

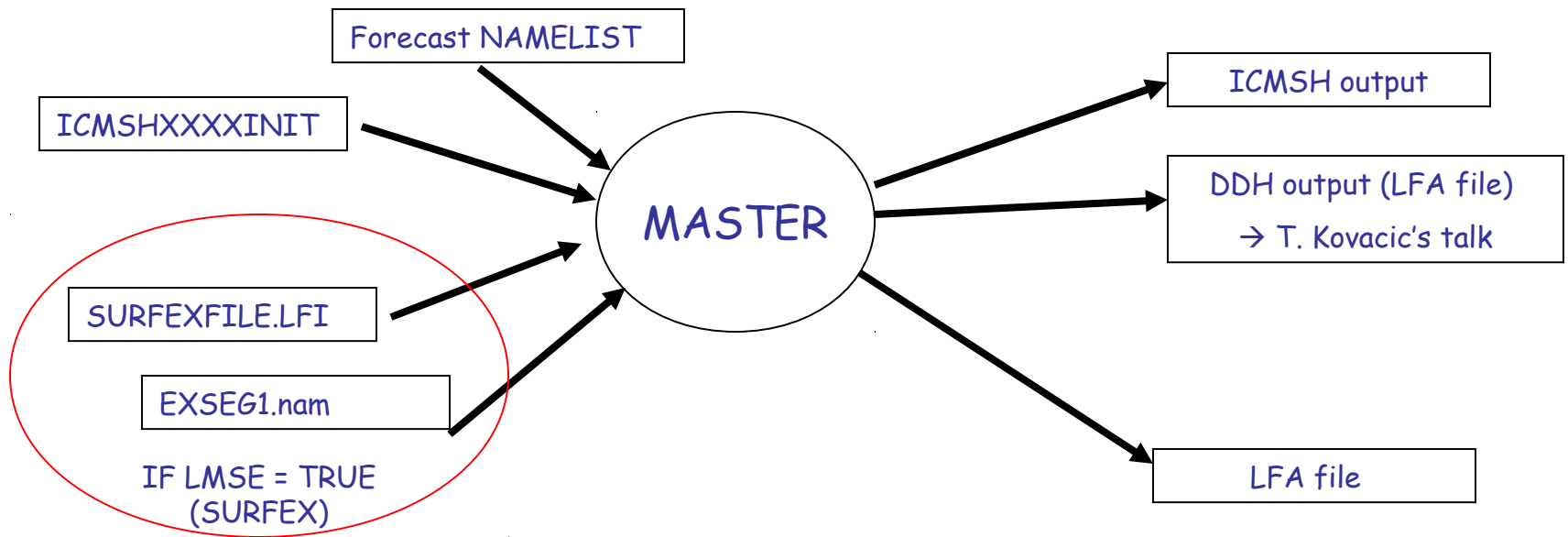
Output format and tools in MUSC

(or do we need specific output in a specific format ?)

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Output files:

- For the output : ICM SH or DDH file + lfa files with LMUSCLFA (used in the previous 1D model)



LFA files with LMUSCLFA (NAMLSFORC)

•In mf_phys.F90 (file created at each time step)=Out.0hh.xxxx.lfa
with xxxx= seconds /3600 and hh forecast length in hour

```
#include "open_output_lfa.intfb.h"
```

```
! -----
```

```
IF (LHOOK) CALL DR_HOOK('CPG',0,ZHOOK_HANDLE)
```

```
IF (LMUSCLFA) CALL OPEN_OUTPUT_LFA)
```

```
..
```

```
..
```

```
IF(LGSCM.OR.LMUSCLFA)
```

```
CALL WRITEPHYSIO ( (KEND, KST, KGL1, KGL2, KSTGLO,  
NSTEP , NTSSG , &YSP_SBD%NLEVS ,PGELAM, PGEMU, PGM, ZMUO,  
POROG, POROGL, ..... )
```

```
..
```

```
..
```

```
IF (LMUSCLFA) CALL LFAFER(86)
```

```
! -----
```

If LMUSCLFA

CALL WRITEMUSC (.....)
write common diagnostic for AROME and
ARPEGE fluxes, variables etc ...

LFA files with LMUSCLFA (NAMLSFORC)

WRITEMUSC (KIDIA , KFDIA , KLON , &
&KTDIA , KLEV , KGL1 , KGL2 , &
&KSTEP , KSGST , KCSS , &
&PAPHI , PAPRS , PAPHIF , PAPRSF , PALPH , PARG , PD2 , &
&PDELP , PIVEG , PLAI , PLNPR , PRDELP , PRSMIN , PSAB , &
+ several FLUXES
& PFPFPSL, PFPFPSN, PFPFPCL, PFPFPCN,
&PFPEVPSL,PFPEVPSN,PFPEVPCL,&
& PFPEVPCN,PFTKE , PGZO , PGZOH , PNEIJ , PVEG , PQS , &
& PQSATS , PRUISL , PRUISP , PRUISS , PUCLS , PVCLS , PTCLS , &
& PQCLS , PRHCLS , PCLCT , PCLCH , PCLCM , PCLCL , &
& PCLCC , PCAPE , KCLPH , PCLPH , PUGST , PVGST , &
& CDLOCK)

• Minimum common output for
AROME, ARPEGE, ALADIN, ALARO physics

WRITEMUSC.F90

```
CALL WRSCMR(IUSCM,'PU',PU,KLON,KLEV)
CALL WRSCMR(IUSCM,'PV',PV,KLON,KLEV)
ZVENT(:,:)=SQRT(PU(:,:)**2+PV(:,:)**2)
CALL WRSCMR(IUSCM,'PVENT',ZVENT,KLON,KLEV)
DO JLON=1,KLON
DO JLEV=1,KLEV
CALL RECPOL(PU(JLON,JLEV),PV(JLON,JLEV),ZVENT(JLON,JLEV),ZDIRVENT(JLON,JLEV))
ZDIRVENT(JLON,JLEV)=ZDIRVENT(JLON,JLEV)/RPI*180._JPRB
ZDIRVENT(JLON,JLEV)=270._JPRB-ZDIRVENT(JLON,JLEV)
IF (ZDIRVENT(JLON,JLEV) < 0.0_JPRB) THEN
  ZDIRVENT(JLON,JLEV)=360._JPRB+ZDIRVENT(JLON,JLEV)
ELSEIF (ZDIRVENT(JLON,JLEV) > 360.0_JPRB) THEN
  ZDIRVENT(JLON,JLEV)=ZDIRVENT(JLON,JLEV)-360._JPRB
ENDIF
ENDDO
ENDDO
CALL WRSCMR(IUSCM,'PDIRVENT',ZDIRVENT,KLON,KLEV)
CALL WRSCMR(IUSCM,'PT',PT,KLON,KLEV)
```

write the wind speed in
the lfa file named
PVENT

write the wind direction
in the lfa file named
PDIRVENT

LFA files with LMUSCLFA (NAMLSFORC)

- and after for "specific outputs" for 1D case : example with Kh the exchange coefficient for T and Q

For ARPEGE/ALARO:

WRSCMR (for 2d) and ECR1D in APLPAR

! MUSC Specific output should

!be put under LMUSCLFA

DO JLEV=KTDIA,KLEV-1

DO JLON=KIDIA,KFDIA

ZKH(JLON,JLEV)=ZKTROV(JLON,JLEV)*ZDPHI/

& (PAPRS(JLON,JLEV)*ZZRTI*RG) ZKM(JLON,JLEV)
=ZKUROV(JLON,JLEV)*ZDPHI/

& (PAPRS(JLON,JLEV)*ZZRTI*RG) ZRIF(JLON,JLEV)
=ZKH(JLON,JLEV)/ZKM(JLON,JLEV)

&*ZRI(JLON,JLEV)

ENDDO

ENDDO

CALL WRSCMR(86, 'ZKH', ZKH, KLON, KLEV+1)

CALL WRSCMR(86, 'ZKM', ZKM, KLON, KLEV+1)

! END OF MUSC OUTPUT

For AROME:

WRAROM (for 2d) and ECR1D

SUBROUTINE TURB_VER_THERMO_FLUX(

!* 2.4 Storage in LES configuration

!

! Copie de Kh pour MUSC

ZA = DZM(PTHLP)

WHERE (ZA==0.) ZA=1.E-6

ZA = - ZFLXZ / ZA * PDZZ

ZA(:, :, IKB) = XCSHF*PPHI3(:, :, IKB)*ZKEFF(:, :, IKB)

CALL WRAROM(86, 'ZKH', ZA(:, 1, IKB:IKU), IIU, IKE)

CALL WRAROM(86, 'WTHL_tur',

&ZFLXZ(:, 1, IKB:IKU), IIU, IKE)

! END OF MUSC OUTPUT

How to use the LFA files ?

• DDHTOOLBOX:

- List of utilities : ls lfa*
- **lfaedit** : edit a lfafile
- **lfamoy** mean_file list_of_file: lfamoy lfa1h Out.010.****.lfa
computes the 1h mean between 10h and 11h
- **lfaminm** gives the list of the field with min max mean
- **lfadiff** F1 F2 FOUT: computes F2-F1 for ALL the fields in the file and creates a lfa file FOUT (**lfadiffrelnz**)
- **mevol** to extract ASCII file for one field .
- In general a manual (short and some time in French !) is available ex: lfamoy but for mevol it is in english !

pxgmap9:/home/bazile/MUSC/GABLS3/OUTPUT_37+1 => lfamoy

Moyenne de n fichiers LFA.

Utilisation: lfamoy FMOY F1 F2 [F3 ... Fn]

avec

F1 F2 [F3 ... Fn] les n fichiers d'entrée.

FMOY le fichier de sortie, recevant la moyenne.

Remarque: la moyenne est opérée sur les articles communs aux n fichiers.

pxgmap9:/home/bazile/MUSC/GABLS3/OUTPUT_37+1 =>

Example for Kh ?

- Mean vertical on profile after 2 and 3h
Ifamoy meanfile Out.002.****.lfa
mevol ZKH meanfile → creates ZKH.tmp.evol
cat ZKH.tmp.evol (two columns height and ZKH)

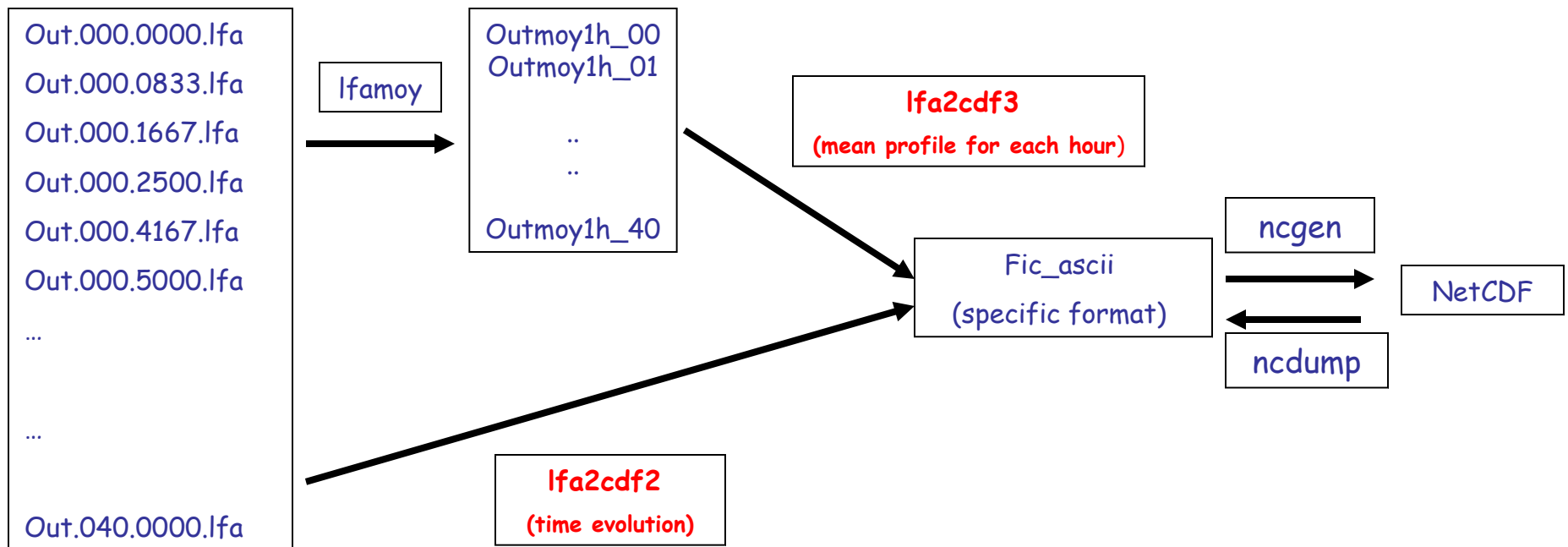
```
...          ....  
1.80096151604  0.2702337E-04  
1.51717446244  16.98675  
1.25646120341  56.43900  
1.01892708640  98.63331  
0.804787827694  133.2816  
0.614352386034  154.8668  
0.448030600535  159.1960  
0.306332005664  139.0621  
0.189872335995  101.2349  
0.993931913041E-01  57.34435  
0.357602768304E-01  22.22794  
0.000000000000  6.674128
```


Example for Kh ?

- Time evolution for the lowest level
mevol -nlast ZKH Out.*.lfa → creates ZKH.tmp.evol
cat ZKH.tmp.evol (two columns time and ZKH)
- 2D Time evolution
mevol ZKH Out.*.lfa → creates ZKH.tmp.evol
cat ZKH.tmp.evol (Three columns time , height and ZKH)

Output files:

- To provide NetCDF files for the EUCLIPSE project from the LFA files, some converters have been written:



Thanks for your attention
Questions ?