Implementation of LM assimilation suite at MeteoSwiss

- First **operational** implementation of LM assimilation cycle at MeteoSwiss, run **since end of October 2001**.
- Design goals:
  - simple
  - robust

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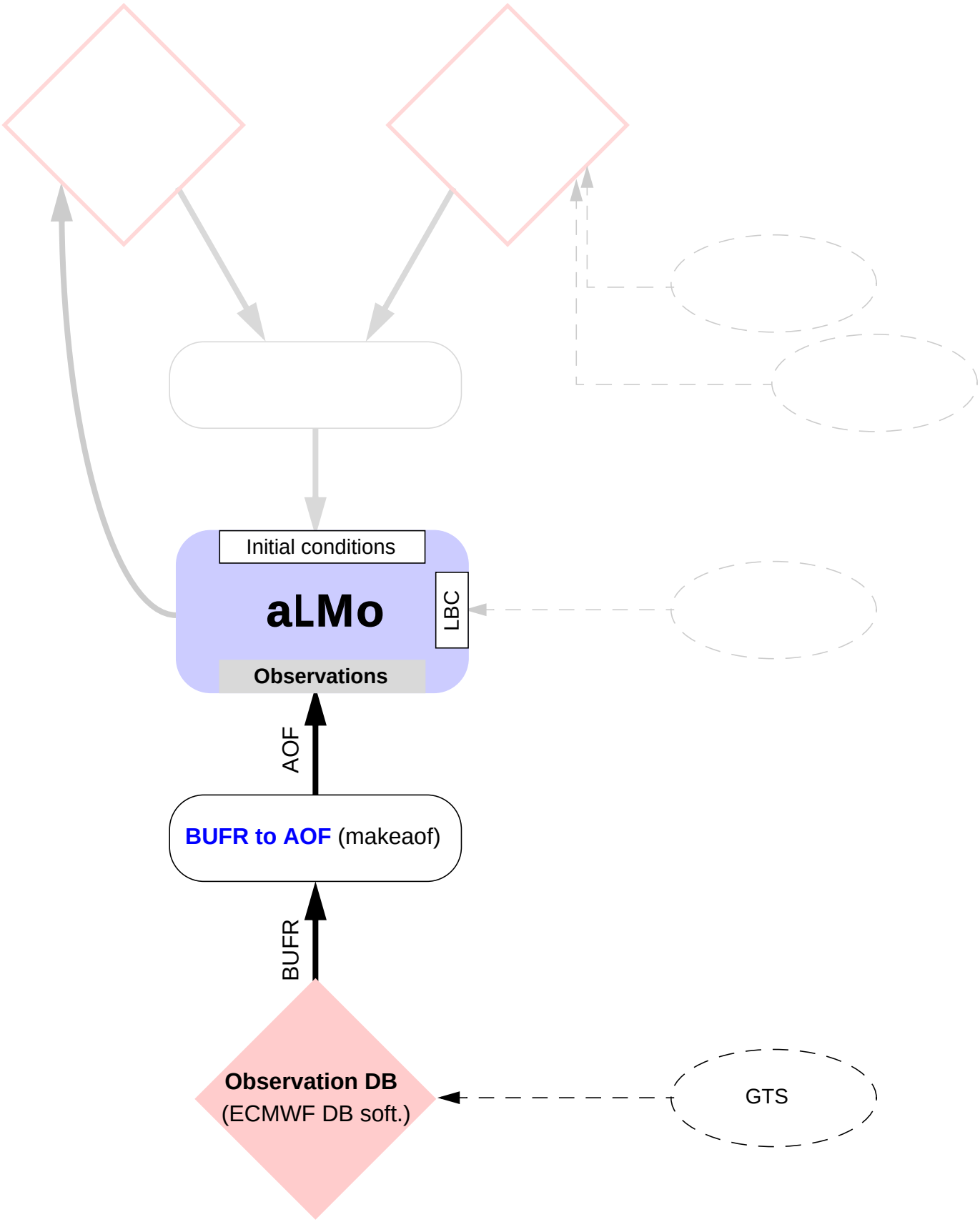
COSMO – Warsaw, September 2002

aLMo assimilation cycle – overview



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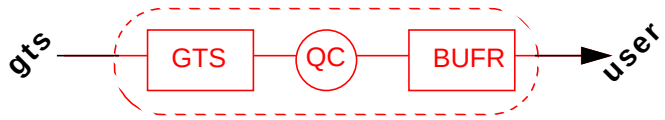
The observation database

Based on ECMWF software suite (libemos, preproc, mars client/server, …)

- Uses Empress (v.8.6) as DB software
- Store quality controlled data in BUFR format
- GTS decoding software included
- Data quality control sofware included



- Extendible to non-conventional data types (radar data, satellite images, …)
- Access to data via MARS requests
- Transparency/configurable access to ECMWF database
- Interface to Metview

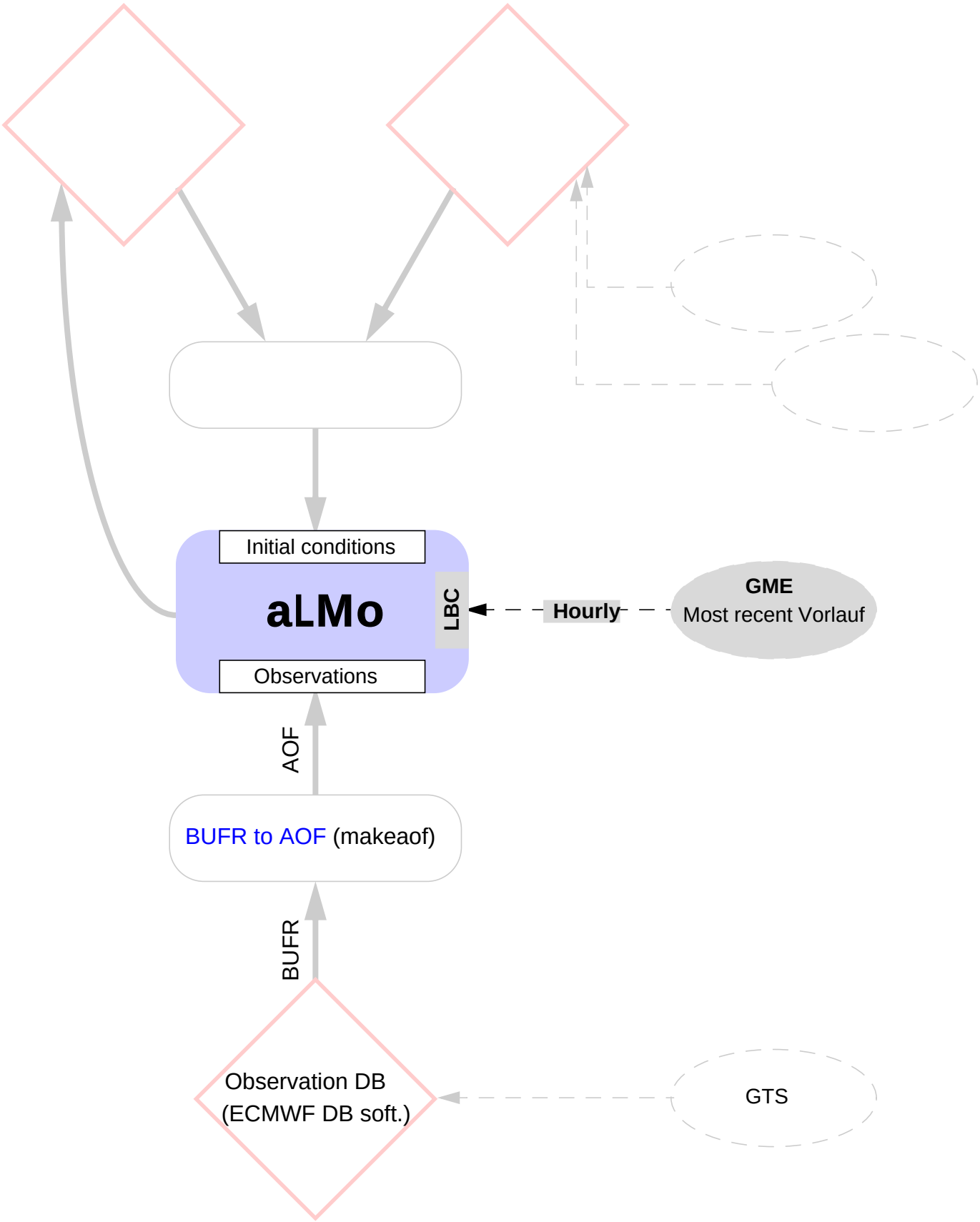
- Located at Swiss Center for Scientific Computing in Manno (SCSC)
- Runs on a SGI Origin 3000
- Data actively sent from MeteoSwiss GTS point of presence
- Actual data type content:
  - SYNOPS, SHIPS, ANETZ
  - DRIBUS
  - AIREPS, AMDARS
  - TEMPS
  - PILOTS
- Data retention: currently 90 days
  - permanent storage planned

Statistics

Typical assimilation cycle of 3 hours (mean values over 1700 cycles):

Synops: 4690
Aircrafts: 1460
Dribus: 30
Temps: 55
Pilots: 10

aLMo assimilation cycle – overview



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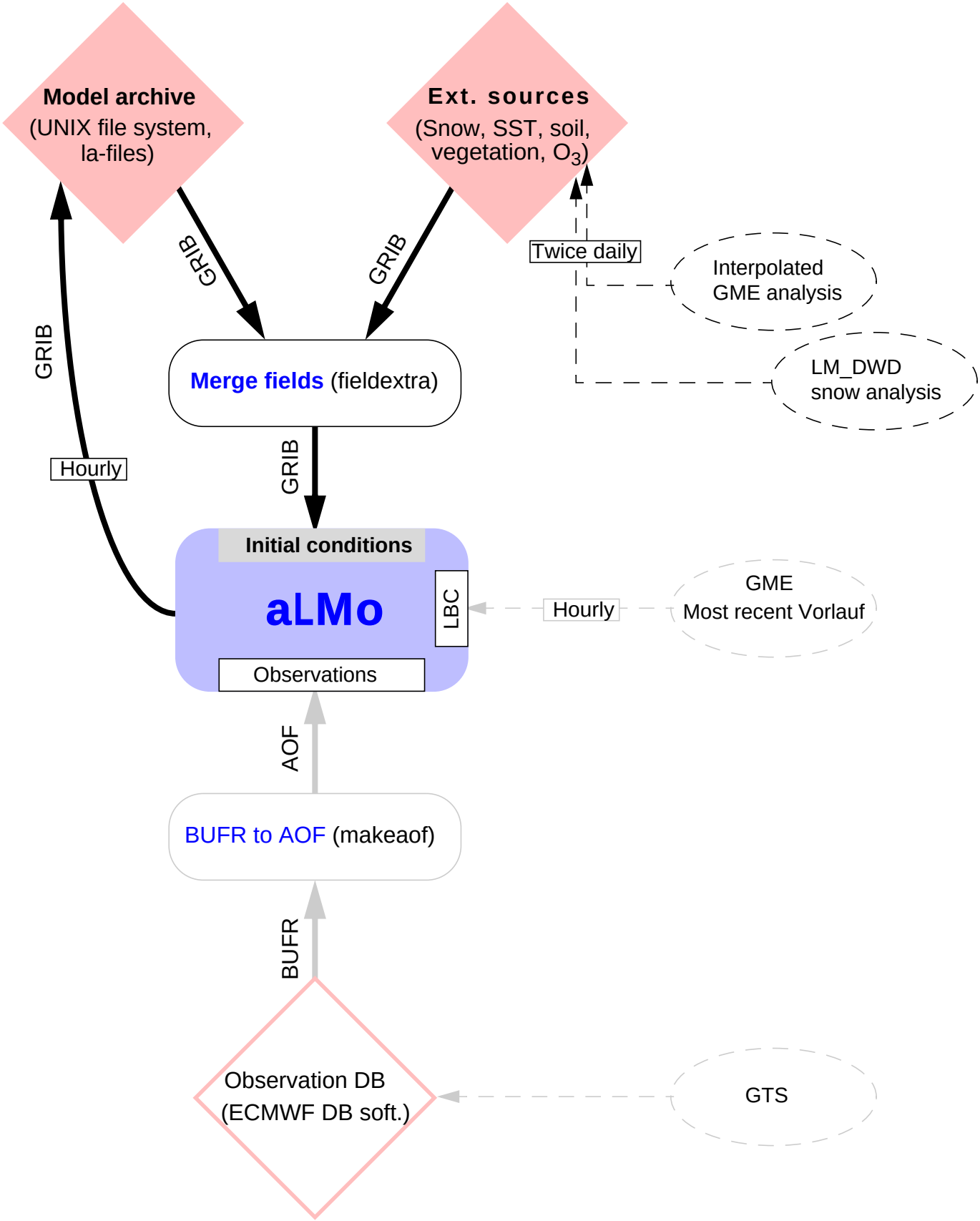
aLMo assimilation cycle – overview



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aLMo initial fields

	Field	Source (lmass: previous aLMo assim. cycle)	
		standard	06 and 18 UTC
Cst. ext. Param.	**HSURF**	lmass	
	FR_LAND	lmass	
	SOILTYP	lmass	
	GZ0	lmass	
Atm. fields	**UV**	lmass	
	W	lmass	
	T	lmass	
	PP	lmass	
	QV	lmass	
	QC	lmass	
Ozone	**VIO3**	lmass	interpolation program (gme2lm)
	HMO3	lmass	interpolation program (gme2lm)
Vegetation	**PLCOV**	lmass	interpolation program (gme2lm)
	LAI	lmass	interpolation program (gme2lm)
	ROOTDP	lmass	interpolation program (gme2lm)
Snow	**T_SNOW**	lmass	LM-DWD + GME analysis
	W_SNOW	lmass	LM-DWD + GME analysis
	W_I	lmass	LM-DWD + GME analysis
Soil	**QV_S**	lmass	interpolated GME field
	W_G1	lmass	interpolated GME field
	W_G2	lmass	interpolated GME field
	T_S	lmass	interpolated GME field
	T_M	lmass	interpolated GME field
Soil clim.	**T_CL**	lmass	interpolated GME field
	W_CL	lmass	interpolated GME field

blue: derived from climatology
magenta, red: analysed at DWD

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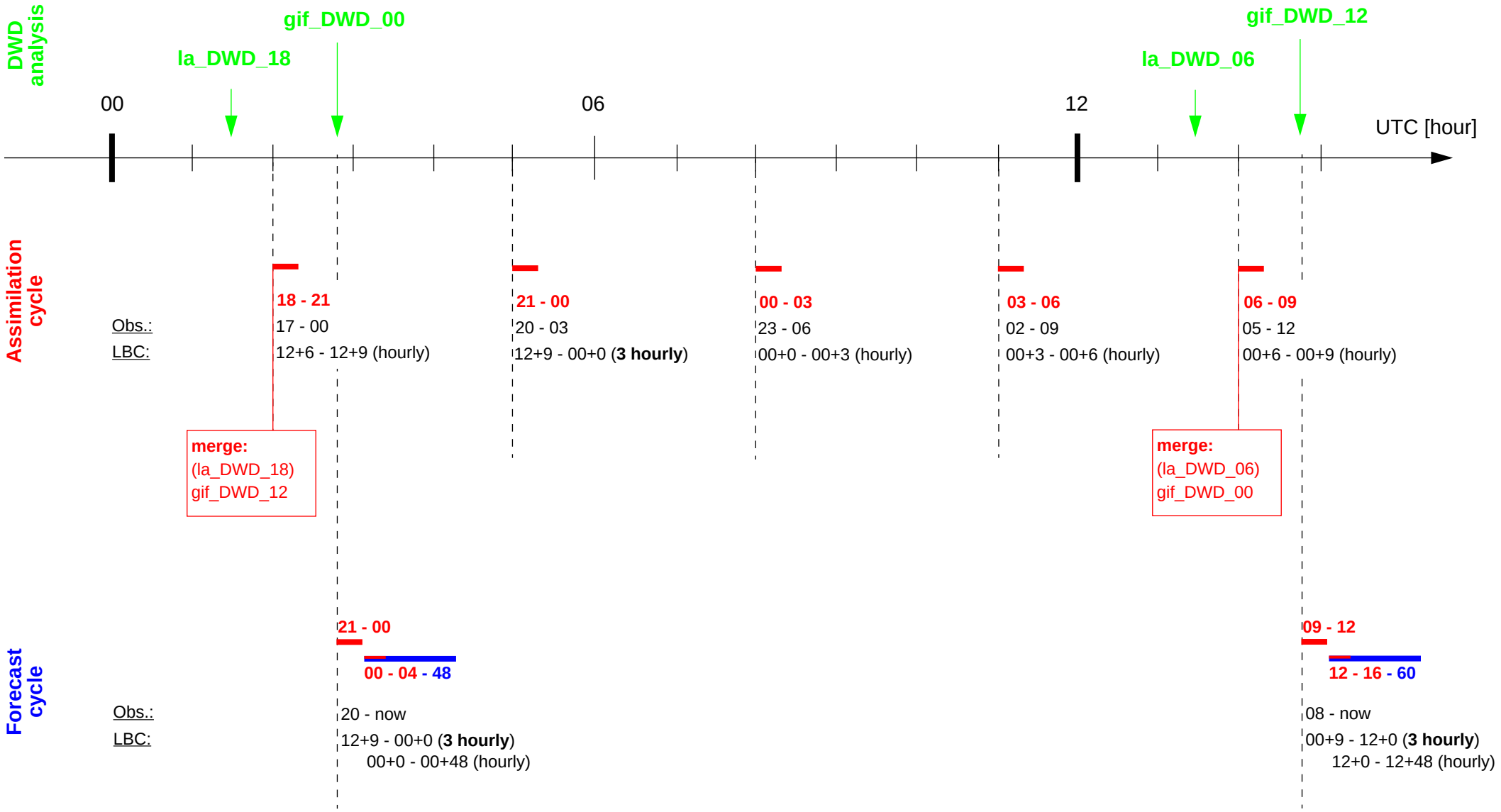
Timetable aLMo assimilation cycle (05.2002)



Performance: *1 assimilation cycle:* *10'-30' elapsed time (SX5_lm_assml, 4 PUs)*

forecast cycle: *4' + 43' elapsed time (SX5_lm, 12PUs)*

Outlook

- Real time monitoring
  (e.g. map of obervation increments)

- Improve data quality control
  (e.g introduction of blacklist based on real time monitoring)

- More frequent update of lateral boundary conditions set

- Dual assimilation cycle
  (long cut-off for high quality / short cut-off for near real time applications)

- Improve assimilation algorithm (but this is another chapter …)