Documentation

MesoNH Tutorial Class 12-15 November 2024

Informations pool

- The website
- The scientific doc
- The user's guide
- The support team

The website

`http://mesonh.aero.obs-mip.fr/mesonh`

The website : Research Activity

- Publications list (with URL)
- Meetings : every 2 years for the user's meeting (presentations are online)
- Some videos and illustrations in a gallery

The website : Documentation

- Specific Meso-NH references (by topic)
- Scientific docs (by topic + SURFEX)
- User's guide (Méso-NH + SURFEX)
- Misc. doc
  (parallelization, Lagrangian analysis, Forefire, reproductibility)
- Docs on graphical tools (ncl, python, visIt, vapor)
- Guide for simulations with chemistry
- This tutorial : exercices (with solutions) and the presentations
- Guide for GIT and Meso-NH setup on several machines
- Guide for extracting IFS, ARPEGE, AROME and GFS files

The website : Code & Data

- Downloading the code and data (PACK + physiographic files)
- GIT sources
- Sample of simulations examples (KTEST)

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The scientific doc

The Meso-NH Atmospheric Simulation System:

Scientific Documentation

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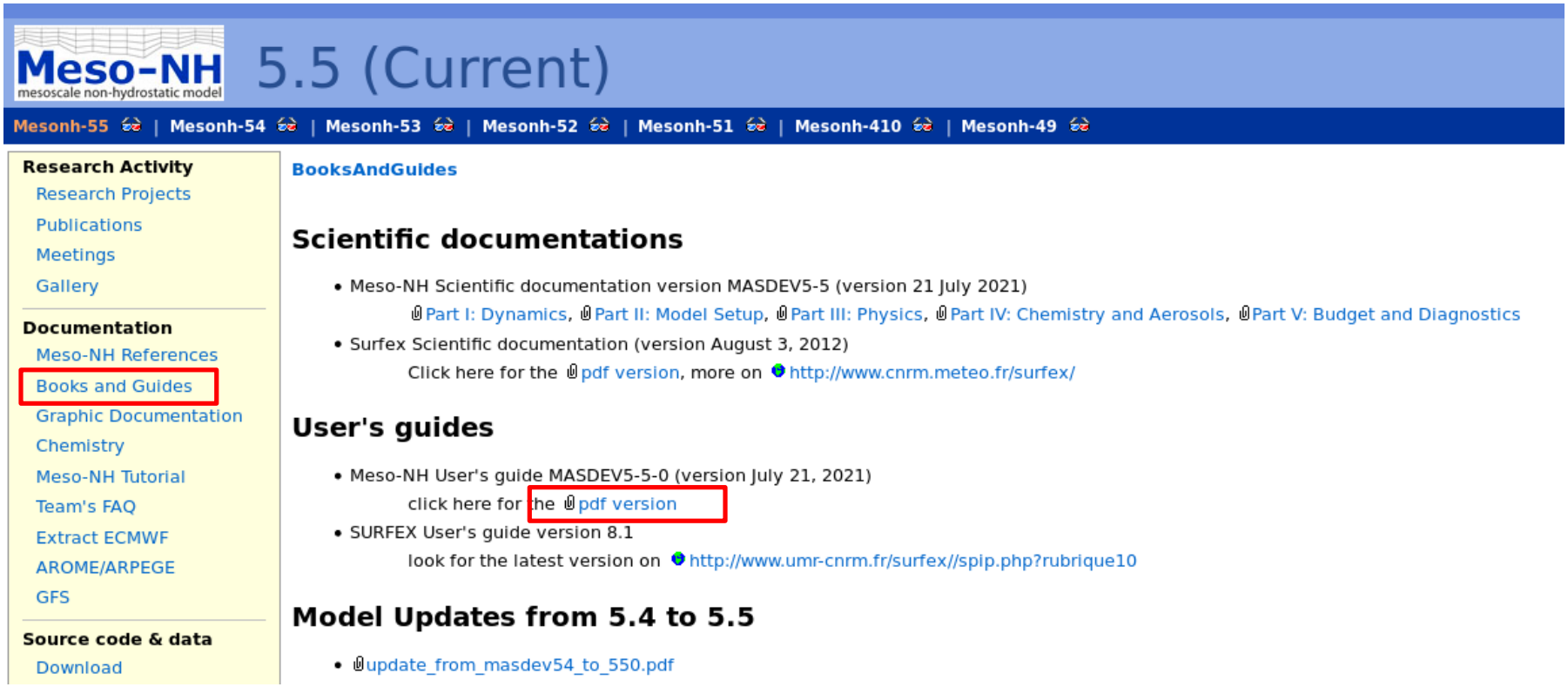

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9.2.33 Namelist NAM_DYNn (parameters for the dynamics of model n)

Fortran name	Fortran type	default value
XTSTEP	real	60.
CPRESOPT	4 characters	'CRESI'
NITR	integer	4
LITRADJ	logical	TRUE
XRELAX	real	1.
LHORELAX_UVWTH	logical	FALSE
LHORELAX_RV	logical	FALSE
LHORELAX_RC	logical	FALSE
LHORELAX_RR	logical	FALSE
LHORELAX_RI	logical	FALSE
LHORELAX_RS	logical	FALSE
LHORELAX_RG	logical	FALSE
LHORELAX_RH	logical	FALSE
LHORELAX_TKE	logical	FALSE
LHORELAX_SV	array logical	FALSE
LHORELAX_SVC2R2	logical	FALSE
LHORELAX_SVC1R3	logical	FALSE
LHORELAX_SVLG	logical	FALSE
LHORELAX_SVCHEM	logical	FALSE
LHORELAX_SVDST	logical	FALSE
LHORELAX_SVPP	logical	FALSE
LHORELAX_SVAER	logical	FALSE
LVE_RELAX	logical	FALSE
LVE_RELAX_GRD	logical	FALSE
NRIMX	integer	1
NRIMY	integer	1
XRIMKMAX	real	$1/(100*60.)$
XT4DIFU	real	1800.
XT4DIFTH	real	1800.
XT4DIFSV	real	1800.

It contains the specific dynamic parameters for the modesimulation.texl n. They are included in the module MODD_DYNn.

- XTSTEP : Time step in seconds. If the model is not the DAD model, XTSTEP is not taken into account but NDTRATIO in NAM_NESTING.

- CPRESOPT : Pressure solver option. 3 choices are implemented in MESONH for the moment (see the Scientific documentation for more details) :

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The user's guide : variables names

Name	Dim	Meaning	Unit
ACPRC	[D]	Accumulated Cloud Precipitation Rain Rate	mm
ACPRG	[D]	Accumulated Precipitation Graupel Rate	mm
ACPRH	[D]	Accumulated Precipitation Hail Rate	mm
ACPRR	[D]	Accumulated Precipitation Rain Rate	mm
ACPRS	[D]	Accumulated Precipitation Snow Rate	mm
ACPRT	[D]	Total Accumulated Precipitation Rate	mm
AZIM	[2D]	azimuth	rad
CG_RATE	[2D]	CloudGround lightning Rate	/s
CG_TOTAL_NB	[2D]	CloudGround lightning Number	-
CLDFR	[2D]	Cloud fraction	
CLEARCOL_TM1	[2D]	Trace of cloud	-
DIR_ALB	[2D]	Direct albedo	-
DIRFLASWD	[2D]	Direct Downward Long Waves on flat surface	W/m^2
DIRSRFSWD	[2D]	Direct Downward Long Waves	W/m^2
DSVCONVxxx	[3D]	Convective tendency for scalar variable	/s
DSVCONV_LINOX	[3D]	Convective tendency for linox	/s
DRCCONV	[2D]	Convective R_c tendency	/s
DRICONV	[2D]	Convective R_i tendency	/s
DRVCONV	[2D]	Convective R_v tendency	/s
DTHCONV	[2D]	Convective heating/cooling rate	K/s
DTHRAD	[2D]	Radiative heating/cooling rate	K/s

The user's guide : variables names

Name	Dim	Meaning	Unit
PRSCONV	[2D]	Convective instantaneous Precipitation Rate for Snow	mm/h
RCT	[3D]	Cloud mixing Ratio at t time	kg/kg
RGT	[3D]	Graupel mixing Ratio at t time	kg/kg
RHODREF	[3D]	Dry density for reference state with orography	kg/m^3
RHOREFZ	[1D]	rhodz for reference state without orography	kg/m^3
RHT	[3D]	Hail mixing Ratio at t time	kg/kg
RIT	[3D]	Ice mixing Ratio at t time	kg/kg
RRT	[3D]	Rain mixing Ratio at t time	kg/kg
RST	[3D]	Snow mixing Ratio at t time	kg/kg
RVFRC	[1D]	$(\partial r_v/\partial t)_{frc}$ forcing vapor mixing ratio	kg/kg
RVT	[3D]	Vapor mixing Ratio at t time	kg/kg
SCA_ALB	[2D]	Scattered albedo	-
SCAFLASWD	[2D]	Scattered Downward Long Waves on flat surface	W/m^2
SVTnnn	[3D]	User or passive scalar variables at t time	kg/kg
TENDRVFRC	[1D]	$(\partial r_v/\partial t)_{frc}$	/s
TENDTHFRC	[1D]	$(\partial \theta/\partial t)_{frc}$	K/s
THFRC	[1D]	θ_{frc} forcing potential temperature	K
THT	[3D]	potential temperature at t time	K
THVREF	[3D]	Thetav for reference state with orography	K
THVREFZ	[1D]	thetavz for reference state without orography	K
TKET	[3D]	Turbulent Kinetic Energy at t time	m^2/s^2
TSRAD	[2D]	Radiative Surface Temperature	K
UFRC	[1D]	zonal component of horizontal forcing wind	m/s
UT	[3D]	horizontal component U of wind at t time	m/s
VFRC	[1D]	meridian component of horizontal forcing wind	m/s
VT	[3D]	horizontal component V of wind at t time	m/s
WFRC	[D]	vertical forcing wind	m/s
WT	[3D]	vertical wind at t time	m/s
ZENITH	[2D]	zenith	rad
ZS	[2D]	orography	m
ZSMT	[2D]	smoothed orography for SLEVE vertical coordinate	m

The SURFEX doc

`http://www.umr-cnrm.fr/surfex/`
SURFEX tutorial : twice a year (november and march)

Links

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- General presentation
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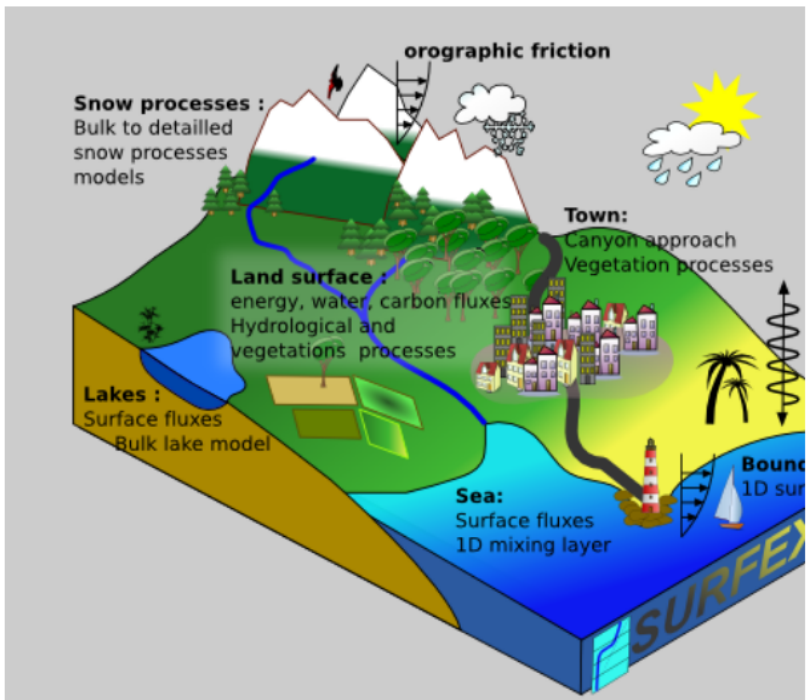
Welcome to the SURFEX Home Page



SURFEX (Surface Externalisée, in French) is a surface modelling platform developed by Météo-France in cooperation with the scientific community.

SURFEX is composed of various physical models for natural land surface, urbanized areas, lakes and oceans. It also simulates chemistry and aerosols surface processes and can be used for assimilation of surface and near surface variables.