EURRA 2D

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SURFACE/SURFEX WORKSHOP

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METEO FRANCE
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OUTLINE

- EURRA project :
  - Presentation
  - Interest
- Tools for EURRA available at Meteo-France :
  - Diagpack
  - Varpack
  - SIM

EURRA

- Eurra is a project from EEA (European Environmental Agency) for a mesoscale reanalysis to provide Meteorological and climatological data.

- The project is not yet clearly defined nor funded.

- Requires to find a coordinator

- Historical background :

  - 1995-2002 : ERA-40 reanalysis much used for climate and environmental research

  - EU wants more public mesoscale weather data available, ECMWF suggests EEA to fund EURRA program.

  - 2005 EEA and different partners started to reflect about requirements for a mesoscale analysis.

EEA requirements for EURRA

- Data needs by EEA :
  - Low-level wind
  - T2m, Hu2m
  - Clouds
  - rr, rr24 from radar data + rain gauges.
  - Soil humidity/temperature/runoff
  - Ground snow
  - …
- System for analysis, 3dvar/4dvar/OI ? => depending on the parameter
- Grid size for the analysis :
  - 10 km for the first reanalysis
  - Downscaling to 2km later

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Interest for the ALADIN/HIRLAM community

- Climate change studies
- Nowcasting applications
- Use of more elaborated data inside NWP systems (ex : bogus)
- Link with surface analysis
- More resources by joining forces with the climate and nowcasting communities

Diagnostic tools for mesoscale analysis in Meteo-France

- SIM : daily analysis providing surface parameters
- Diagpack : based on OI algorithm, adapted for screen level diagnostics
- Varpack : similar to diagpack with 3dvar algorithm

Varpack

- Diagnostic analysis based on variational method : minimization of a cost function

- Cost function :

$$\delta x^t B^{-1} \delta x^t + (H\delta x - y)^t R^{-1} (H\delta x - y)$$

- Algorithm similar to our 3-dvar system for LAM model ALADIN

- Minor changes :
    - screen-level observation operators
    - B matrix (2 more levels)

Varpack versus Diagpack

- **Advantages** :
  - possibility to use more observations (satellite)=> better upper-air
  - Analysis benefits improvement of 3dvar system (multivariate aspect)
- **Drawback** : more expensive (x4 computational time on the same domain)
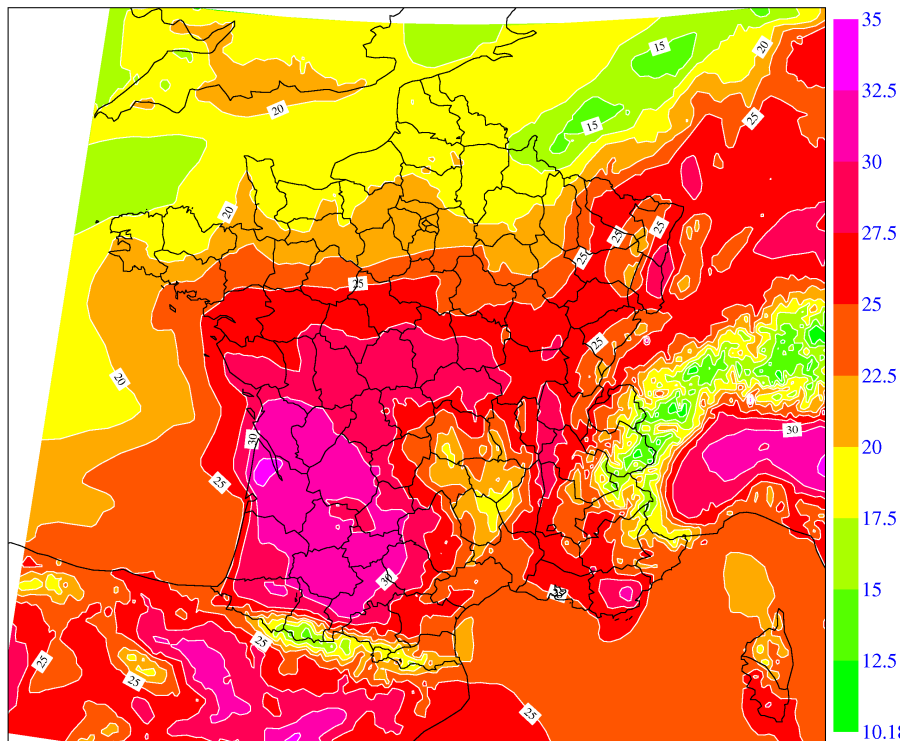
Varpack Observations

- SYNOP observation (T2m, Hu2m)
- TEMP
- AIREP
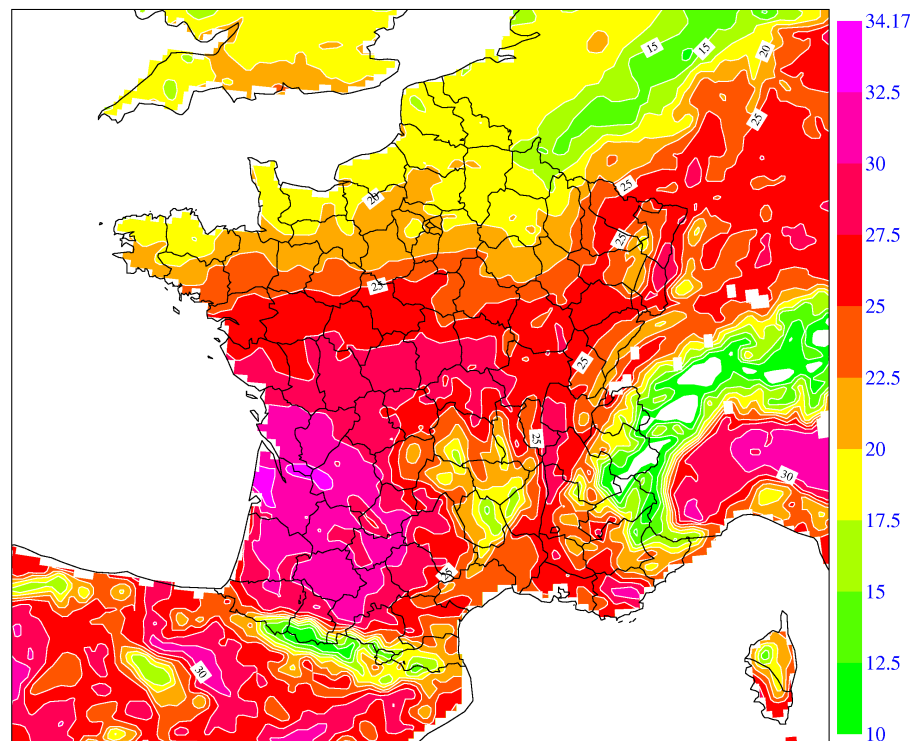- Satellite radiances (SEVIRI,NOAA…)

Same as diagpack

T2m+Hu2m observations

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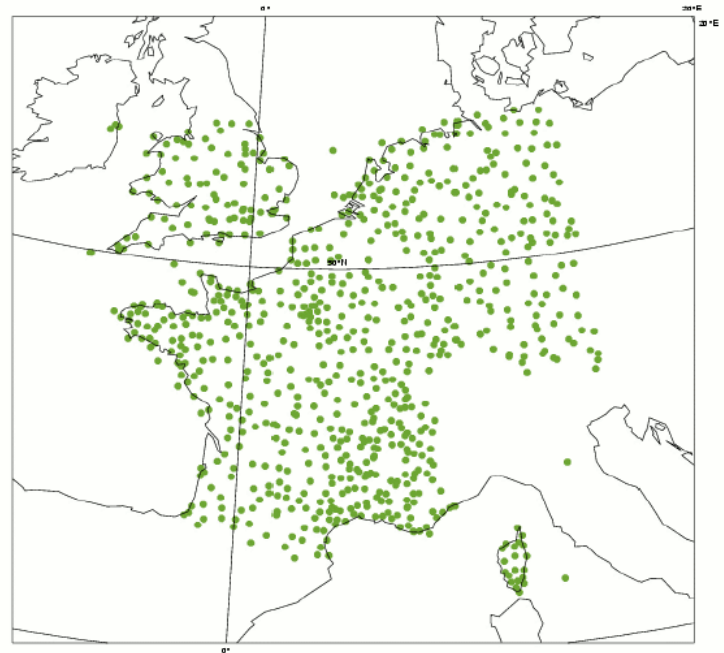
Varpack/Diagpack T2m
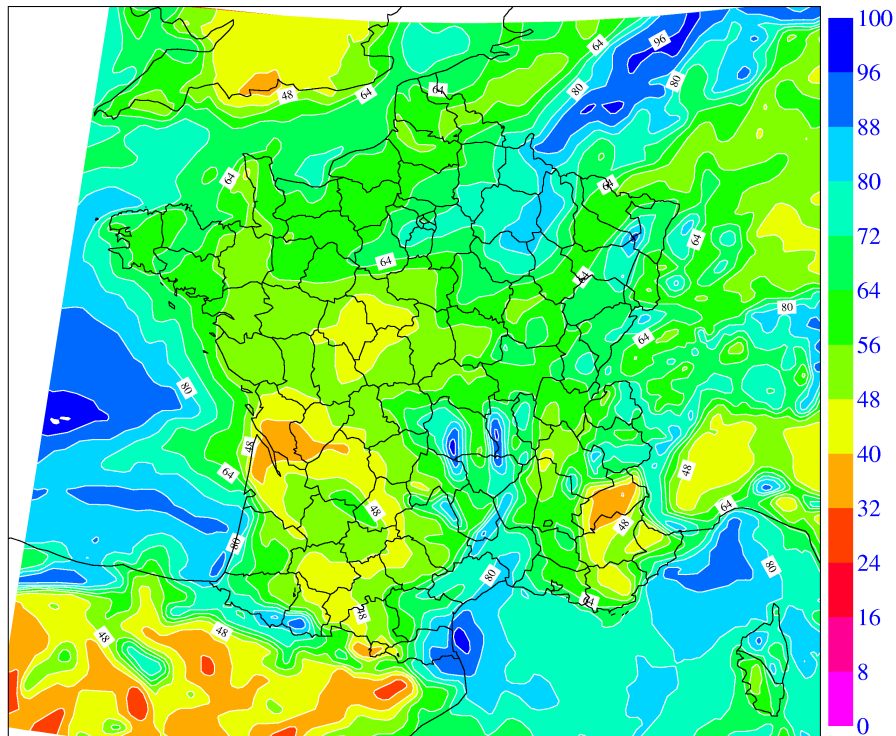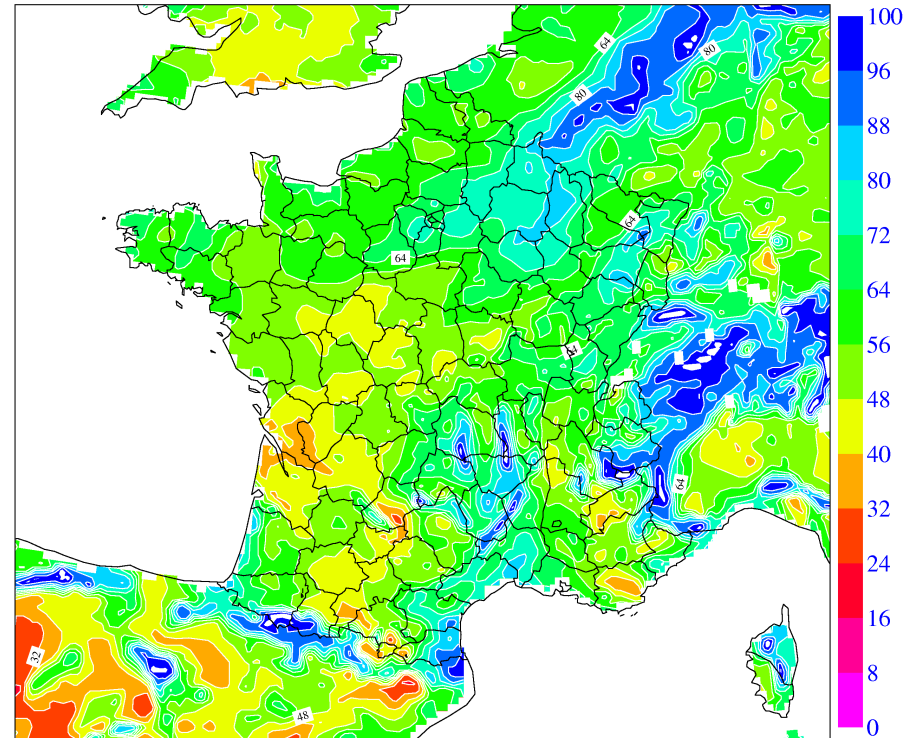## 07/10/2006, 15H00 UTC

Varpack

Diagpack

Varpack/Diagpack Hu2m,
07/10/2006, 15H00 UTC

Varpack

Diagpack

SAFRAN-ISBA-MODCOU Analysis

Stage I : SAFRAN ANALYSIS

ARPEGE forecast

Obs : T2m, Hu2m Precip, couldiness…

Safran Analysis (T2m, Hu2m, u10, precipitations , cloudiness)
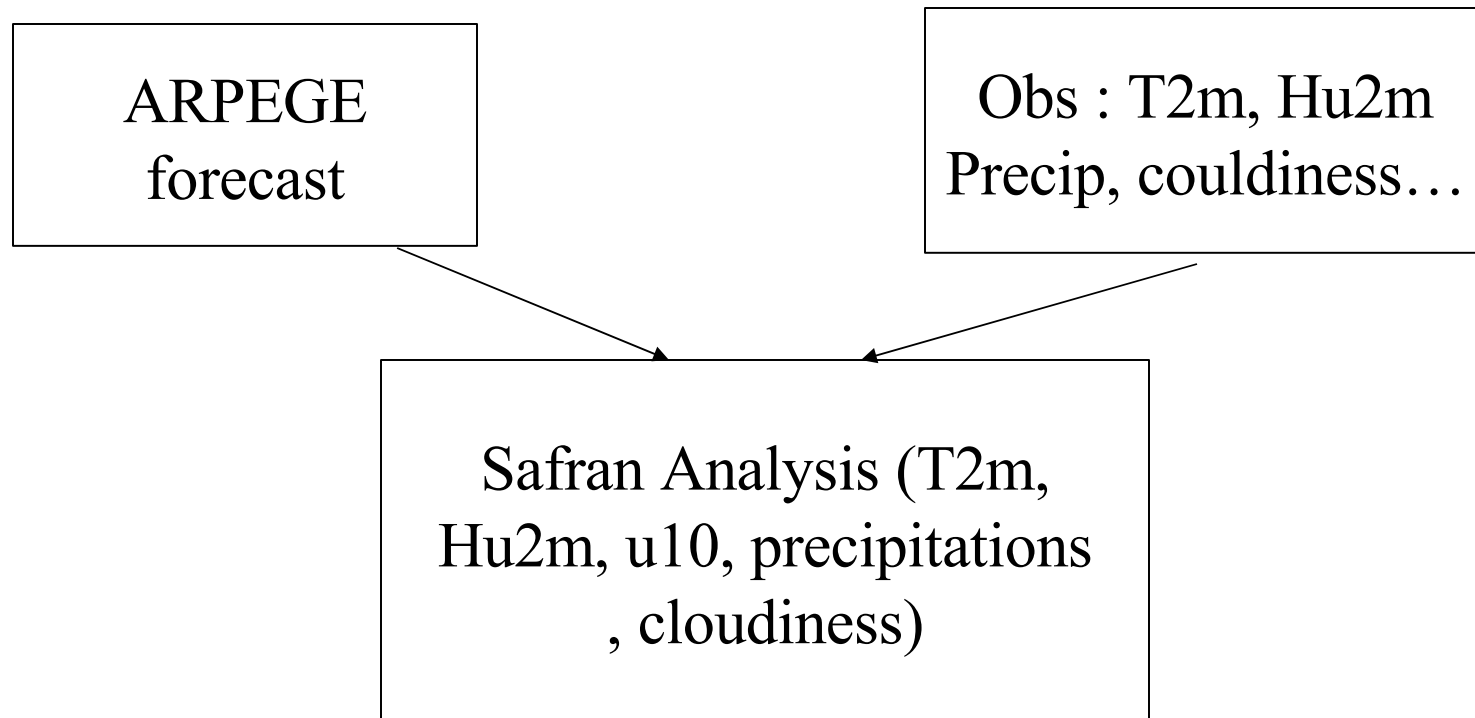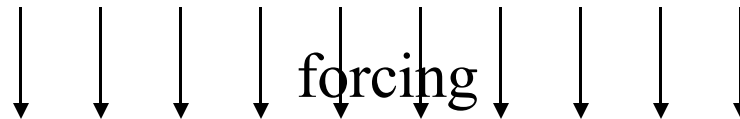
SAFRAN-ISBA-MODCOU Analysis

Stage II : ISBA RUN

Safran Analysis (T2m, Hu2m, u10, precipitations , cloudiness

forcing

ISBA model

6H00   6H00 J+1

- ISBA model gives ground water content
- Information used by hydrologic model MODCOU

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Initialization of Wp with SIM

- Deep Water content from SIM interesting to use
- We use the soil wetness index (SWI) (under our latitudes humidity fluxes are mainly due to transpiration).
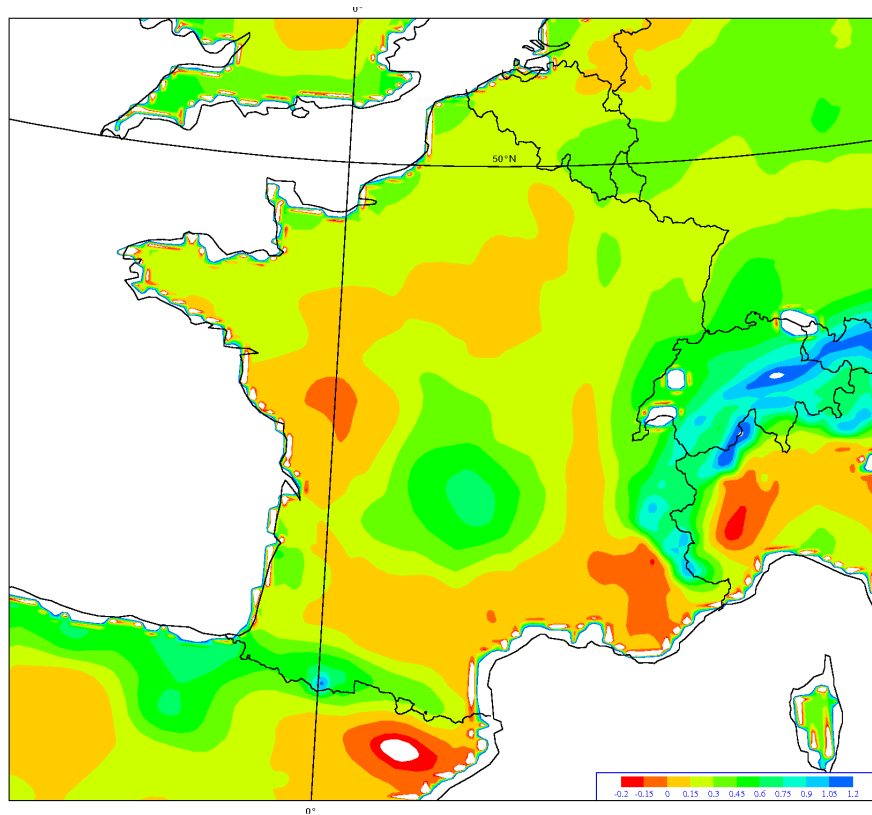
$$SWI = \frac{w - w_{wilt}}{w_{fc} - w_{wilt}}$$

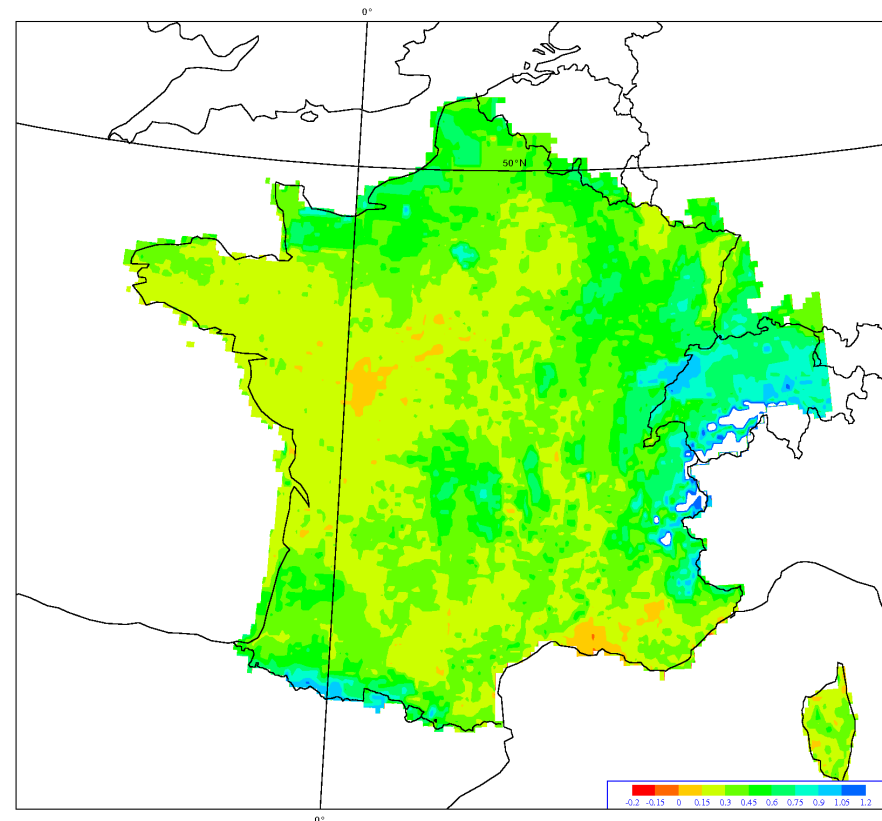- Wilting point and field capacity depends on ground parameters.

SWI for aladin/SIM

01/07/2006 at 06H00 UTC

ALADIN

SIM

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Thank you for your attention…