Norwegian
Meteorological
Institute

Offline SURFEX forcing and output interface

Trygve Aspelien

18.09.2017

Offline/inline environment

- https//svn.hirlam.org/branches/harmonie-40h1.2_EKF/
  - util/offline
  - util/offline/src
    - ASSIM -> ../../../src/surfex/ASSIM
    - FORC -> ../../forcing/FORC
    - MSE -> ../../../src/mse/programs (*)
    - OFFLIN -> ../../../src/surfex/OFFLIN
    - SURFEX -> ../../../src/surfex/SURFEX
    - Makefile.SURFEX.mk (*)

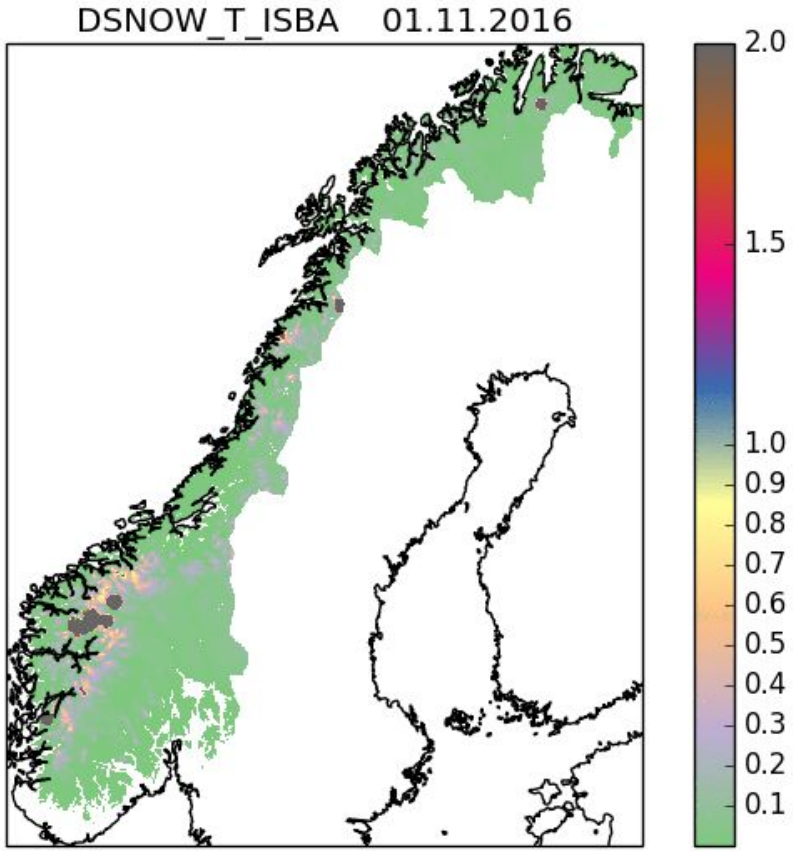
(*) Extra «project» compared to pure offline

Forcing and surfex tools

- Python project on github (still under development)
  - https://github.com/metno/offline-surfex-forcing
- Forcing generation (similar to shell+fortran tool in trunk at the moment)
  - Arbitrary input and format for each Surfex variable
  - Full user flexibility based on configuration files (YAML)
    - Model forcing from NetCDF files
    - Points are tested
    - Grib not yet implemented
    - FA/lfi not implemented. Should use epygram libary for IO.
- Plotting
  - Python framework for reading different gridtypes, project them to a map and plotting.
    - ASCII
    - ASCII/OFFLIN/NetCDF/TEXTE together with a PGD file

Snow map

- Defined a new IGN grid with MetCoOp projection parameters
  - ~50 000 points vs ~ 0.7 mill points or more with new domain



Norwegian Meteorological Institute

Norwegian Meteorological Institute

CANARI (assimilation) and SURFEX

Trygve Aspelien

17.09.2017

Motivation

- The analysis in CANARI is only reading atmosphere file
  - - OK, for grid average of T2M, RH2M and SWE because the first guess is the same in atmosphere file and SURFEX file
  - - Needs communication of these variables in apl_aome/aplpar during forecast
  - - assimilating SWE and not snow depth
    - observations are converted to SWE based on climatological density values
  - - no patch information
- apl_arome/aplpar are also used in the forecast but only relevant values are synchronized
- Mismatch in upper air field time step 0 and SURFEX time 0 (in reality after one time step)

LMSE=.T.

- Tested technically OK
  - Still needs the SURFEX fields in buffer
    - GOTO SURFEX(BLOCK,LOGICAL)
    - Read SURFEX variable
  - Must be in MSE project due to interoperability with other external partners

At least 3 possibilities

- General solution:
  - - create a new setup module (su_surf_flds_sfx)
    - extend pointers to surface_field_mix
- Extend output
  - - Make sure to write field to upper air output
  - - Read this new output in setup into a new variable/pointer
- Dirty hack for snow depth
  - - Modify SWE to new snow depth in input file for CANARI
  - - read it as before for SWE
  - - Skip converting snow depth to SWE for observations in ODB

- CNT0
  - SU_SURF_FLDS # Set up surface fields from surface_fields_mix
- CAN1
  - CANARI
    - SUGOMS
    - CAMELO
      - CALICO # Climatological snow densities
    - CANACO(1)
    - STEPO # Step control
      - SCAN2M # Inside NPROMA loop

        COBSALL

        COBS # Use fields read in setup

        GP_MODEL # CANARI exits right away, no physics called

        CAPOTX # First guess
    - OBSV # JO computation

      TASKOB # Loop all observations

      HOP

      PREINTS

      PPOBSN # Obs operator for snow
    - CAIDCU # Analyis
    - CANACO(2)

Future

- CANARI, does it have a future?
  - + uses ODB
  - + parallel environment
  - - CANARI will never be used offline
  - - Must be adapted to patches
- Gridpp is open source
  - + will soon get OI, used in MET-Norway PP
  - + Could be used also in offline environment
  - - Need ODB interface
  - - Parallelization not fully implemented
- ECMWF surface analysis
  - + uses ODB
  - + parallell environment
  - - Not SURFEX adapted (patches)
  - - Can it be used offline?