PEARP:

the Meteo-France short-range ensemble prediction system

METEO FRANCE
Toujours un temps d'avance

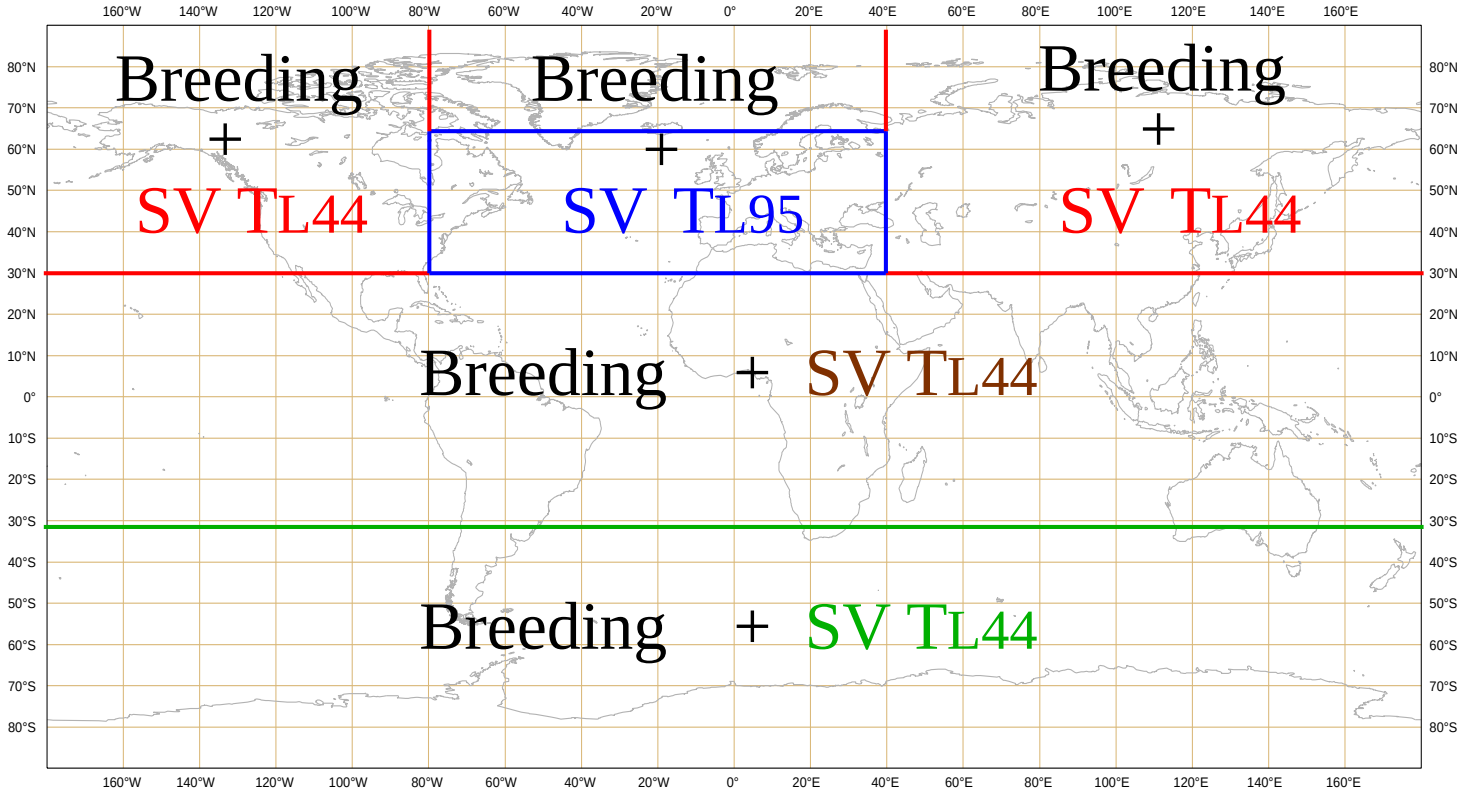
Outline

- PEARP configuration in 2008
  - initialization procedure
  - ensemble size
  - model characteristics
- Upgrades planned for 2009
- Conclusion

PEARP 2008

- Prévision Ensemble ARPEGE
- Initialization procedure
- Combine breeding and SVs
  - SV computed for four targeted areas:
    - EURAT,NHC,TROP,SH
  - 16 TL95-SVs for EURAT, 10 TL44-SVs for NHC and TROP, 20-TL44 SVs for SH

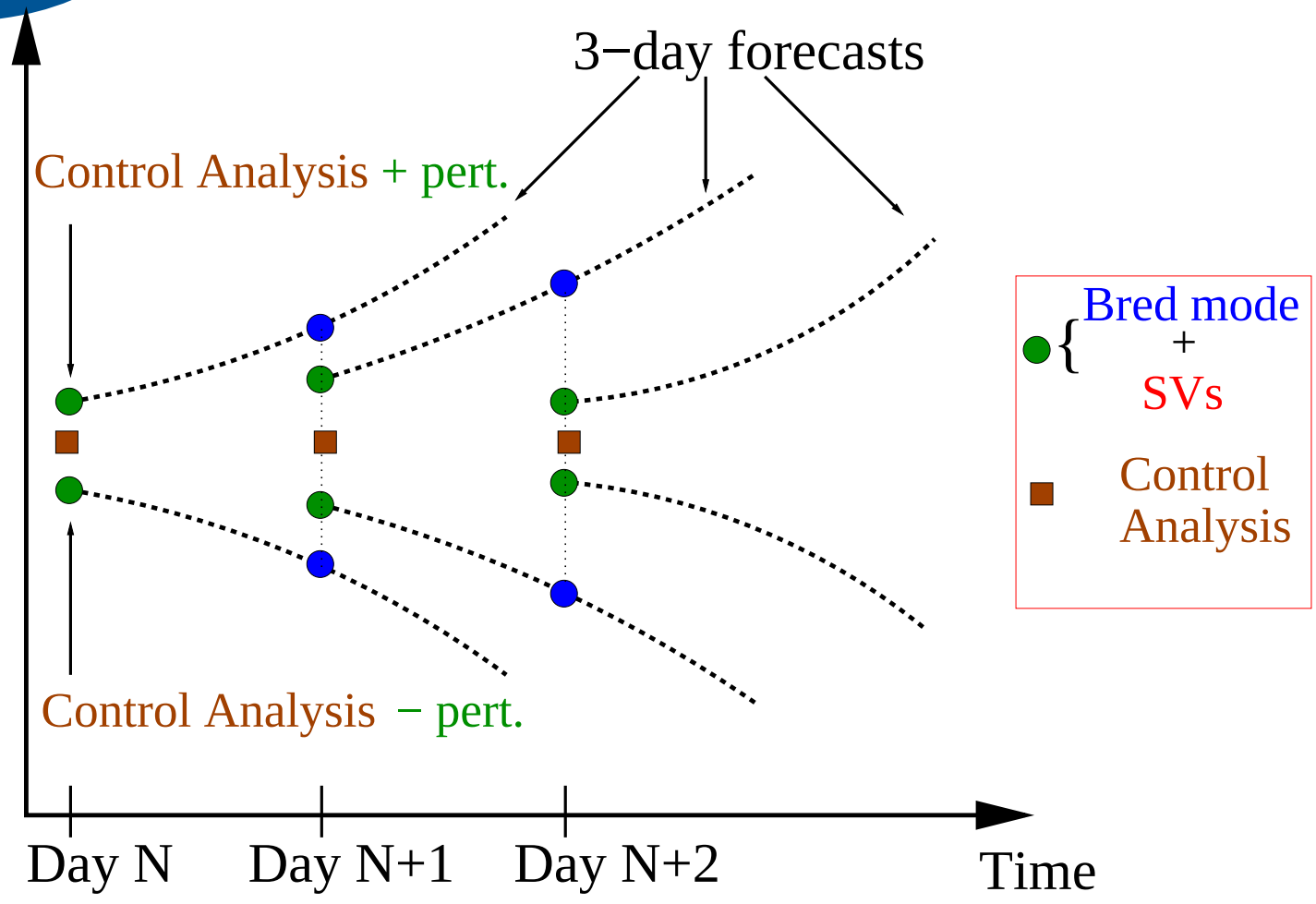
PEARP 2008


Breeding + SV TL44
Breeding + SV TL95
Breeding + SV TL44
Breeding + SV TL44
Breeding + SV TL44
160°W 140°W 120°W 100°W 80°W 60°W 40°W 20°W 0° 20°E 40°E 60°E 80°E 100°E 120°E 140°E 160°E
80°N 70°N 60°N 50°N 40°N 30°N 20°N 10°N 0° 10°S 20°S 30°S 40°S 50°S 60°S 70°S 80°S

PEARP 2008

- Prévision Ensemble ARPEGE
- Initialization procedure
- Combine breeding and SVs
  - SV computed for four targeted areas:
  - 16 TL95-SVs for EURAT, 10 TL44-SVs for NHC and TROP, 20-TL44 SVs for SH
  - Simple Breeding
    - Bred modes rescaled every 24h
- Amplitude of perturbations controled by analysis error variance 'of the day'

PEARP 2008

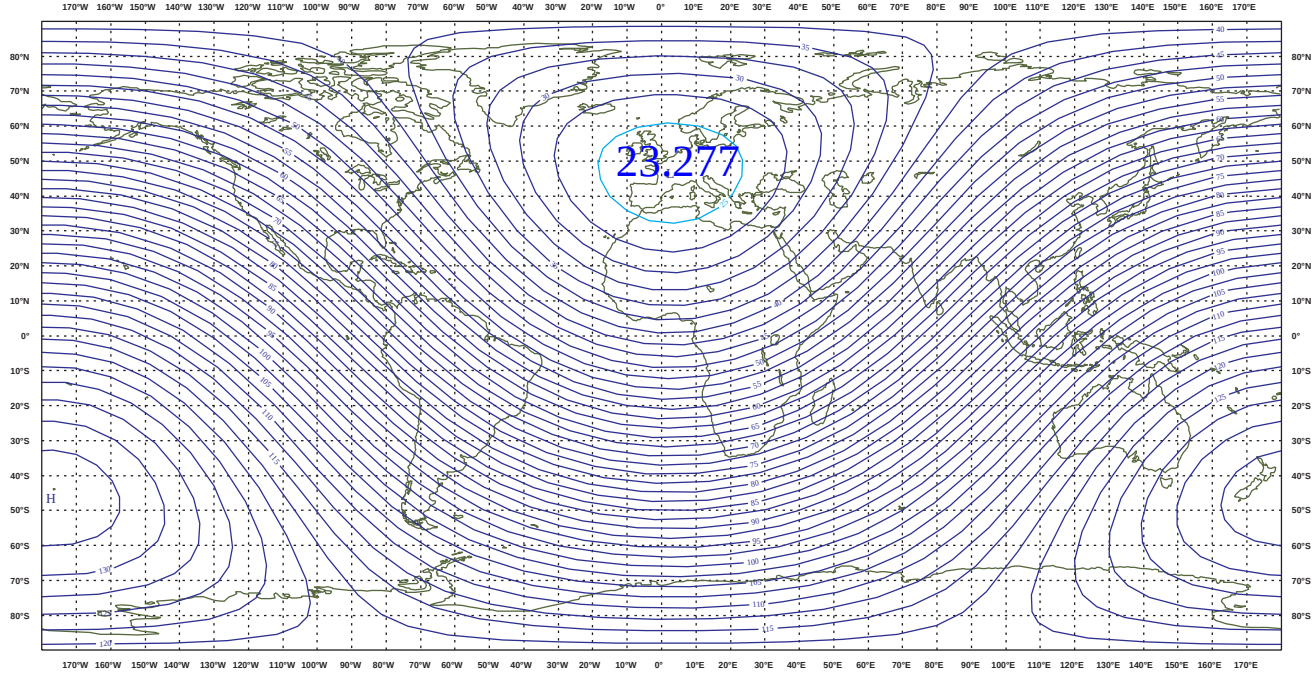

3−day forecasts
Control Analysis + pert.
Control Analysis − pert.
Day N
Day N+1
Day N+2
Time
Bred mode
+
SVs
Control
Analysis

PEARP 2008

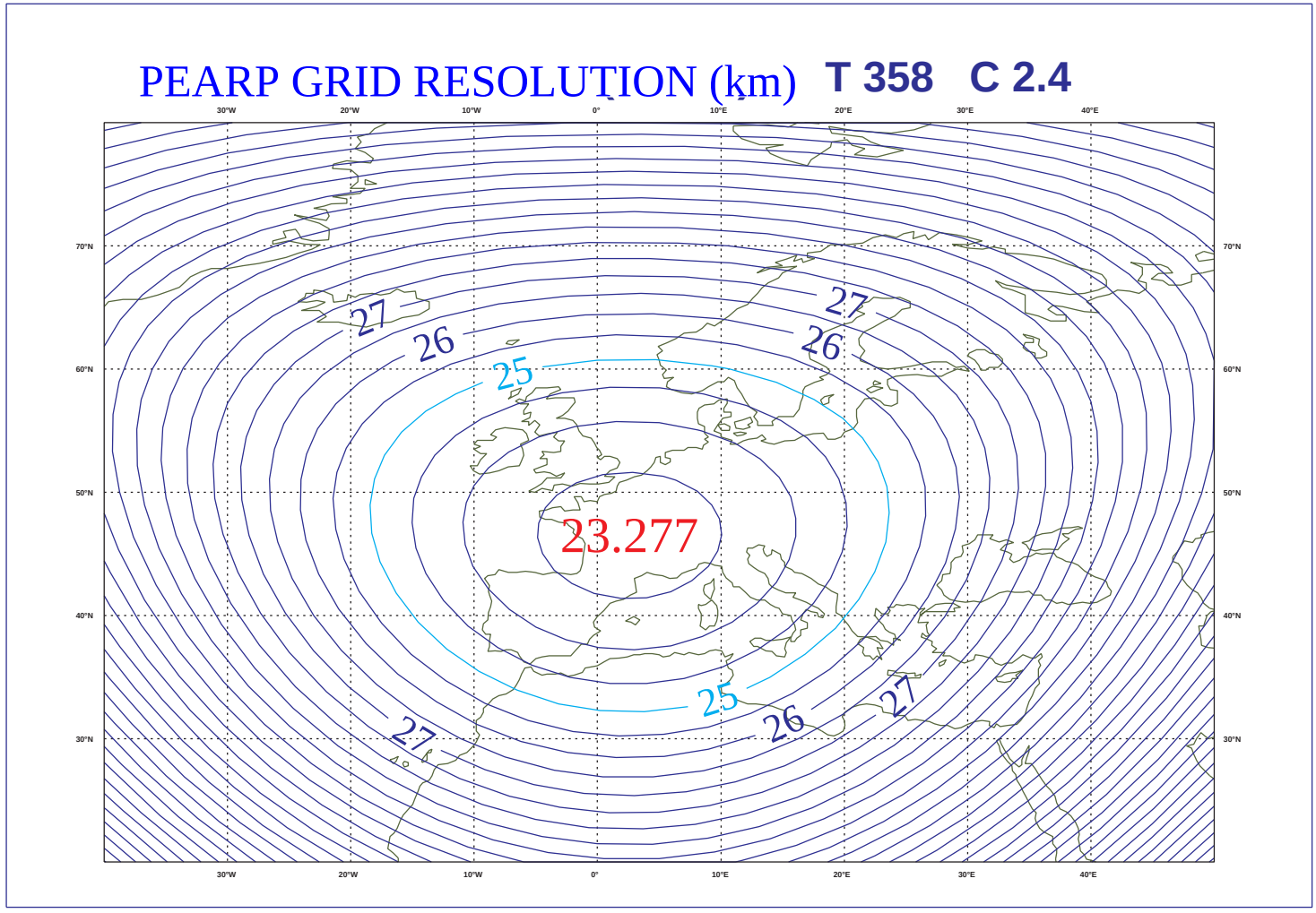
- Prévision Ensemble ARPEGE
- Ensemble size
  - 11 ensemble members (10 perturbed members centered around control analysis + 1 control member)
- Model characteristics
  - 11 3-Day forecasts run at T358c2.4 L55 resolution (25 km over Europe)
  - Top of the model at 50 km

PEARP 2008

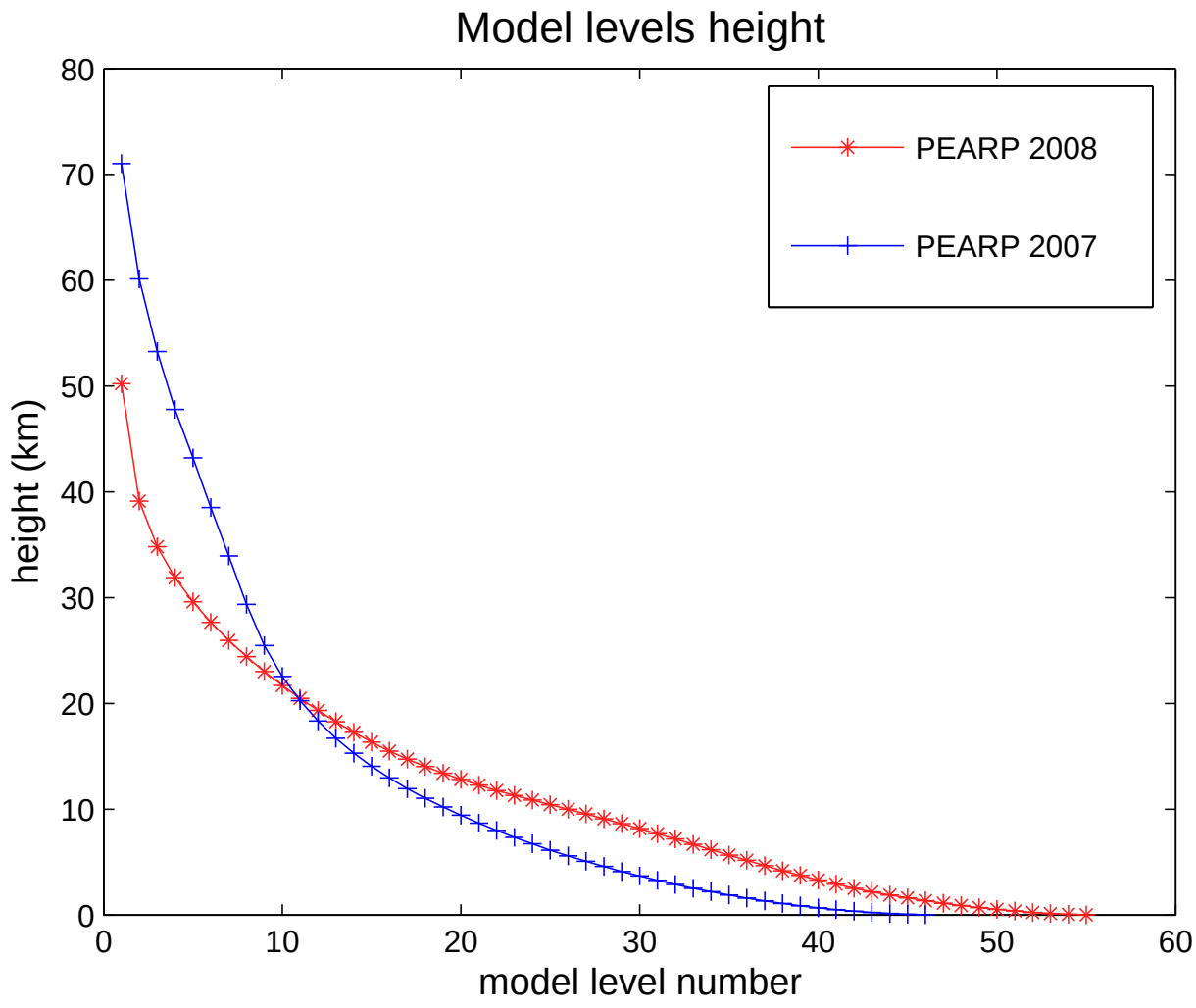
PEARP GRID RESOLUTION (km) **T 358 C 2.4**



PEARP 2008


PEARP GRID RESOLUTION (km) T 358 C 2.4
30°W
20°W
10°W
0°
10°E
20°E
30°E
40°E
70°N
60°N
50°N
40°N
30°N
27
26
25
23.277

PEARP 2008


Model levels height
height (km)
model level number
PEARP 2008
PEARP 2007
0
10
20
30
40
50
60
70
80

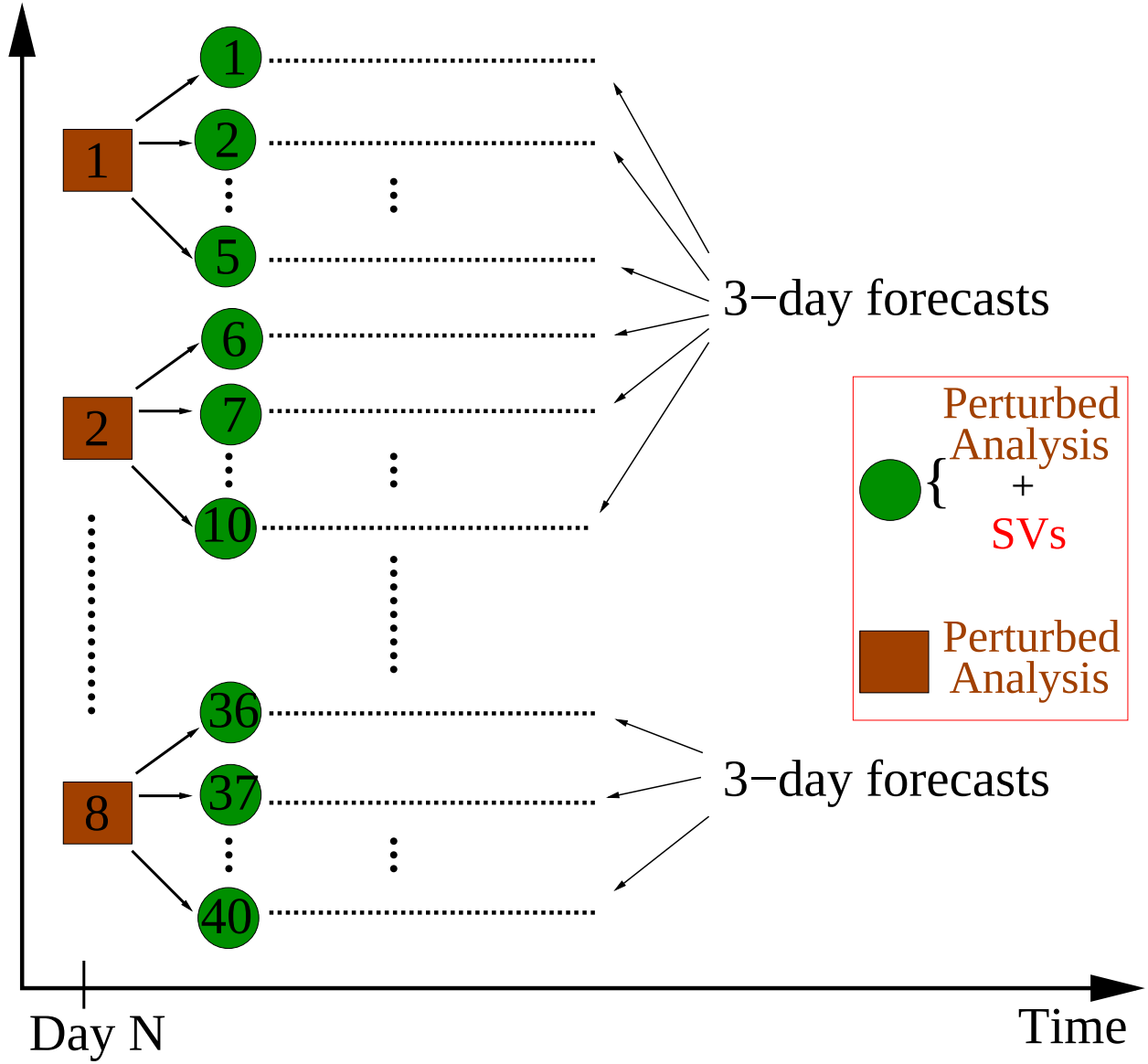
Outline

- PEARP configuration in 2008
  - initialization procedure
  - ensemble size
  - model characteristics
- Upgrades planned for 2009

Upgrades planned for 2009

- Initialization procedure
  - Combine Ensemble Data Assimilation with ’dynamically constrained’ perturbations

Upgrades planned for 2009



Upgrades planned for 2009

- Initialization procedure
  - Simulate model uncertainties
    - stochastic physics
    - random perturbations
- Ensemble size
  - Increased to $\sim$40 members

Upgrades planned for 2009

- Model characteristics
  - New physical parametrizations as in ARPEGE model
  - Increased grid resolution from 25 km to 15-10 km over western Europe
    - Use of the specific geometrical grid transformation of ARPEGE

Conclusion

- PEARP is the operational SREPS of Météo-France
  - Coupling model for the Hungarian LAM-EPS (LACE)
  - PEARP is ’a global’ SREPS since february 2008
    - and also an "unlimited area" local one
  - Small ensemble size but highest grid resolution over Europe

Conclusion

- Future changes:
  - Use of EDA in initialization procedure
  - Simulate model uncertainties
  - New physical parametrizations
  - Increased ensemble size
  - Increased grid resolution over Europe

Conclusion

any questions ?