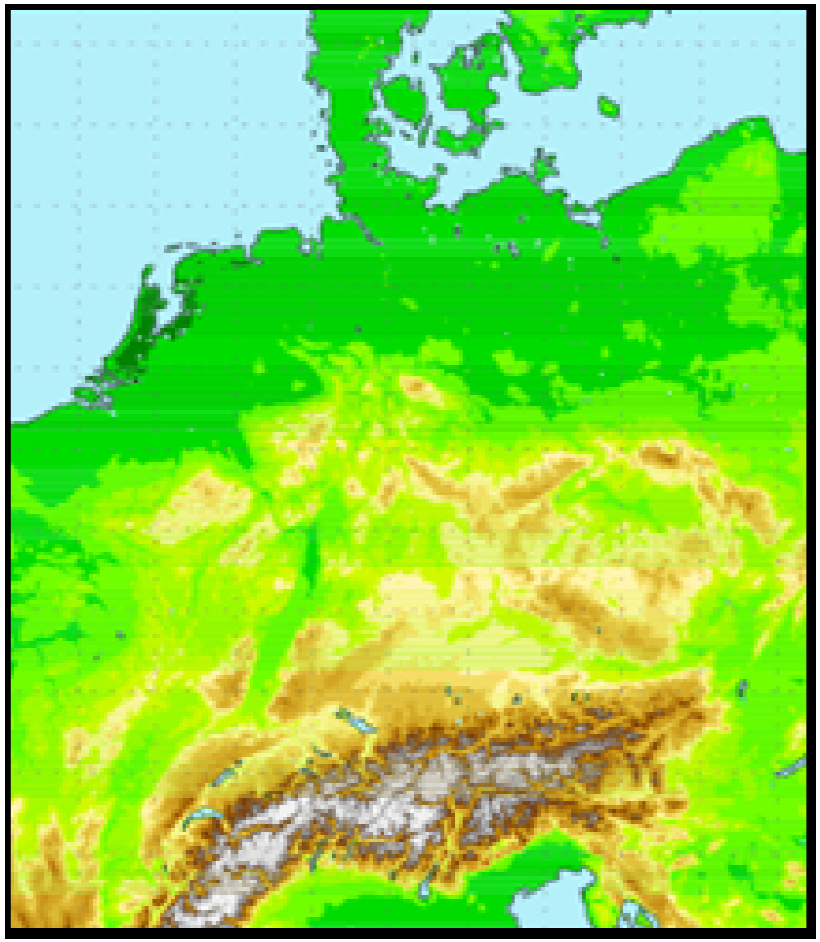
Research and Development

Contents

- The convection-permitting COSMO-DE Ensemble
- Generation of the Ensemble Members
- The Boundary Condition EPS
- Benefits from Interoperability

The Convection-Permitting COSMO-DE Ensemble

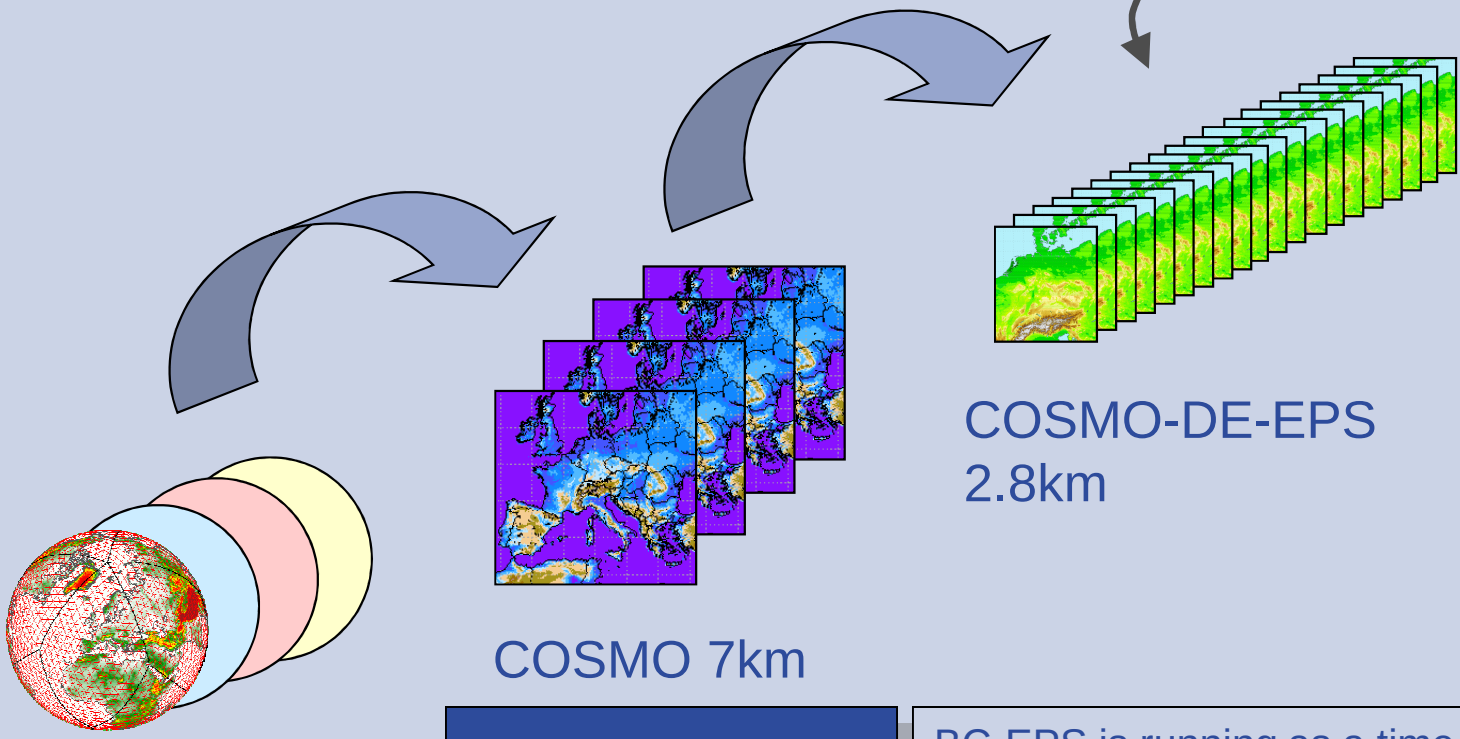
- Operational setup:
  - 20 members
  - 461×421×50 grid points
  - grid size: 2.8 km
  - Lead time: 0-21 hours
  - 8 starts per day
  - Variations in
    - Physics
    - Initial condition
    - Boundary conditions



Generation of Ensemble Members

plus variations of
- initial conditions
- model physics

Ensemble Chain



COSMO-DE-EPS
2.8km

COSMO 7km

GME, IFS, GFS, GSM

BC-EPS

BC-EPS is running as a time-critical application at ECMWF

The Boundary Condition EPS

Data are taken from 4 different global models

	GME (DWD)	IFS (ECMWF)	GSM (JMA)	GFS (NCEP)
Horizontal Grid	icosahedral	lat-lon		
Vertical Grid	hybrid pressure based vertical coordinate			Pressure levels
Data Format	GRIB 1	GRIB 1 / 2	GRIB 2	

to start 4 different runs with the COSMO-Model

The Boundary Condition EPS

➔ Fields provided are:

GME	U	V	T	QV	QC	QI	QR	QS	PS	T_S	QV_S
IFS:	U	V	T	QV	QC	QI	QR	QS	PS	T_S	QV_S
GFS:	U	V	T	QV	QC	QI			PS	T_S	QV_S
GSM:	U	V	T	QV	QC				PS	T_2M	QV_2M

➔ GSM is counting vertical levels from bottom to top, while all others are counting from top to bottom.

➔ GSM is providing 2m temperature and relative humidity, all others surface values

➔ Global data are available for 00 and 12 UTC

➔ BCEPS is running at 00, 06, 12 and 18 UTC for +24 hours

Temperature (lowest modell evel)

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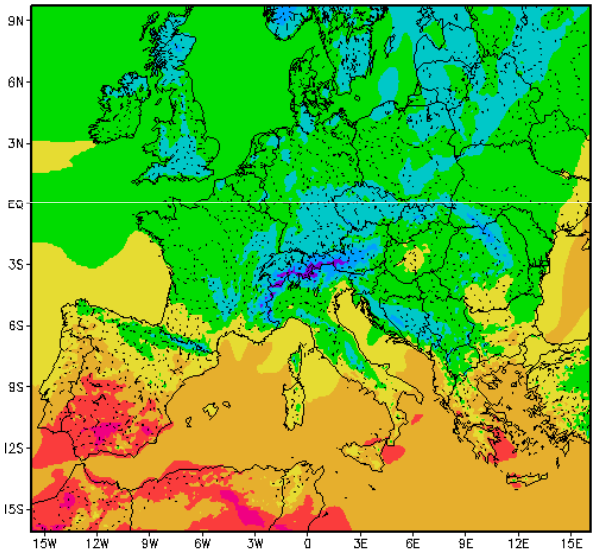
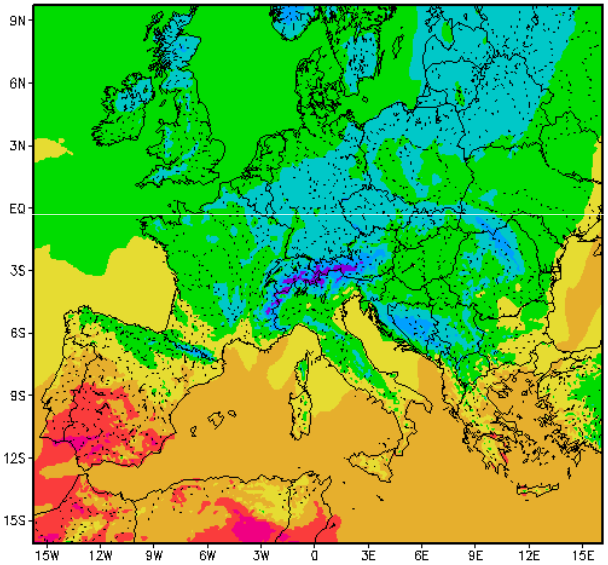
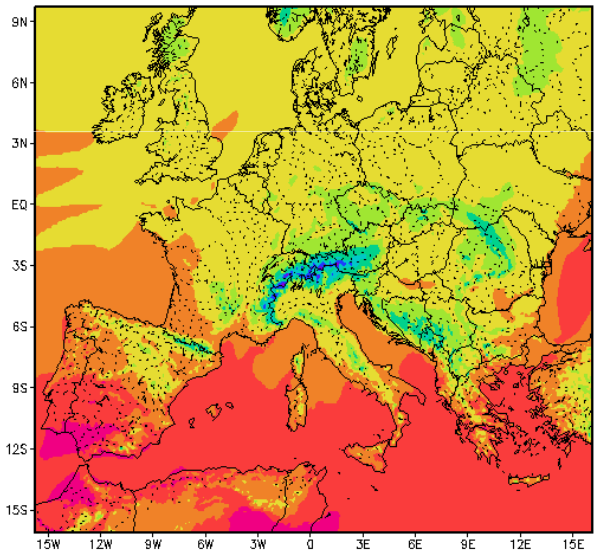
GME



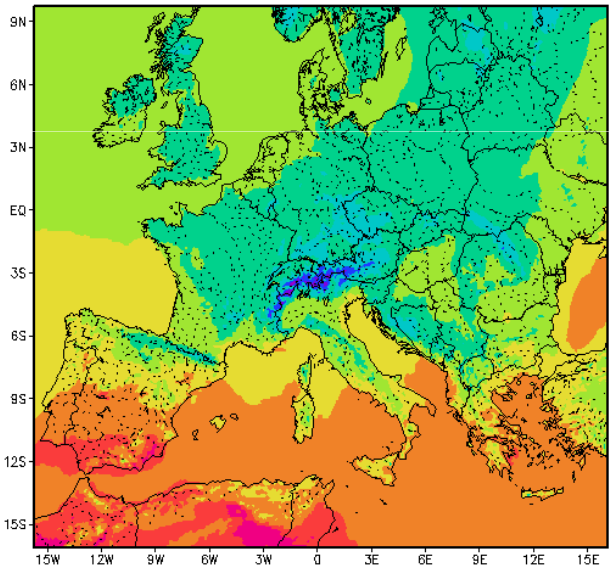
IFS



GSM



GFS



Pressure Deviation

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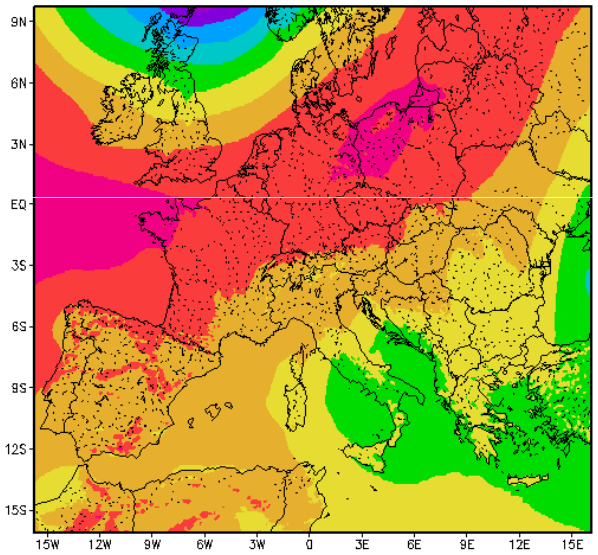
GME



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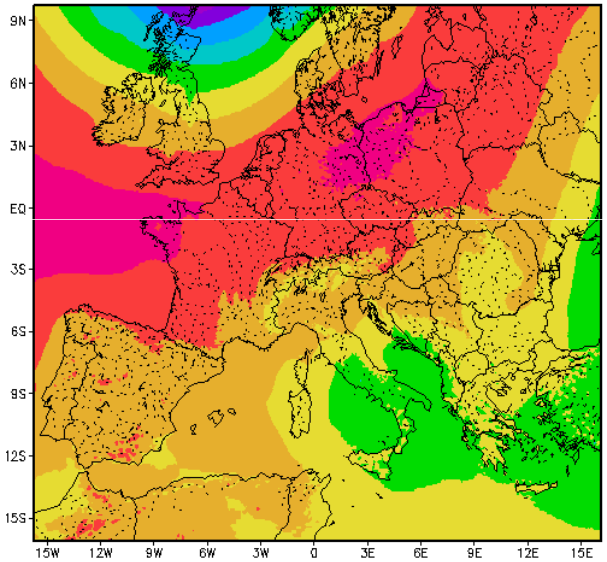
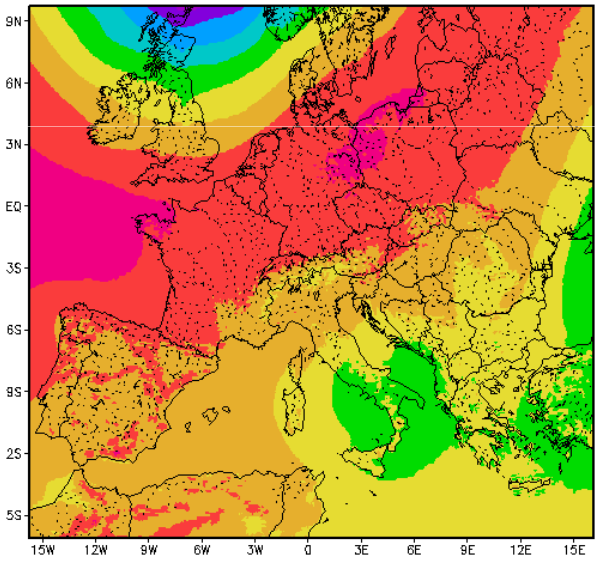
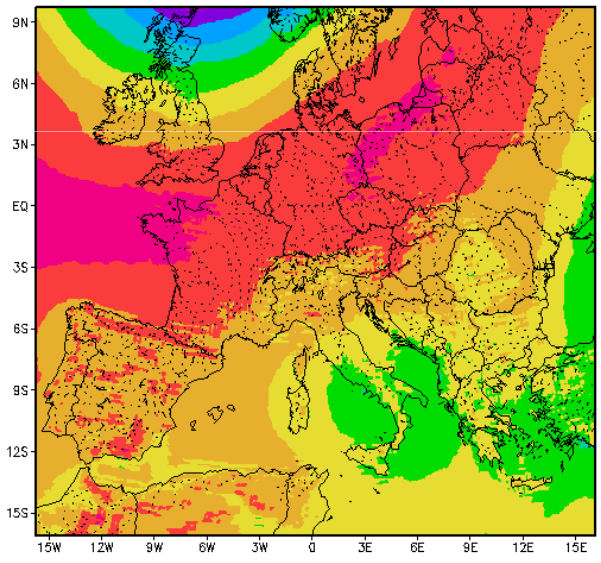


GSM



GFS



Water Vapor

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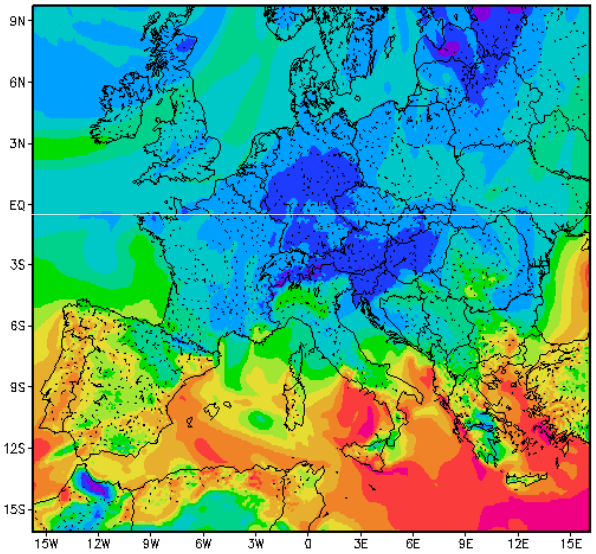
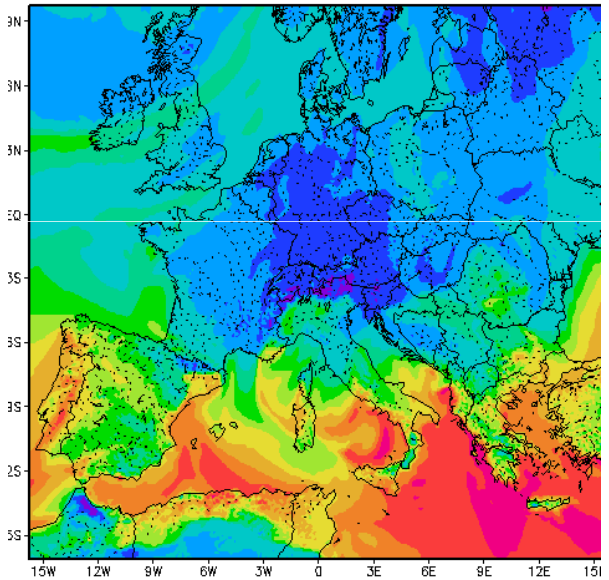
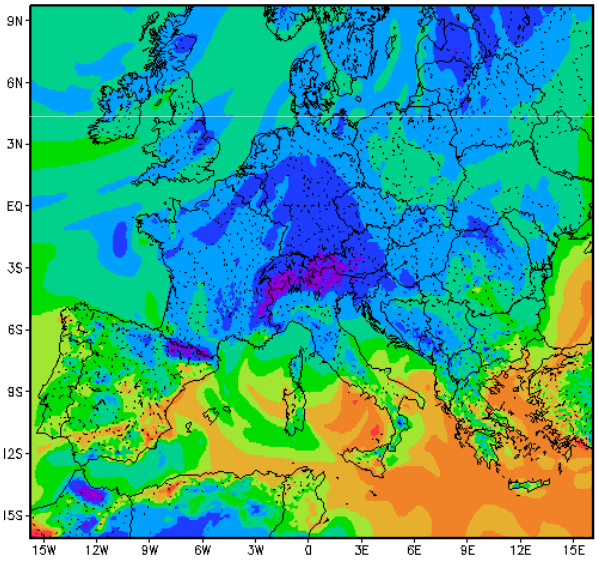
GME



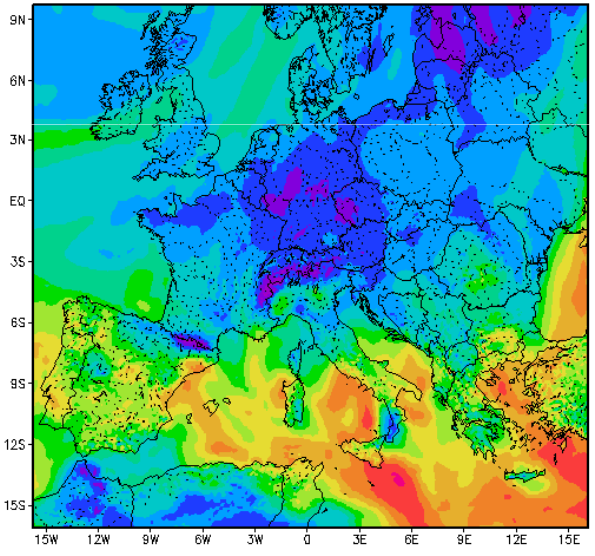
IFS



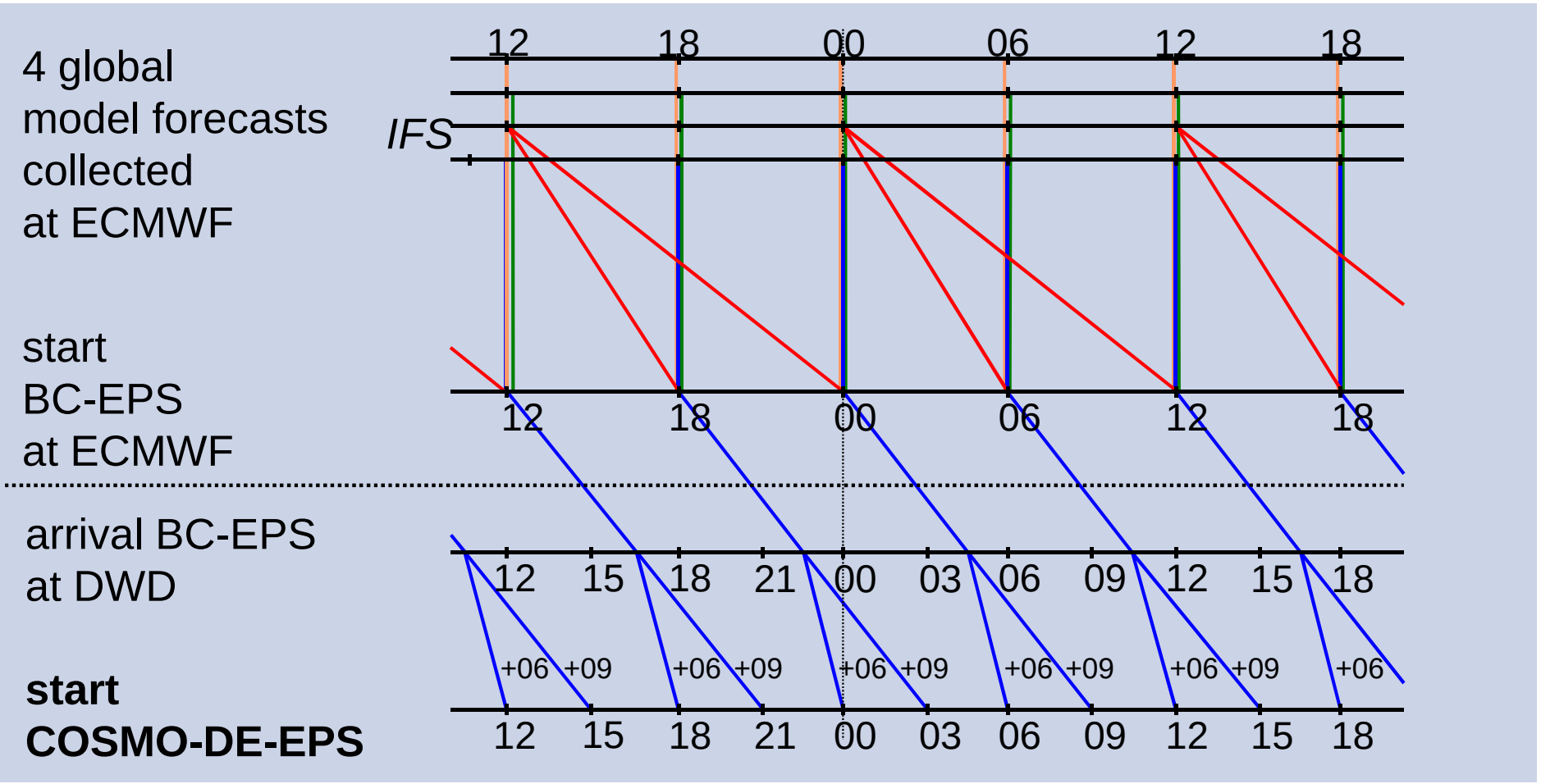
GSM



GFS



Start Times of the BCEPS



Benefits from Interoperability

- Horizontal and vertical grids
  - Having implemented 2 or 3 „data providing models“, you know where to look at for the next models
  - There are only few really different grids
- Usage of Grib 2
  - Take a close look to the fields and the corresponding Grib parameters:
    - (0,1,23) ice water mixing ratio or (0.6.23) cloud ice mixing ratio
    - (0,0,0), leveltype=„surface“ (surface temperature) or (0,0,17) (Skin temperature)
  - Coordination with ECMWF and grib_api developers important
- Interoperability prepared the COSMO pre-processing tool INT2LM for multi-model input


Thank you
very much
for your
attention