

Namelist for MUSC and forcing routines

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Atmospheric forcing: NAMLSFORC

```
! -----  
NAMELIST/NAMLSFORC/                                     &  
& LGEOST_UV_FRC, RCORIO_FORC, RZO_FORC, NL_GEOST_UV_TIME, NGEOST_UV_FREQ, &  
& NGEOST_U_DEB, NGEOST_U_NUM, NGEOST_V_DEB, NGEOST_V_NUM, &  
& LUV_ADV_FRC, NL_UV_ADV_TIME, NUV_ADV_FREQ, NU_ADV_DEB, NU_ADV_NUM, NV_ADV_DEB,  
NV_ADV_NUM, &  
& LT_ADV_FRC, NL_T_ADV_TIME, NT_ADV_FREQ, NT_ADV_DEB, NT_ADV_N &  
& LQV_ADV_FRC, NL_QV_ADV_TIME, NQV_ADV_FREQ, NQV_ADV_DEB, NQV_ADV_NUM, &  
& LSW_FRC, NL_LSW_TIME, NLSW_FREQ, NLSW_DEB, NLSW_NUM, &  
& LSOMEGA_FRC, NL_LSOMEGA_TIME, NLSOMEGA_FREQ, NLSOMEGA_DEB, NLSOMEGA_NUM, &  
& NL_SH_ADV_TIME, NSH_FORC_DEB, NSH_FORC_NUM, &  
& NL_LH_ADV_TIME, NLH_FORC_DEB, NLH_FORC_NUM, &  
& LT_NUDG, LQV_NUDG, LUV_NUDG, RELAX_TAUT, RELAX_TAUQ, RELAX_TAUU, NT_NUDG,  
NQV_NUDG, NU_NUDG, NV_NUDG, &  
& LMUSCLFA  
! -----
```

Information in [arp/module/yomlsforc.F90](#)

Atmospheric forcing: NAMLSFORC

```
Add in NAMCTO LSFORC=.TRUE.,  
&NAMGFL  
  NGFL_FORC=2,  
  YFORC_NL(1)%CNAME='FORC01',  
  YFORC_NL(2)%CNAME='FORC02',  
/  
&NAMLSFORC  
  LGEOST_UV_FRC=T,  
  RCORIO_FORC=1.39E-4,  
  NGEOST_U_DEB=1,  
  NGEOST_U_NUM=1,  
  NGEOST_V_DEB=2,  
  NGEOST_V_NUM=1,  
  LT_ADV_FRC=F,  
  LQV_ADV_FRC=F,  
  LSW_FRC=F,  
/
```

Subroutine for the atmospheric MUSC forcing

arp/adiab/cp_forcing.F90

arp/adiab/gpcty_forc.F90

Atmospheric forcing

Bottom pressure for the nudging level: NAMTOPH

&NAMTOPH

ETRELAXT=60000.

ETRELAXQ=60000.

ETRELAXU=0.

/

&NAMLSFORC

LT_NUDG=.TRUE.,

LQV_NUDG=.TRUE.,

RELAX_TAUT=43200.

RELAX_TAUQ=43200.

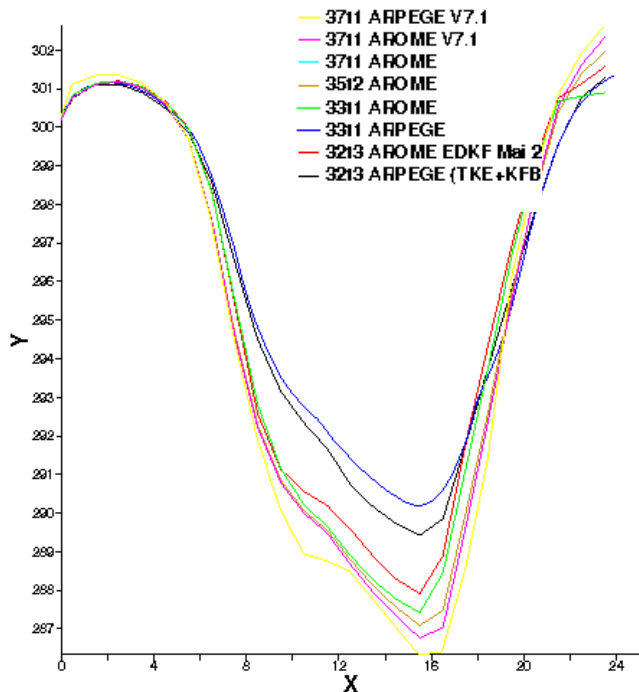
NT_NUDG=1

NQV_NUDG=2

/

GABLS3

GABLS3 (TCLS)



```
&NAM_SURF_ATMn /
```

```
&NAM_ISBAn /
```

```
&NAM_DIAG_SURFm LSURF_BUDGET=.TRUE.,  
LSURF_VARS=.TRUE., N2M=2 /
```

```
&NAM_DIAG_ISBAn LSURF_EVAP_BUDGET=.TRUE.,  
LSURF_MISC_BUDGET=.TRUE., LPGD=.TRUE. /
```

```
&NAM_CH_ISBAN CCH_DRY_DEP='NONE' /
```

```
&NAM_READ_DATA_COVER LREAD_DATA_COVER=.FALSE. /
```

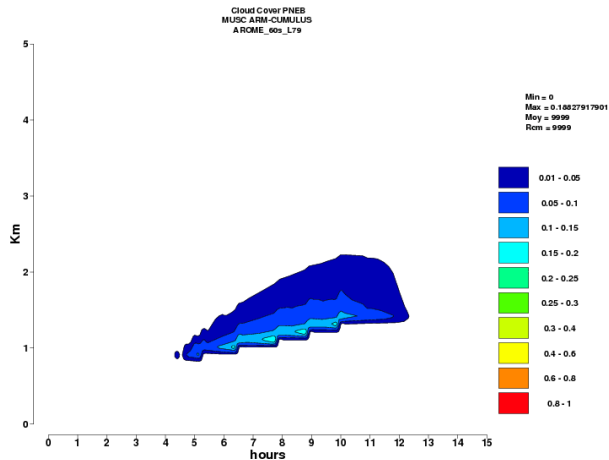
SURFEX V7.1

```
&NAMGFL  
NGFL_FORC=48,  
YFORC_NL(1)%CNAME='FORC001',  
YFORC_NL(2)%CNAME='FORC002',  
..  
.. YFORC_NL(48)  
%CNAME='FORC048'  
/  
&NAMLSFORC  
LMUSCLFA=.T.,  
LGEOST_UV_FRC=T,  
RCORIO_FORC=1.E-4,  
NL_GEOST_UV_TIME(1)=0,  
NL_GEOST_UV_TIME(2)=21600,  
NL_GEOST_UV_TIME(3)=39600,  
NL_GEOST_UV_TIME(4)=54000,  
NL_GEOST_UV_TIME(5)=64800,  
NL_GEOST_UV_TIME(6)=86400,  
NGEOST_U_DEB=1,  
NGEOST_U_NUM=6,  
NGEOST_V_DEB=7,  
NGEOST_V_NUM=6,  
LT_ADV_FRC=T,  
NL_T_ADV_TIME(1)=0,  
NL_T_ADV_TIME(2)=46800,  
NL_T_ADV_TIME(3)=46860,  
NL_T_ADV_TIME(4)=64800,  
NL_T_ADV_TIME(5)=64860,  
NL_T_ADV_TIME(6)=86400,  
NT_ADV_DEB=13,  
NT_ADV_NUM=6,
```

```
LQV_ADV_FRC=T,  
NL_QV_ADV_TIME(1)=0,  
NL_QV_ADV_TIME(2)=32400,  
NL_QV_ADV_TIME(3)=32460,  
NL_QV_ADV_TIME(4)=43200,  
NL_QV_ADV_TIME(5)=43260,  
NL_QV_ADV_TIME(6)=50400,  
NL_QV_ADV_TIME(7)=50460,  
NL_QV_ADV_TIME(8)=61200,  
NL_QV_ADV_TIME(9)=61260,  
NL_QV_ADV_TIME(10)=86400  
NQV_ADV_DEB=19,  
NQV_ADV_NUM=10,  
LUV_ADV_FRC=T,  
NL_UV_ADV_TIME(1)=0,  
NL_UV_ADV_TIME(2)=21600,  
NL_UV_ADV_TIME(3)=21660,  
NL_UV_ADV_TIME(4)=39600,  
NL_UV_ADV_TIME(5)=39660,  
NL_UV_ADV_TIME(6)=54000,  
NL_UV_ADV_TIME(7)=54060,  
NL_UV_ADV_TIME(8)=86400,  
NU_ADV_DEB=29,  
NU_ADV_NUM=8,  
NV_ADV_DEB=37,  
NV_ADV_NUM=8,  
LSOMEGA_FRC=T,  
NL_LSOMEGA_TIME(1)=0,  
NL_LSOMEGA_TIME(2)=18000,  
NL_LSOMEGA_TIME(3)=25200,  
NL_LSOMEGA_TIME(4)=86400,  
NLSOMEGA_DEB=45,  
NLSOMEGA_NUM=4,
```

CUMULUS CASE : Arm-Cu

- **ARMCU** (Duynderke et al 2004)(+16h): Prescribed surface fluxes (latent and sensible heat), hor. Adv for T and Qv (time dependant). Constant geostrophic wind. Radiation switch off. **AVAILABLE** in MUSC since **CY32** → **CY37T1+V7.1**



```
&NAMGFL
NGFL_FORC=14,
YFORC_NL(1)%CNAME='FORC001',
YFORC_NL(2)%CNAME='FORC002',
..
.. YFORC_NL(14)
%CNAME='FORC014'
/
```

```
&NAM_SURF_ATMn /
```

SURFEX V6.0

```
&NAM_ISBAn /
```

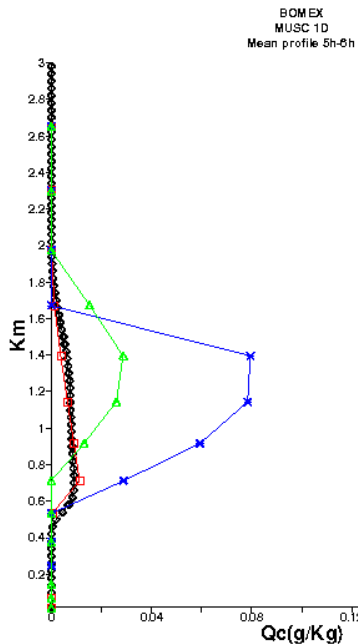
```
&NAM_DIAG_SURFh LSURF_BUDGET=.TRUE.,
LCOEF=.TRUE., LSURF_VARS=.TRUE., N2M=2 /
```

```
&NAM_DIAG_ISBAn
LSURF_EVAP_BUDGET=.TRUE.,
LSURF_MISC_BUDGET=.TRUE., LPGD=.TRUE. /
```

```
&NAMLSFORC
LMUSCLFA=.T.,
LGEOST_UV_FRC=T,
RCORIO_FORC=8.5E-5,
NGEOST_U_DEB=1,
NGEOST_U_NUM=1,
NGEOST_V_DEB=2,
NGEOST_V_NUM=1,
LT_ADV_FRC=T,
NT_ADV_DEB=3,
NT_ADV_NUM=6,
NL_T_ADV_TIME(1)=0,
NL_T_ADV_TIME(2)=10800,
NL_T_ADV_TIME(3)=21600,
NL_T_ADV_TIME(4)=32400,
NL_T_ADV_TIME(5)=43200,
NL_T_ADV_TIME(6)=54000,
LQV_ADV_FRC=T,
NQV_ADV_DEB=9,
NQV_ADV_NUM=6,
NL_QV_ADV_TIME(1)=0,
NL_QV_ADV_TIME(2)=10800,
NL_QV_ADV_TIME(3)=21600,
NL_QV_ADV_TIME(4)=32400,
NL_QV_ADV_TIME(5)=43200,
NL_QV_ADV_TIME(6)=54000,
LSW_FRC=F,
/
```

CUMULUS CASE : BOMEX

- **BOMEX** : constant surface fluxes constant geostrophic wind, hor. Adv for T and Q (Constant), vertical velocity. Radiation switch off. **AVAILABLE** in MUSC cy33+1



```
&NAMGFL
NGFL_FORC=5,
YFORC_NL(1)%CNAME='FORC001',
YFORC_NL(2)%CNAME='FORC002',
..
.. YFORC_NL(5)
%CNAME='FORC005'
/
```

```
&NAMLSFORC
LGEOST_UV_FRC=T,
RCORIO_FORC=3.76E-5,
NGEOST_U_DEB=1,
NGEOST_U_NUM=1,
NGEOST_V_DEB=2,
NGEOST_V_NUM=1,
LT_ADV_FRC=T,
NT_ADV_DEB=3,
NT_ADV_NUM=1,
LQV_ADV_FRC=T,
NQV_ADV_DEB=4,
NQV_ADV_NUM=1,
LSW_FRC=T,
NLSW_DEB=5,
NLSW_NUM=1
/
```

```
&NAM_SURF_ATMn /
```

SURFEX V6.0

```
&NAM_ISBAn /
```

```
&NAM_DIAG_SURF LSURF_BUDGET=.TRUE.,
LCOEF=.TRUE., LSURF_VARS=.TRUE., N2M=2 /
```

```
&NAM_DIAG_ISBAn
LSURF_EVAP_BUDGET=.TRUE.,
LSURF_MISC_BUDGET=.TRUE., LPGD=.TRUE. /
```

MUSC Working week

29Nov-2Dec 2011 Helsinki

ASTEX lagrangian (13th, June 1992, +40 h)

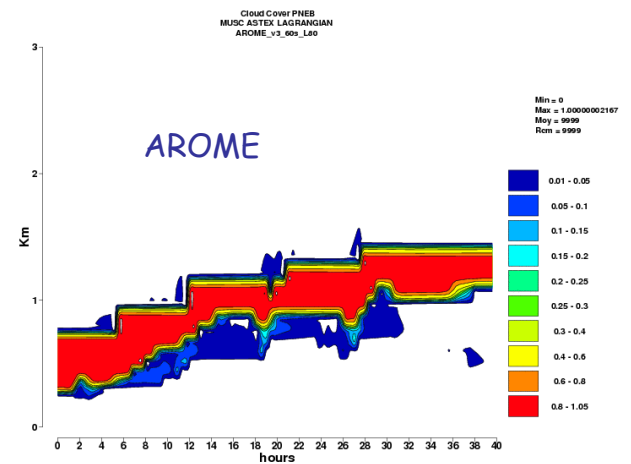
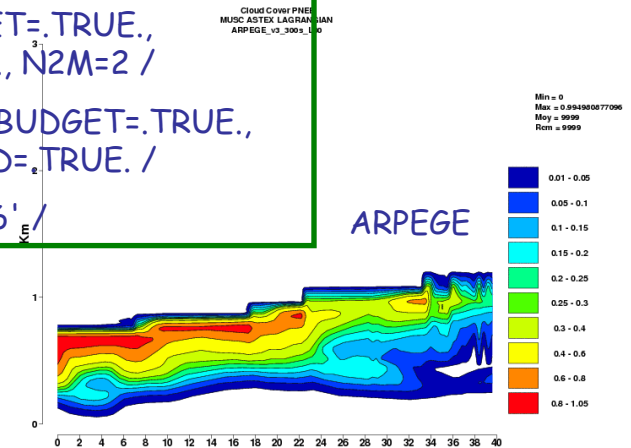
```
&NAMGFL
NGFL_FORC=125,
YFORC_NL(1)%CNAME='FORC001',
YFORC_NL(2)%CNAME='FORC002',
..
.. YFORC_NL(125)
%CNAME='FORC125'
/
```

```
&NAMTOPH
ETRELAXT=60000.
ETRELAXQ=60000.
ETRELAXU=0.
/
&NAMLSFORC
LGEOST_UV_FRC=T,
RCORIO_FORC=8.15E-5,
NGEOST_U_DEB=1,
NGEOST_U_NUM=41,
NGEOST_V_DEB=42,
NGEOST_V_NUM=41,
```

```
NL_GEOST_UV_TIME(1)=0,
NL_GEOST_UV_TIME(2)=3600,
NL_GEOST_UV_TIME(3)=7200,
NL_GEOST_UV_TIME(4)=10800,
...
...
NL_GEOST_UV_TIME(40)=140400,
NL_GEOST_UV_TIME(41)=144000
```

```
&NAM_SURF_ATMn / &NAM_ISBAn / SURFEX V6.0
&NAM_DIAG_SURFh LSURF_BUDGET=.TRUE.,
LCOEF=.TRUE., LSURF_VARS=.TRUE., N2M=2 /
&NAM_DIAG_ISBAn LSURF_EVAP_BUDGET=.TRUE.,
LSURF_MISC_BUDGET=.TRUE., LPGD=.TRUE. /
&NAM_SEAFLUXn CSEA_ALB='TA96' /
```

```
LT_ADV_FRC=F,
LQV_ADV_FRC=F,
LUV_ADV_FRC=F,
LSW_FRC=T,
NLSW_DEB=83,
NLSW_NUM=41,
NL_LSW_TIME(1)=0,
NL_LSW_TIME(2)=3600,
NL_LSW_TIME(3)=7200,
...
..
NL_LSW_TIME(40)=140400
NL_LSW_TIME(41)=144000
LT_NUDG=.TRUE.,
LQV_NUDG=.TRUE.,
RELAX_TAUT=43200.
RELAX_TAUQ=43200.
NT_NUDG=124
NQV_NUDG=125
```



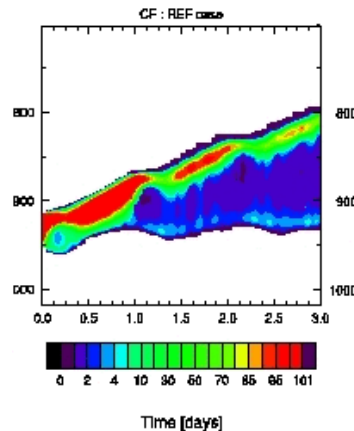
Only available on cy35t2, needs SURFEX V7.2

COMPOSITE Case (15th July, 3 days forecast)

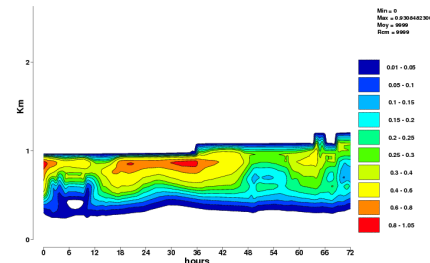
```
&NAMGFL
NGFL_FORC=5,
YFORC_NL(1)%CNAME='FORC001',
YFORC_NL(2)%CNAME='FORC002',
..
YFORC_NL(5)%CNAME='FORC005'
/
```

```
&NAMTOPH
ETRELAXT=60000.
ETRELAXQ=60000.
ETRELAXU=0.
/
&NAMLSFORC
LGEOST_UV_FRC=F.,
LT_ADV_FRC=F,
LQV_ADV_FRC=F,
LUV_ADV_FRC=F,
LSW_FRC=T,
NLSW_DEB=1,
NLSW_NUM=1,
LT_NUDG=.TRUE.,
LQV_NUDG=.TRUE.,
LUV_NUDG=.TRUE.,
RELAX_TAUT=43200.
RELAX_TAUQ=43200.
RELAX_TAUU=900.
NT_NUDG=2
NQV_NUDG=3
NU_NUDG=4
NV_NUDG=5
/
```

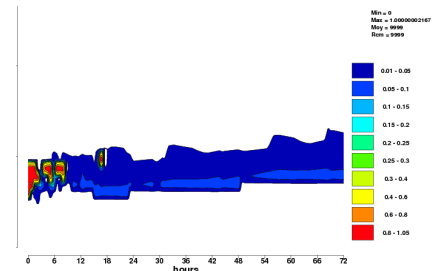
```
&NAM_SURF_ATMn / &NAM_ISBAn / SURFEX V6.0
&NAM_DIAG_SURFh LSURF_BUDGET=.TRUE.,
LCOEF=.TRUE., LSURF_VARS=.TRUE., N2M=2 /
&NAM_DIAG_ISBAn LSURF_EVAP_BUDGET=.TRUE.,
LSURF_MISC_BUDGET=.TRUE., LPGD=.TRUE. /
&NAM_SEAFLUXh CSEA_ALB='MK10' /
```



Cloud Cover ARPEGE NWP



Cloud Cover AROME 60s



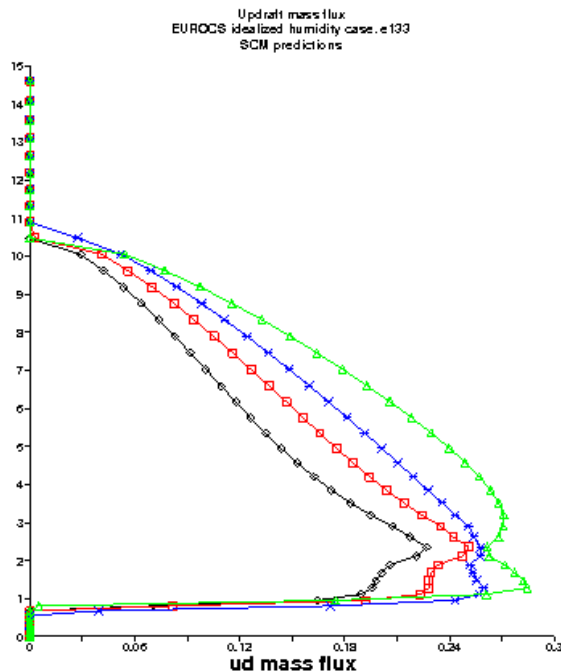
Only available on cy35t2, needs SURFEX V7.2

MUSC Working week

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Deep Convection Idealized Case (Derbyshire et al 2004)

- Only nudging on T,Q and wind. Constant Ts
- Available only on MUSC cy35+2 and cy37+1 WITHOUT SURFEX
- For more detailed contact Jean-Marcel Piriou (used to test PCMT)



```
&NAMGFL  
NGFL_FORC=3,  
YFORC_NL(1)%CNAME='FORC001',  
YFORC_NL(2)%CNAME='FORC002',  
YFORC_NL(3)%CNAME='FORC003'  
/
```

```
&NAMTOPH  
ETRELAXT=89300.  
ETRELAXQ=89300.  
ETRELAXU=89300.  
/  
&NAMLSFORC  
LMUSCLFA=.T.,  
LGEOST_UV_FRC=.F.,  
LT_ADV_FRC=F,  
LQV_ADV_FRC=F,  
LUV_ADV_FRC=F,  
LSW_FRC=F,  
LT_NUDG=.TRUE.,  
LUV_NUDG=.TRUE.,  
LQV_NUDG=.TRUE.,  
RELAX_TAUT=3600.  
RELAX_TAUU=3600.  
RELAX_TAUQ=3600.  
NT_NUDG=1  
NQV_NUDG=2  
NU_NUDG=3  
/
```

MUSC Working week

29Nov-2Dec 2011 Helsinki

Type of forcing

- Atmospheric part :
 - Geostrophic wind (Time dependant)
 - Advection for T, Q, U/V (Time dependant)
 - **Nudging for T, Q, U/V** (Constant profil, above a pressure level)
 - Vertical advection (from W) (Time dependant)
- For the surface, with SURFEX (4.4):
 - By sensible and latent heat fluxes (init_ideal_flux.mnh)
 - By Ts/qs over land or by a **varying SST**
 - **New albedo option Marat Khairoutdinov for the COMPOSITE case.**
- In SURFEX V7.1 the sensible and the latent heat fluxes are given by the namelist
- SURFEX V7.2 will contain a **varying SST** and a **new albedo option Marat Khairoutdinov**

Thanks for your attention
Questions ?