

# **PREP Initialization in SURFEX**

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# The PREP tool

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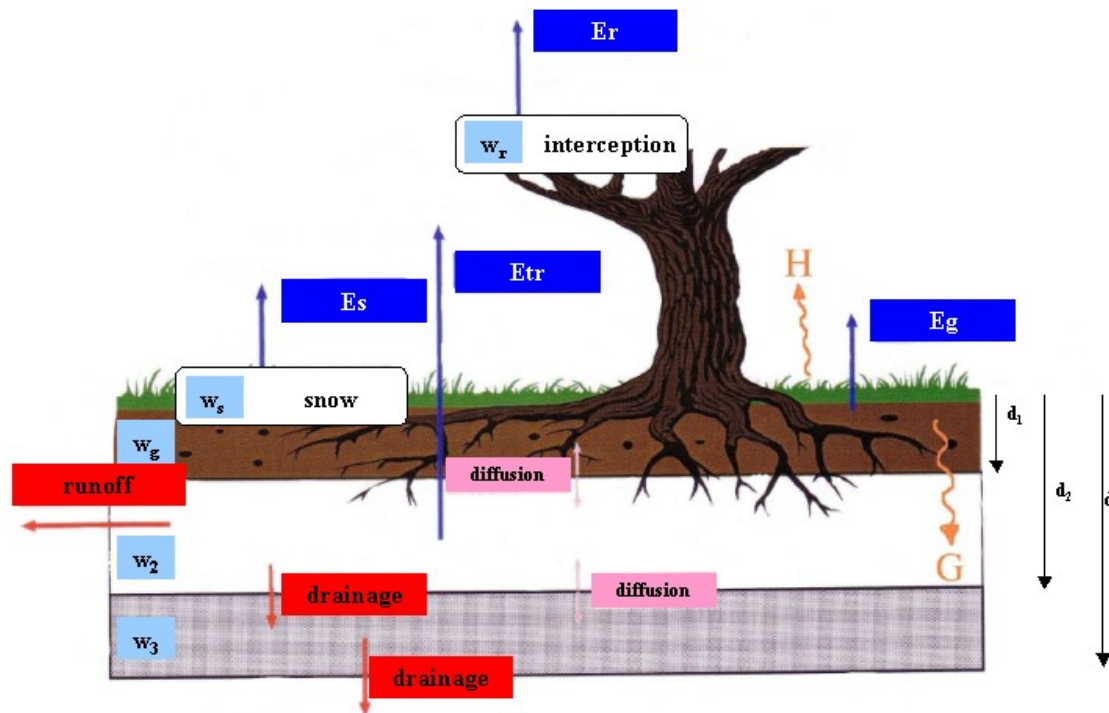
To initialize models prognostic variables for natural areas with **ISBA**, cities with **TEB**, lakes with **Flake** or **WATFLX** and sea/ocean with **CMO1D** or **SEAFLX**.

$$\frac{\partial X(t, s)}{\partial t} = F(t, s) \quad s = (x, y, z)$$

$$X(0, s) = ?$$

# ISBA prognostic variables

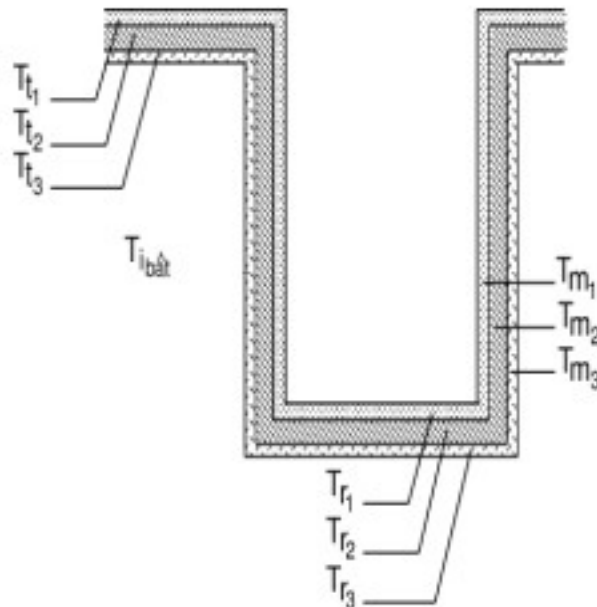
- Vertical profiles of temperature, liquid and ice water contents
- Interception reservoir water content
- Snow water equivalent, albedo of snow...



# TEB prognostic variables

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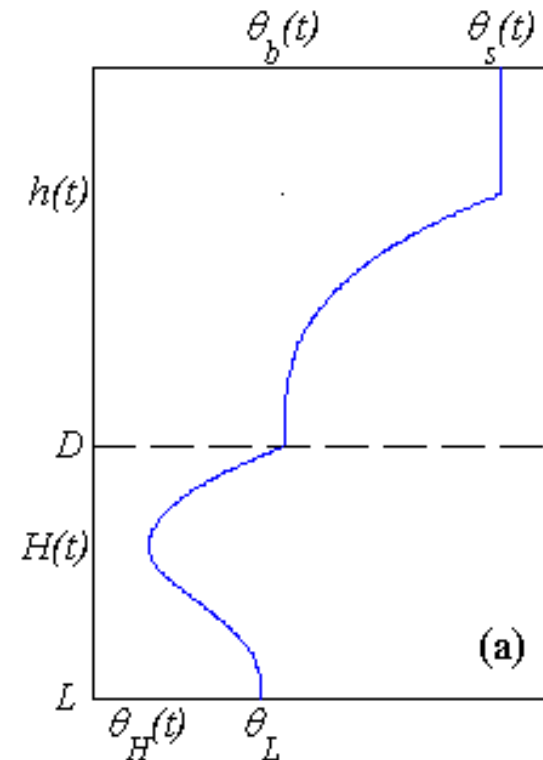
- Roof, walls and road temperatures
- Roof and road water contents
- Building internal temperature
- Snow



# FLake Prognostic variables

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- Surface, bottom, and mean water temperatures
- Mixing layer depth
- Shape of the thermocline profile
- Snow and ice thicknesses
- Snow and ice temperatures



# CMO1D prognostic variables

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- Surface temperature
- Salinity
- Current
- Turbulent kinetic energy

## WATFLX/SEAFLX prognostic variables

- Surface temperature  
(constant during a forecast)

# Initialization

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- Uniform (values at z=0m)
  - Example: to initialize the surface temperature in ISBA
    - ▶ XTG\_SURF=290.
  - Example: to initialize surface soil moisture to field capacity
    - ▶ XHUG\_SURF=1.
- From a model forecast or analysis file
  - ECMWF, ARPEGE, ALADIN, AROME, MOCAGE, MERCATOR
  - Example of ISBA:
    - ▶ Reading of atmospheric fields, then projection on a detailed soil grid (20 layers)
    - ▶ Horizontal interpolations on the fine grid, then vertical interpolations on the target grid
    - ▶ Back to model variables
- From an external file of (lat, lon, value) type (ASCLLV):
  - ▶ Only available for some fields
  - ▶ CFILE\_TG\_SURF='tg\_surf.dat' ; CTYPE\_TG='ASCLLV'

# Example 1:

## Initialization of tile variables from ECMWF file

&NAM\_PREP\_SURF\_ATM

CFILE='ecmwf.OD.20050526.18', CFILETYPE='GRIB' /

&NAM\_PREP\_TEB

CFILE\_TEB='ecmwf.OD.20050526.18', CFILETYPE='GRIB' /

&NAM\_PREP\_SEAFLUX

CFILE\_TEB='ecmwf.OD.20050526.18', CFILETYPE='GRIB' /

&NAM\_PREP\_WATFLUX

CFILE\_TEB='ecmwf.OD.20050526.18', CFILETYPE='GRIB' /

&NAM\_PREP\_ISBA

CFILE\_TEB='ecmwf.OD.20050526.18', CFILETYPE='GRIB' /



## Example 2:

# Initialization of ISBA variables from external file

### &NAM\_PREP\_ISBA

CFILE\_ISBA = 'ecmwf.OD.20050526.18', CTYPE = 'GRIB',

CFILE\_HUG\_SURF = 'SWI1\_SIM\_2005052618\_ALL',

CFILE\_HUG\_ROOT = 'SWI2\_SIM\_2005052618\_ALL',

CFILE\_HUG\_DEEP = 'SWI3\_SIM\_2005052618\_ALL',

CFILE\_TG\_SURF = 'TG1\_SIM\_2005052618\_ALL',

CFILE\_TG\_ROOT = 'TG2\_SIM\_2005052618\_ALL',

CFILE\_TG\_DEEP = 'TG3\_SIM\_2005052618\_ALL',

CFILE\_HUG = 'ASCLLV', CFILE\_TG = 'ASCLLV'

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