



Centro Nazionale di Meteorologia e  
Climatologia Aeronautica

**Common Verification Suite (CVS)  
installation at ECMWF**

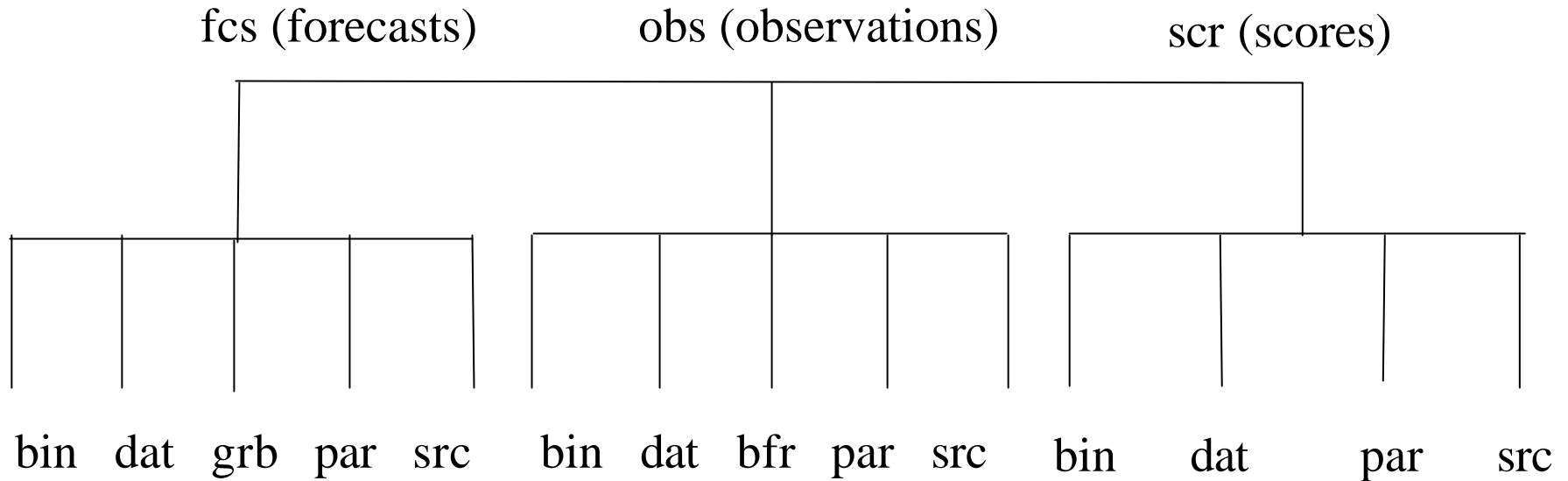
Milano, 22-23 Sep 2004

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# CONTENT

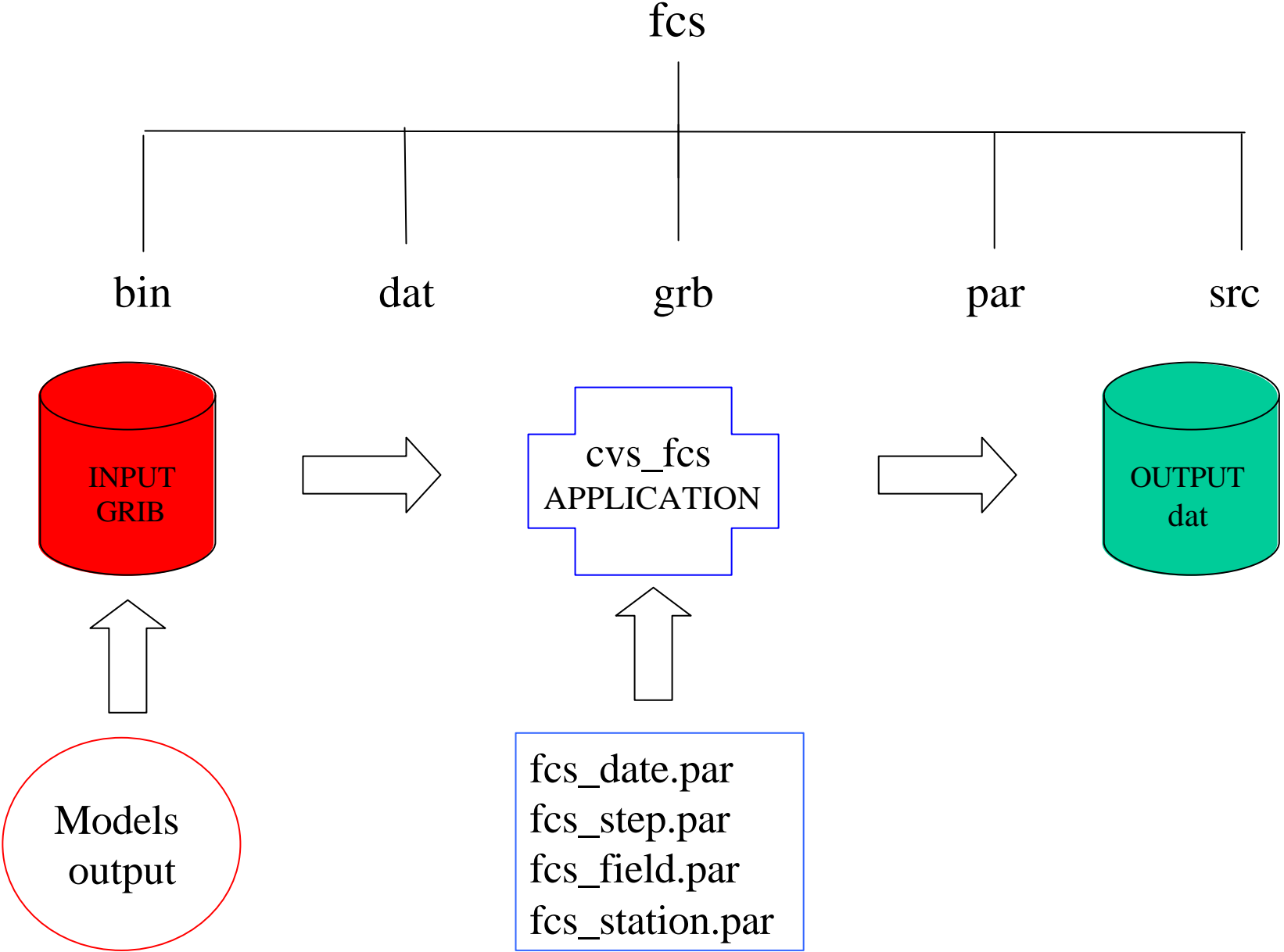
- General structure
- Forecasts pre processing structure
- Observations pre processing structure
- Statistical indexes evaluation
- Final products
- Package installation at ECMWF
- Future implementations

# Common Verification Suite (CVS) General Structure



- bin (application files)
- par (configuration files)
- grb (input GRIB files)
- bfr (input BUFR files)
- dat (output text files)
- src (program source files)

# FCS STRUCTURE



## FCS CONFIGURATION FILE

`fcs_date.par` (includes start and final date, in yyyyymmdd format, and model run time)

20031201

20041231

00-UTC

`fcs_field.par` (includes meteorological field)

MSLP

TEMP

PREC

UWND

VWND

TDEW

# FCS CONFIGURATION FILE

`fcs_step.par` ( includes forecast steps)

003

006

.....

.....

045

048

`fcs_station.par` ( includes station list)

16020 46.45 11.30 241. 1.0

16021 46.30 11.75 2004. 1.0

16022 46.15 11.00 2125. 1.0

16033 46.70 12.20 1222. 1.0

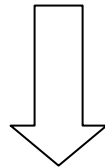
16036 46.00 12.60 126. 1.0

.....

# FCS OUTPUT FILE

Input files

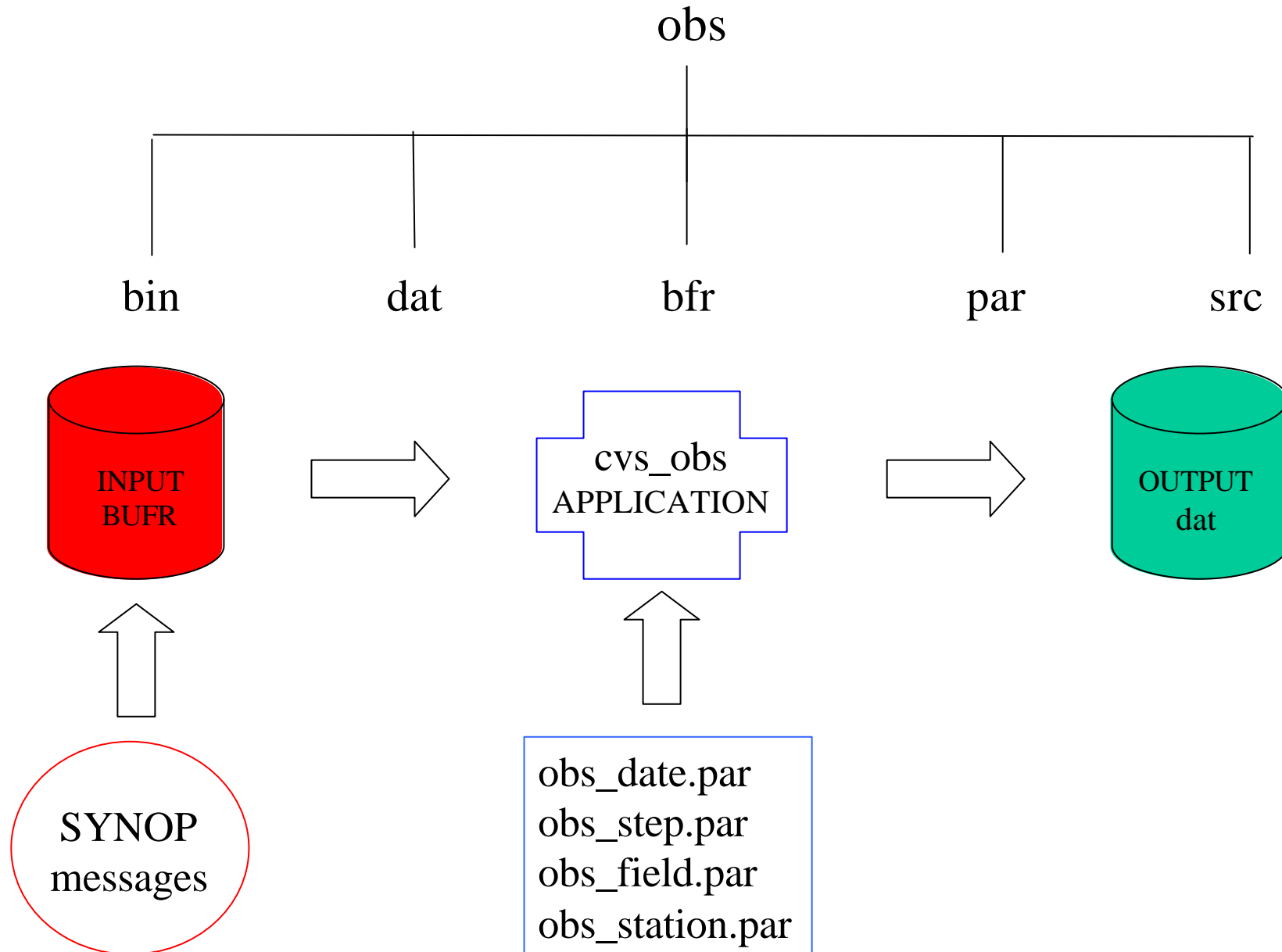
../cvs/fcs/grb/yyyyymmdd\_00.grb



../cvs/fcs/dat/MSLP\_20031201\_f\_20040131\_00.224

DATE	03-UTC	06-UTC	09-UTC	12-UTC	15-UTC	18-UTC	21-UTC	.	.
20031201	1016.6	1016.0	1016.4	1017.6	1016.7	1016.9	1017.9	.	.
20031202	1019.1	1020.4	1019.1	1019.8	1020.0	1020.9	1021.1	.	.
20031203	1021.0	1019.7	1020.2	1020.4	1019.1	1019.3	1018.6	.	.
.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.
20040131	1021.0	1019.7	1020.2	1020.4	1019.1	1019.3	1018.6	.	.

# OBS STRUCTURE





# OBS CONFIGURATION FILE

`obs_date.par` (includes start and final date `yyyymmdd` format)

20031201

20041231

`obs_field.par` (includes meteorological field)

MSLP

TEMP

PREC

WDIR

WMOD

TDEW

# OBS CONFIGURATION FILE

`obs_step.par` (includes time steps)

00  
03  
06  
...  
18  
21

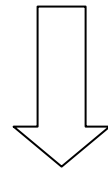
`obs_station.par` (includes station list)

16020 46.45 11.30 241. 1.0  
16021 46.30 11.75 2004. 1.0  
16022 46.15 11.00 2125. 1.0  
16033 46.70 12.20 1222. 1.0  
16036 46.00 12.60 126. 1.0  
.....  
.....

# OBS OUTPUT FILE

Input files

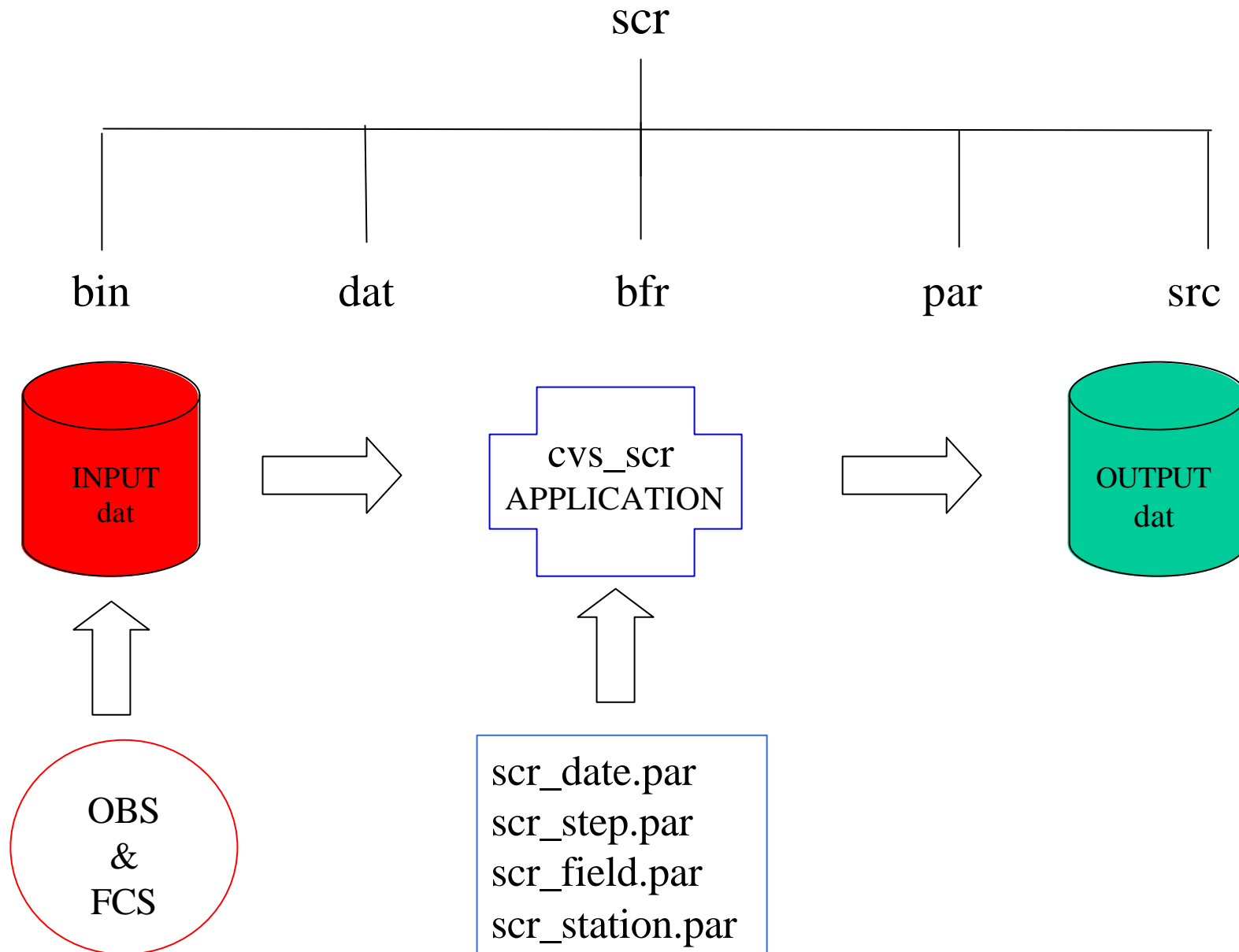
../cvs/obs/bfr/yyyymmgg.bfr



../cvs/obs/dat/MSLP\_20031201\_o\_20040131.16224

DATE	00-UTC	03-UTC	06-UTC	09-UTC	12-UTC	15-UTC	18-UTC	21-UTC
20031201	1019.5	1019.6	1020.0	1021.0	1020.8	1021.2	1022.3	1023.2
20031202	1023.6	9999.9	9999.9	1026.6	1026.1	1025.4	1026.1	1026.8
.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.
20040131	1018.6	1021.3	1021.2	1030.6	1027.5	1025.0	1026.8	1025.6

# SCR STRUCTURE



## SCR CONFIGURATION FILE

[scr\\_date.par](#) (includes start and final date, yyyyymmdd format, and model run time)

20031201

20041231

00-UTC

[scr\\_field.par](#) (includes meteorological field)

MSLP

TEMP

PREC

WDIR

WMOD

TDEW

# SCR CONFIGURATION FILE

`scr_step.par` (includes forecast' steps)

00  
03  
06  
...  
18  
21

`scr_station.par` (includes station list)

16020 46.45 11.30 241. 1.0  
16021 46.30 11.75 2004. 1.0  
16022 46.15 11.00 2125. 1.0  
16033 46.70 12.20 1222. 1.0  
16036 46.00 12.60 126. 1.0  
.....  
.....

# SCR CATEGORICAL CONFIGURATION FILE

`scr_trs.par` (includes station list)

0.0

0.2

0.4

0.8

10.0

.....

.....

40.0

45.0

50.0

# SCR CONTINUOUS STATISTICAL INDEX

ME = mean error

MAE = mean absolute error

MSE = mean square error

RMSE = Root Mean Square Error =  $(\text{MSE})^{1/2}$

MME = Mean Median Error ( Second quartile)

AMME = Absolute Mean Median Error

Q1 = First quartile

Q3 = Third quartile

AQ1 = Absolute first quartile

AQ3 = Absolute third quartile

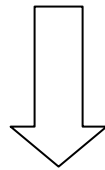


# SCR CONTINUOUS (single station) OUTPUT FILE

Input files

../cvs/fcs/dat/...

../cvs/obs/dat/...

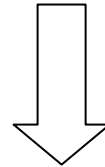


../cvs/scr/dat/MSLP\_20031201\_s\_20040131\_00.16224

<b>FCT</b>	<b>ME</b>	<b>MAE</b>	<b>MSE</b>	<b>RMSE</b>	<b>MME</b>	<b>AMME</b>	<b>Q1</b>	<b>Q3</b>	<b>AQ1</b>	<b>AQ3</b>	<b>Ndata</b>
+03	9999.90	9999.90	9999.90	9999.90	9999.90	9999.90	9999.90	9999.90	9999.90	9999.90	0
+06	1.40	1.44	2.83	1.68	1.30	1.30	0.70	2.20	0.70	2.20	60
+09	9999.90	9999.90	9999.90	9999.90	9999.90	9999.90	9999.90	9999.90	9999.90	9999.90	0
+12	1.50	1.66	3.77	1.94	1.40	1.40	0.85	2.50	0.90	2.50	60
.....											
+45	9999.90	9999.90	9999.90	9999.90	9999.90	9999.90	9999.90	9999.90	9999.90	9999.90	0
+48	1.39	2.67	12.12	3.48	1.30	2.10	-0.30	3.50	0.70	4.20	57
.....											

# SCR CONTINUOUS (total) OUTPUT FILE

Input files  
../cvs/fcs/dat/...  
../cvs/obs/dat/...



../cvs/scr/dat/MSLP\_20031201\_s\_20040131\_00.tot

ID	FCT +03	FCT +06	FCT +09	FCT +12	FCT +15	FCT +18	FCT +21	.	.
016020	-0.67	-0.91	-1.58	-0.06	0.04	-0.41	-0.75	.	.
016021	9999.90	9999.90	9999.90	9999.90	9999.90	9999.90	9999.90	.	.
016036	9999.90	1.31	0.37	1.43	1.40	1.01	1.00	.	.
.	.	.	.	.	.	.	.	.	.
MAE AVG	0.82	1.17	1.11	1.27	1.31	1.42	1.47	.	.
Station	50	74	59	76	59	75	50	.	.

# SCR CATEGORICAL STATISTICAL INDEX

Contingency table (2 x 2)

FBI = Frequency Bias Index

POD = Probability of detection

FAR = False Alarm Ratio

F = False alarm rate

KSS =  $POD - F$  = Hanssen-Kuipers Skill Score

TS = Threat Score

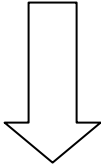
ETS = Equitable Threat Score

HSS = Heidke Skill Score

OR = Odds Ratio

# SCR CATEGORICAL (single station) OUTPUT FILE

Input files  
../cvs/fcs/dat/...  
../cvs/obs/dat/...



../cvs/scr/dat/PREC\_20031201\_s\_20040131\_00.16224

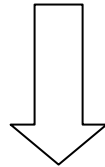
FCT	TRS	A	B	C	D	FBI	POD	FAR	F	KSS	TS	ETS	HSS	OR	Ndata
+12	0.0	2.00	8.00	1.00	48.00	3.33	0.67	0.80	0.14	0.52	0.18	0.14	0.25	12.00	59
+12	0.2	1.00	5.00	1.00	52.00	3.00	0.50	0.83	0.09	0.41	0.14	0.12	0.21	10.40	59
+12	0.4	1.00	4.00	1.00	53.00	2.50	0.50	0.80	0.07	0.43	0.17	0.14	0.25	13.25	59
+12	0.6	1.00	2.00	1.00	55.00	1.50	0.50	0.67	0.04	0.46	0.25	0.23	0.37	27.50	59
+12	0.8	1.00	2.00	1.00	55.00	1.50	0.50	0.67	0.04	0.46	0.25	0.23	0.37	27.50	59
.....															
.....															

# SCR CATEGORICAL (total) OUTPUT FILE

Input files

../cvs/fcs/dat/...

../cvs/obs/dat/...

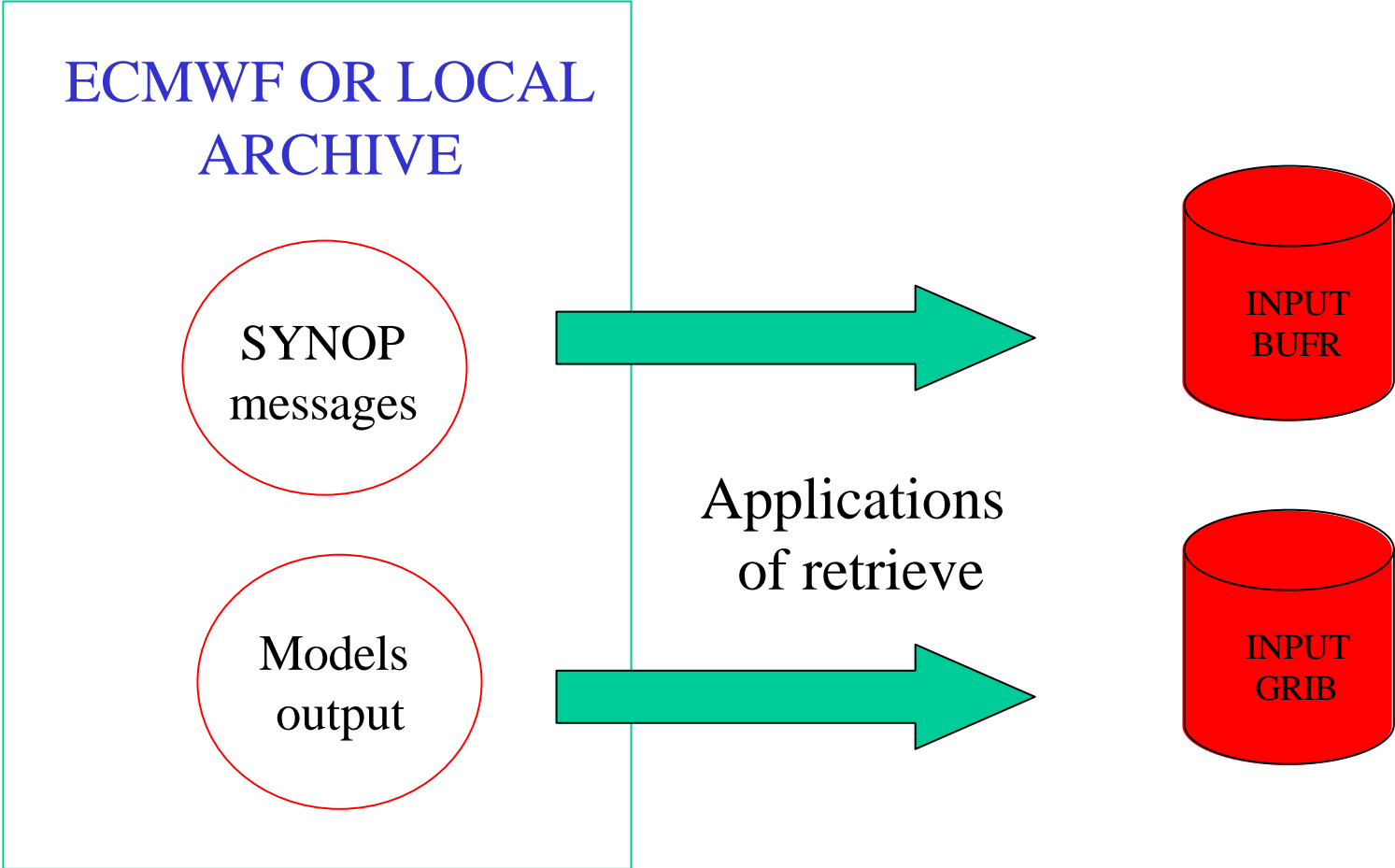


../cvs/scr/dat/PREC\_20031201\_s\_20040131\_00.tot

FCT	TRS	A	B	C	D	FBI	POD	FAR	F	KSS	TS	ETS	HSS	OR	Ndata
+12	0.0	559.00	666.00	202.00	3152.00	1.61	0.73	0.54	0.17	0.56	0.39	0.29	0.45	13.10	4579
+12	0.2	431.00	507.00	193.00	3448.00	1.50	0.69	0.54	0.13	0.56	0.38	0.30	0.46	15.19	4579
+12	0.4	364.00	440.00	188.00	3587.00	1.46	0.66	0.55	0.11	0.55	0.37	0.30	0.46	15.78	4579
+12	0.6	307.00	366.00	193.00	3713.00	1.35	0.61	0.54	0.09	0.52	0.35	0.29	0.46	16.14	4579
+12	0.8	274.00	334.00	186.00	3785.00	1.32	0.60	0.55	0.08	0.51	0.35	0.29	0.45	16.69	4579
+12	1.0	217.00	331.00	144.00	3887.00	1.52	0.60	0.60	0.08	0.52	0.31	0.27	0.42	17.70	4579
+12	2.0	155.00	239.00	123.00	4062.00	1.42	0.56	0.61	0.06	0.50	0.30	0.27	0.42	21.42	4579

.....  
.....

# EXTERNAL INTERFACE

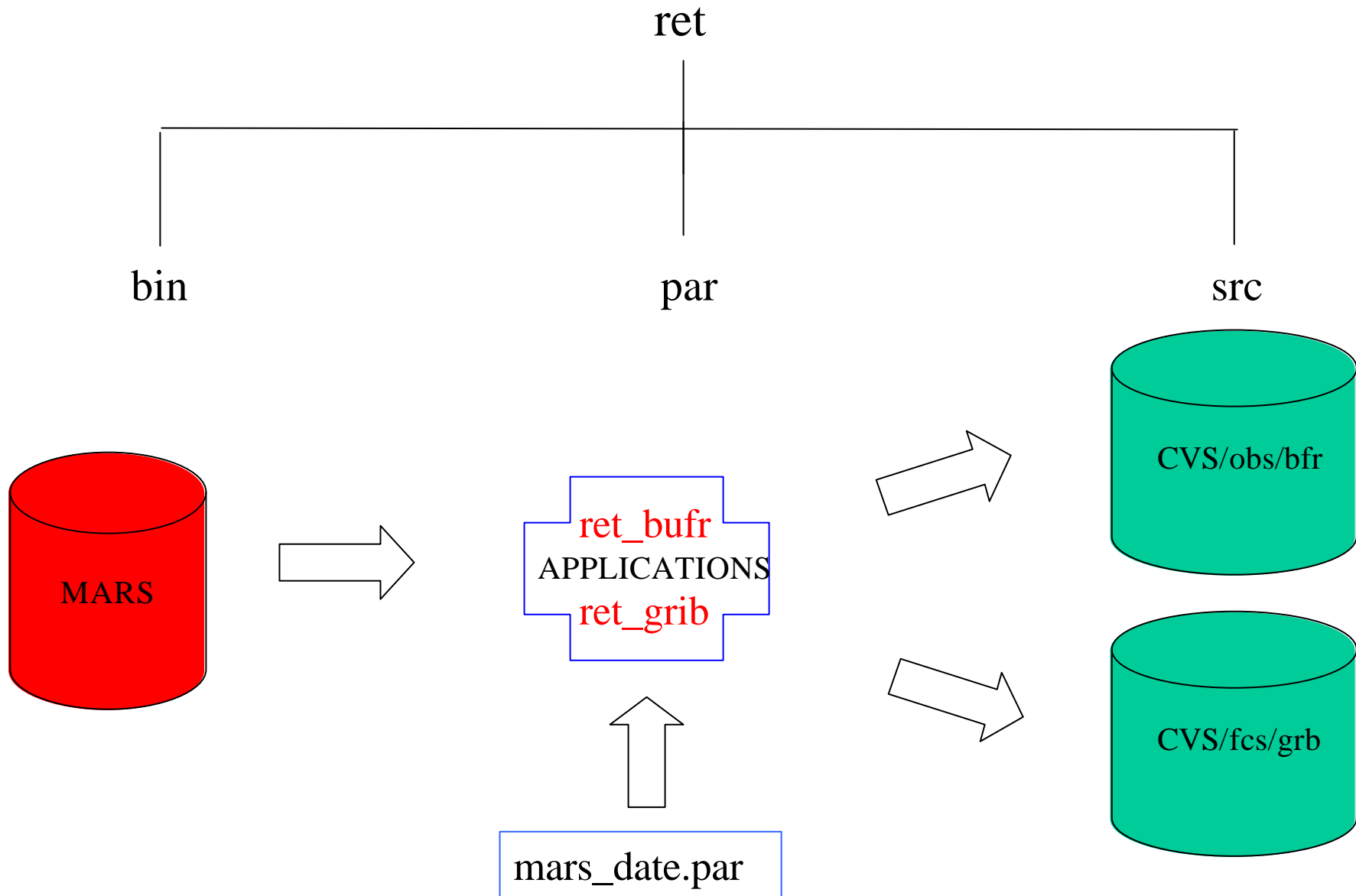


# ECMWF INSTALLATION

## CVS TEST PHASE ON PERSONAL AREA

- Observations are retrieved from MARS in BUFR format (active)
- Forecasts are retrieved from MARS in GRIB format (at the present time active LAMI 00-UTC data)
- Score (in phase of activation)

# CVS RET STRUCTURE





## RET CONFIGURATION FILE

`mars_date.par` (includes start and final date, in `yyyymmdd` format, and model run time)

20031201

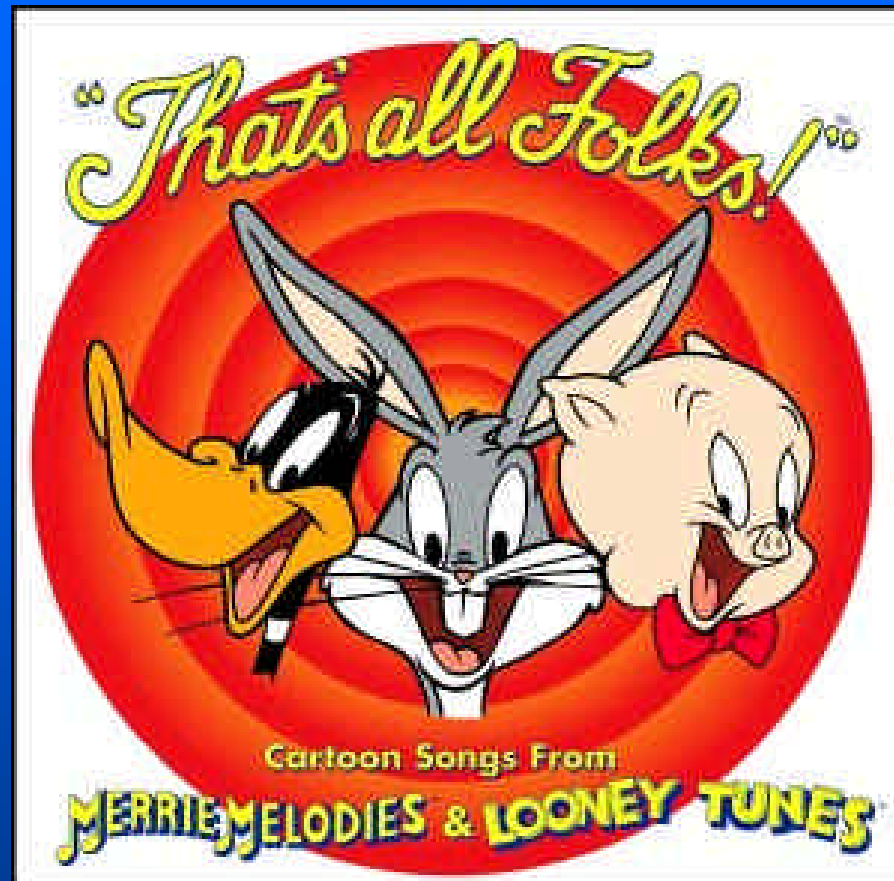
20041231

00-UTC

(model version will be included)

## FUTURE IMPLEMENTATIONS

- Extension to 12-UTC run
- Vertical Profiles
- Score "confidence"
- Graphic Output Representation



Questions & Suggestions ?