Progress in handling the 'grey' resolutions (7-3km grid length)

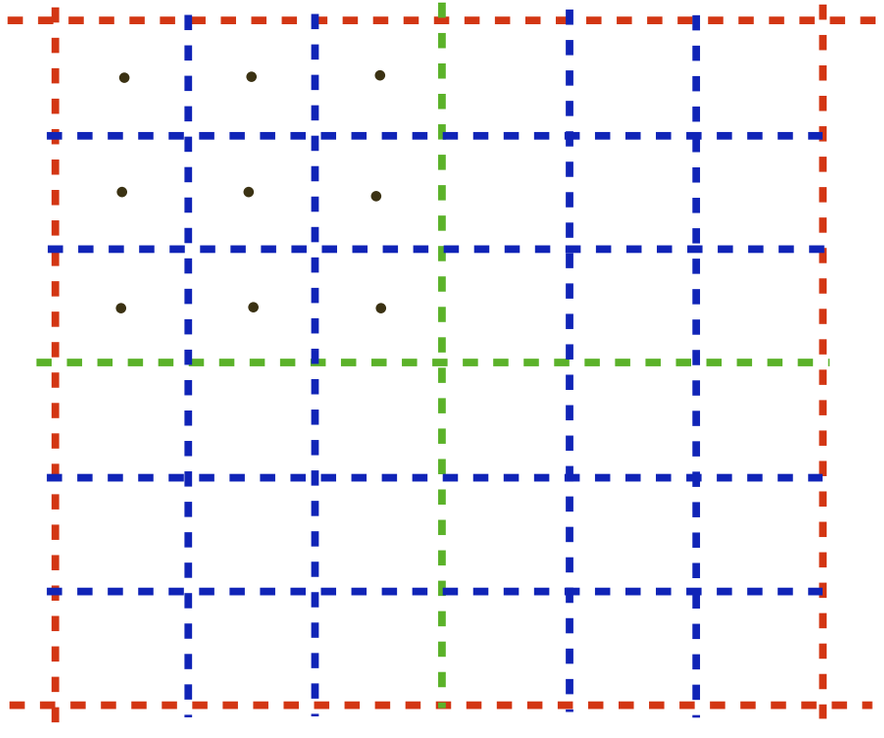
Luc Gerard

23 February 2006

Topics

1. Grey zone
2. Prognostic approach
3. Cascading principle
4. MT adjustment
5. Model resolution study :
   (a) Microphysical profiles
   (b) Precipitaion fields

Model grid resolution issues



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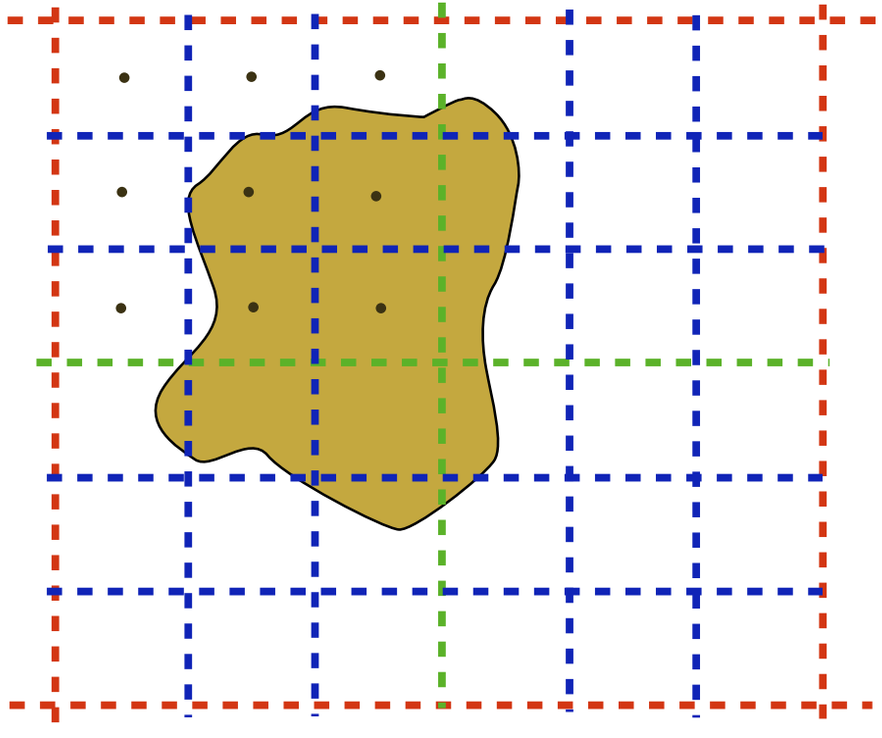
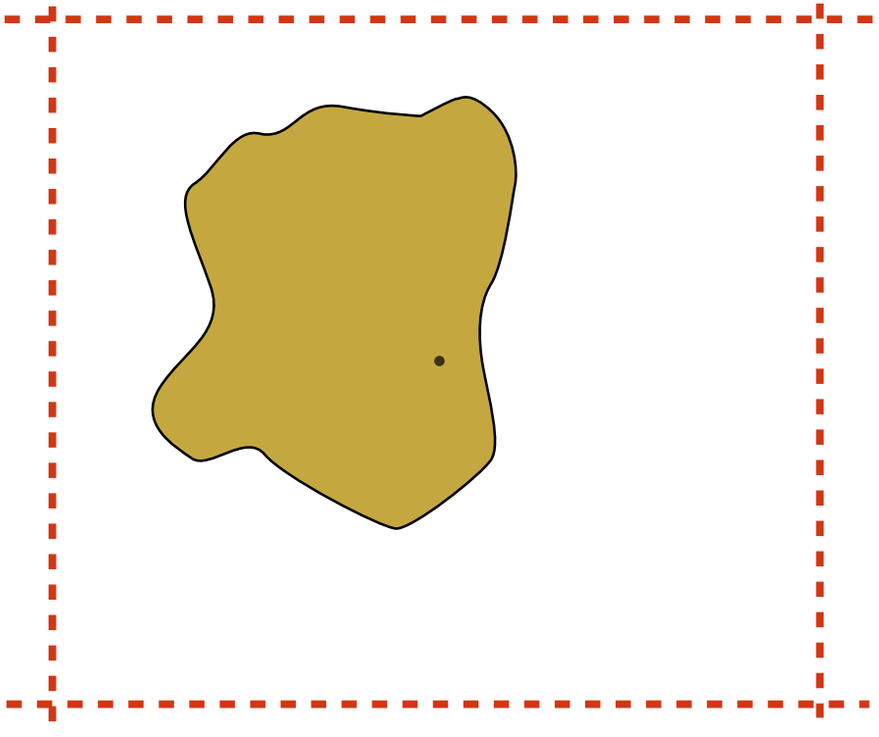


AROME
Grid-length smaller than 2km
Deep convection widely resolved

Resolved condensation / microphysics on mean grid box values

Additional parametrization not essential

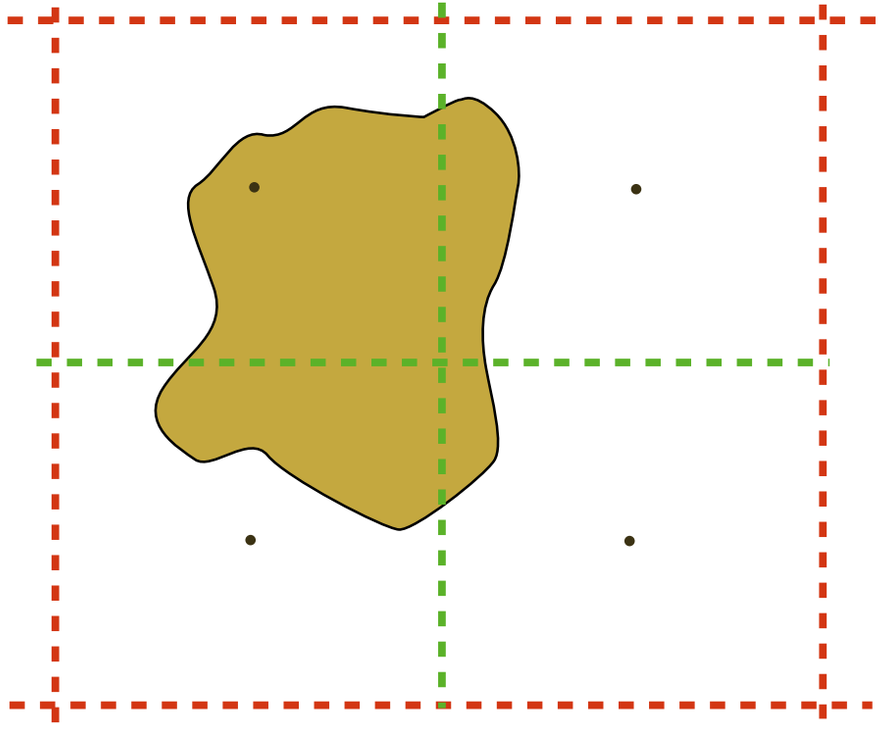
Model grid resolution issues



ALADIN / ARPEGE
Grid-length bigger than 7km
Deep convection is subgrid
Parametrization required

$\Longrightarrow$ Combination with resolved condensation ?

Model grid resolution issues



ALARO 5km / Grey Zone
Grid-length between 7km and 2km
Deep convection contributes to subgrid AND resolved condensation
Parametrization required

$\Longrightarrow$ Combination of the two schemes ?

Subgrid Parametrization

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- Prognostic mesh fraction equation
  + Prognostic vertical motion equation for updraught (NH).

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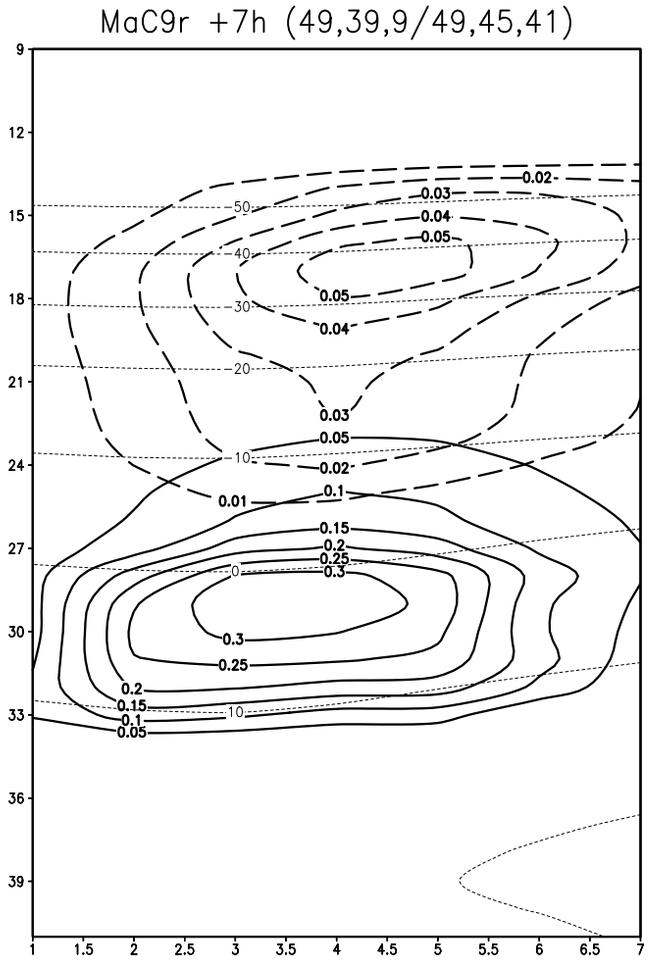
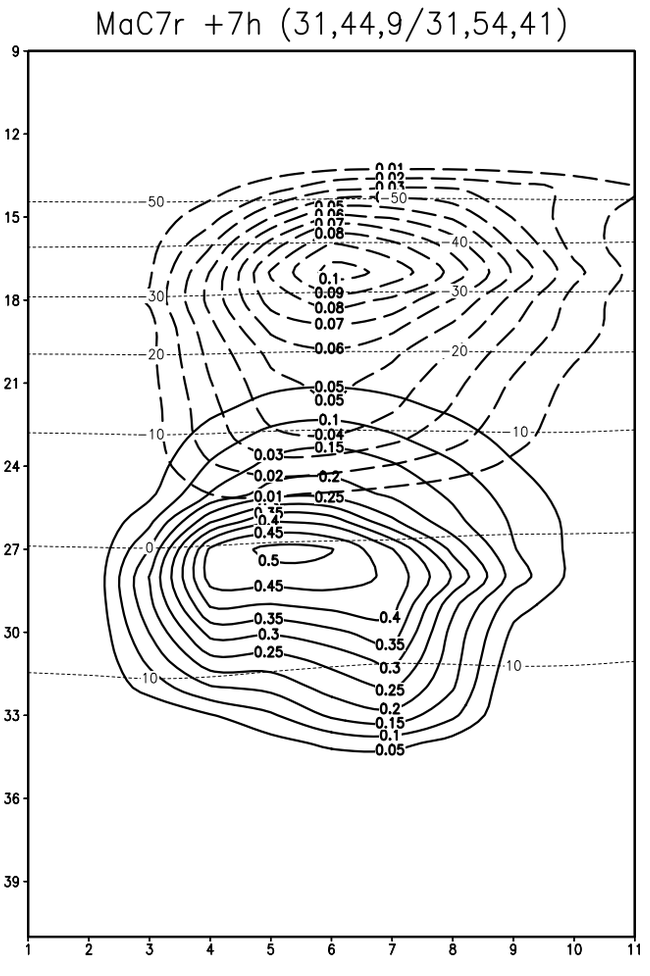
instead the old approach of detrainment + pseudo-subsidence.

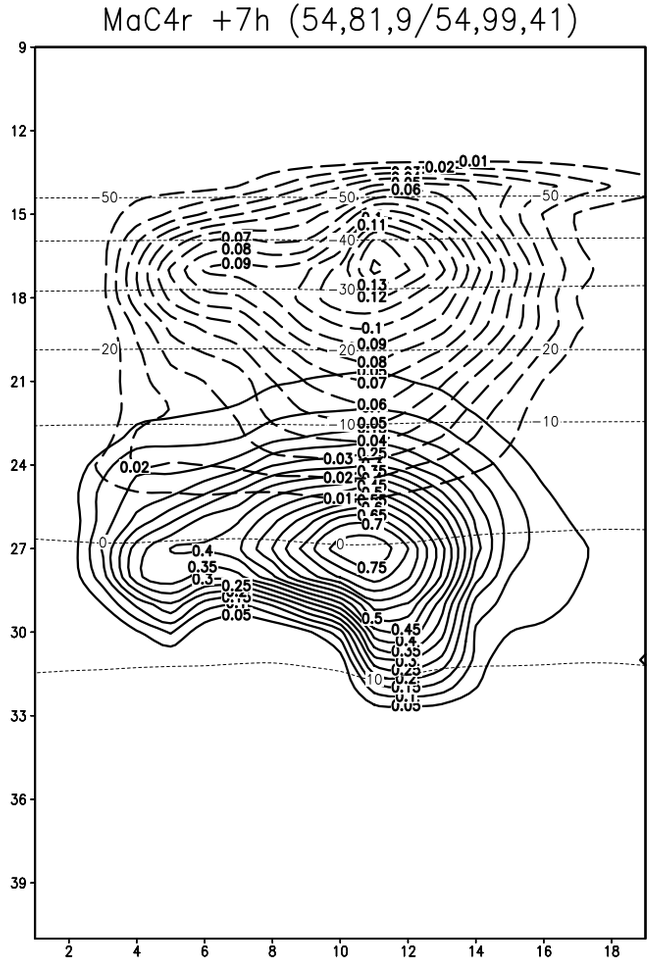
Microphysical profiles



9km q_i, q_ℓ, T

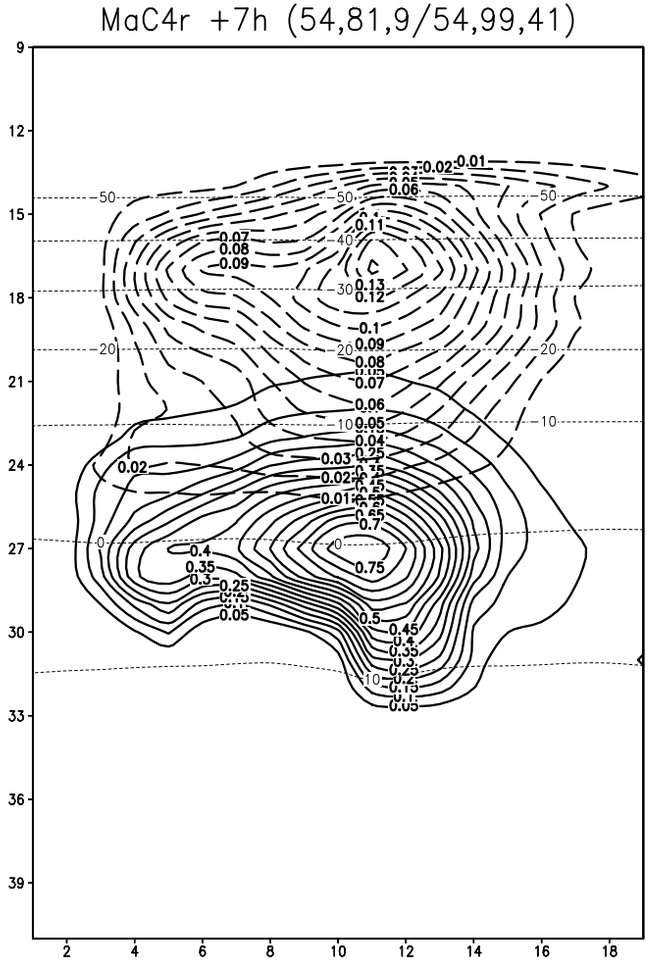


7km q_i, q_ℓ, T

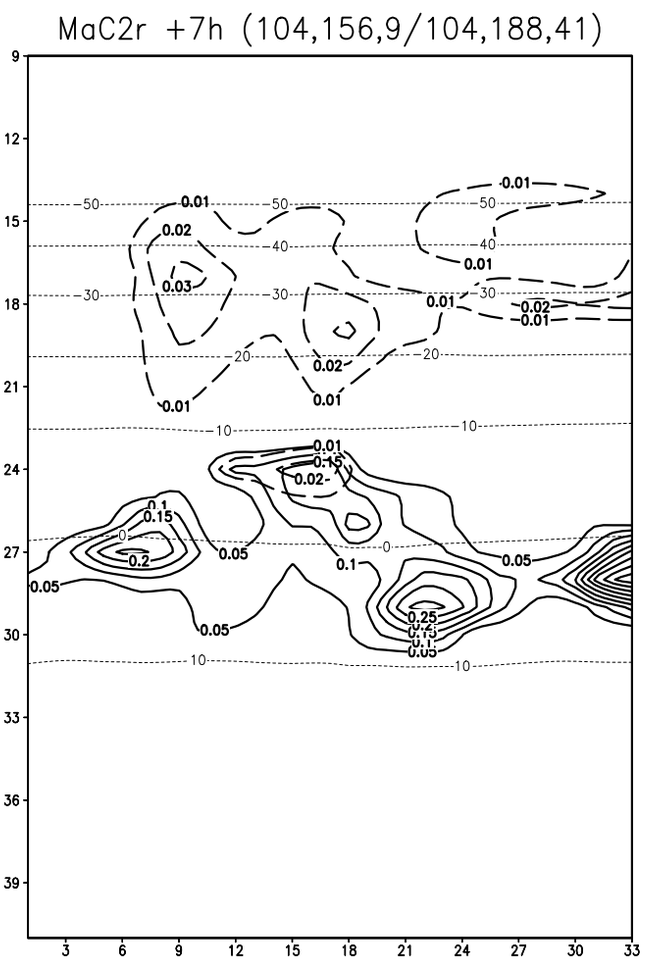


4km q_i, q_ℓ, T

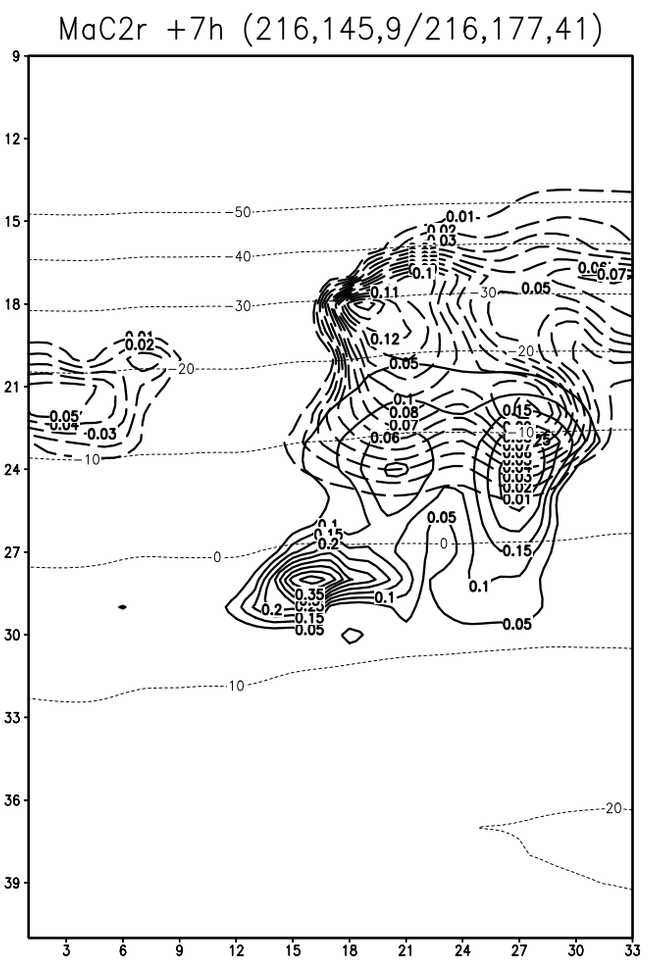
Microphysical profiles



4km q_i, q_ℓ, T



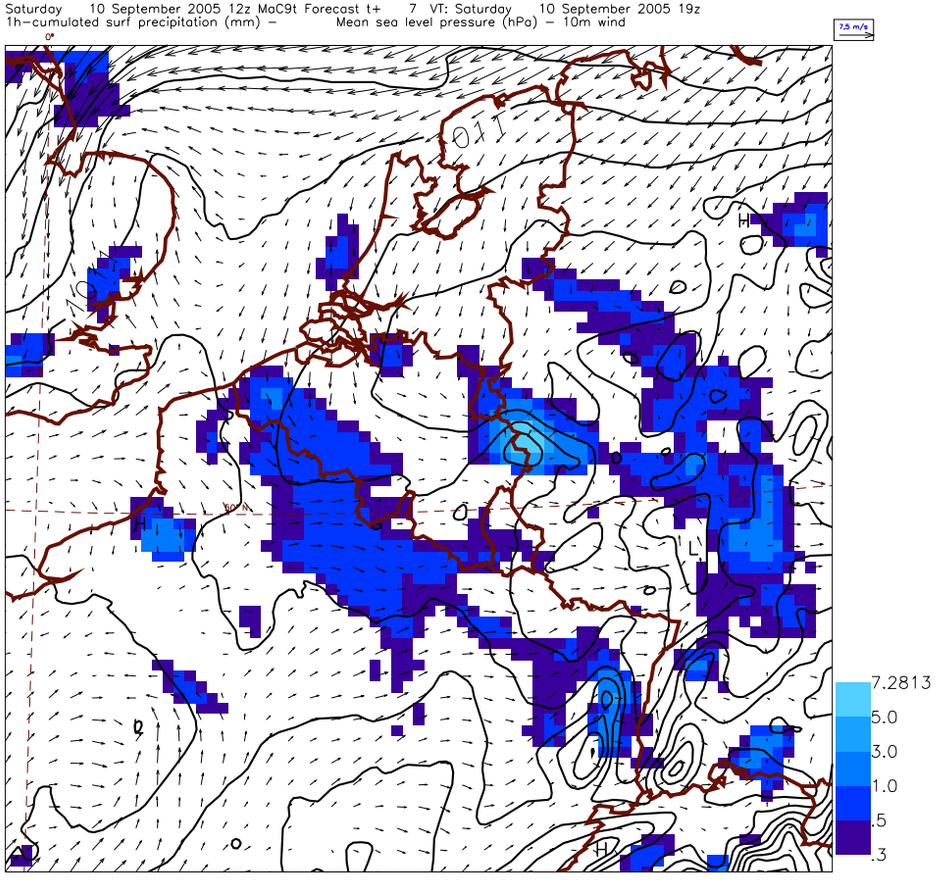
2km q_i, q_ℓ, T



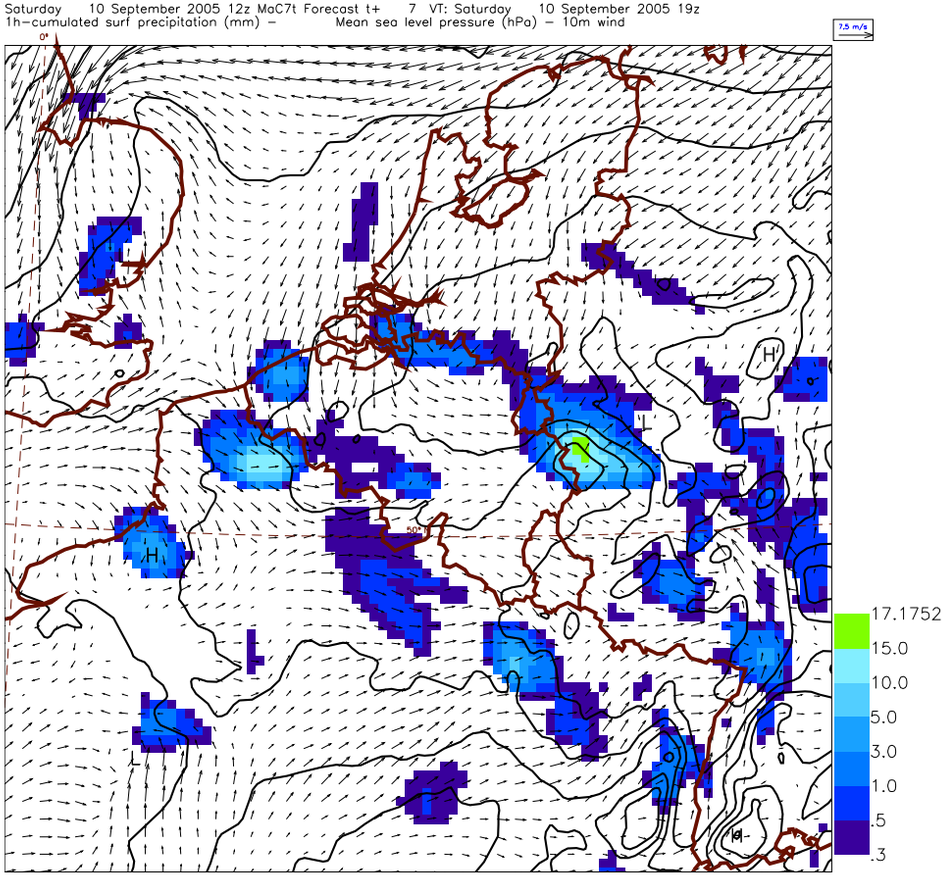
2km q_i, q_ℓ, T

RMI

Precipitation fields



9.9km 1h-precipitation, mslp, 10m-wind



7.0km 1h-precipitation, mslp, 10m-wind

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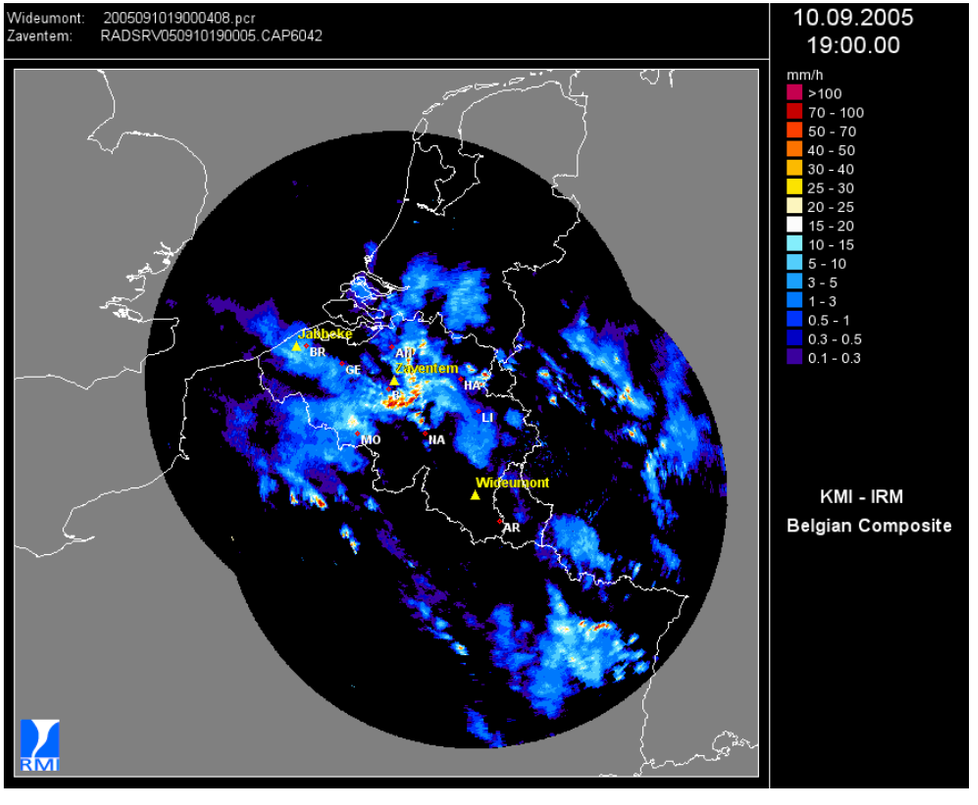

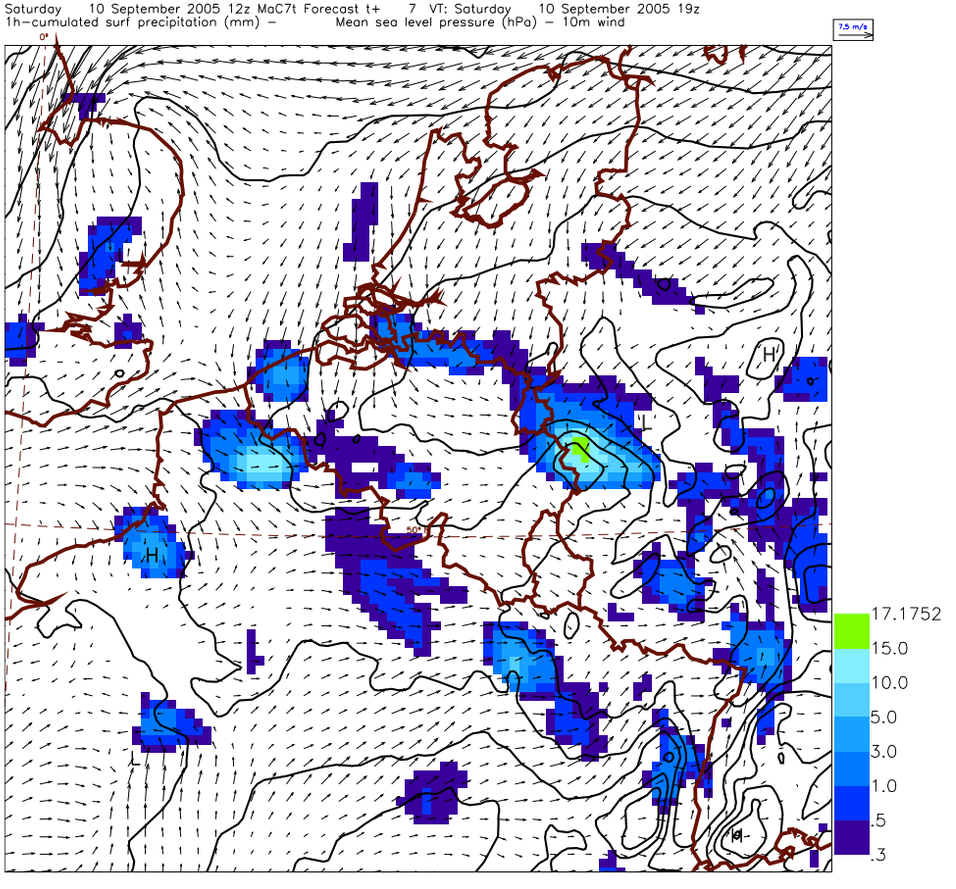

instantaneous radar picture

7.0km 1h-precipitation, mslp, 10m-wind

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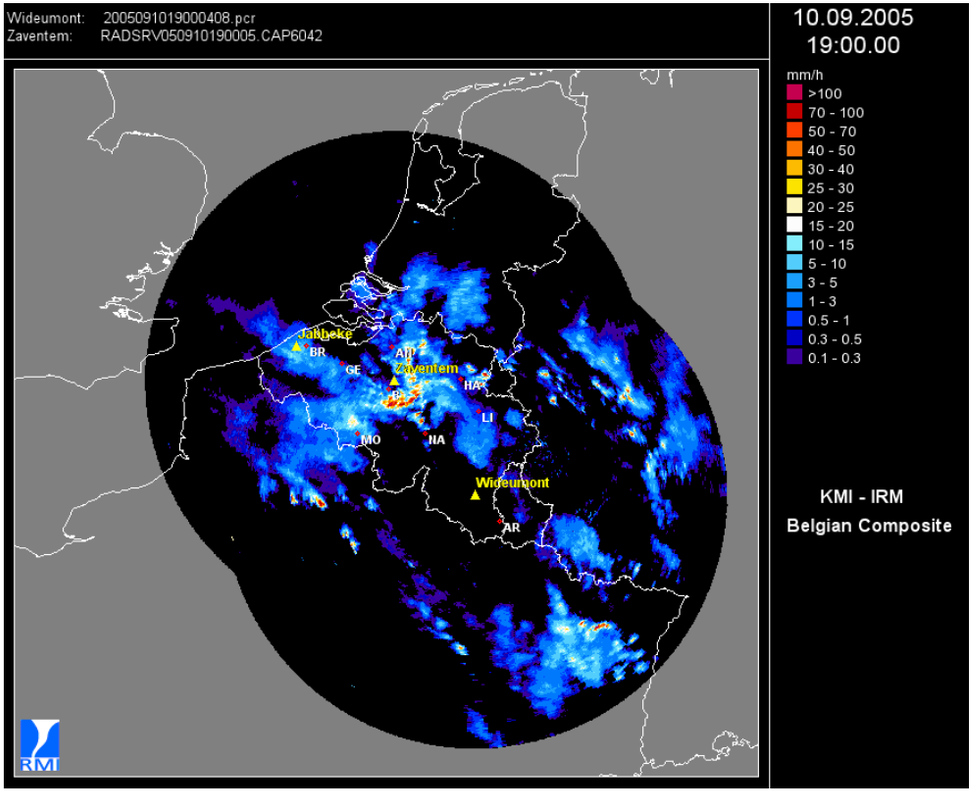
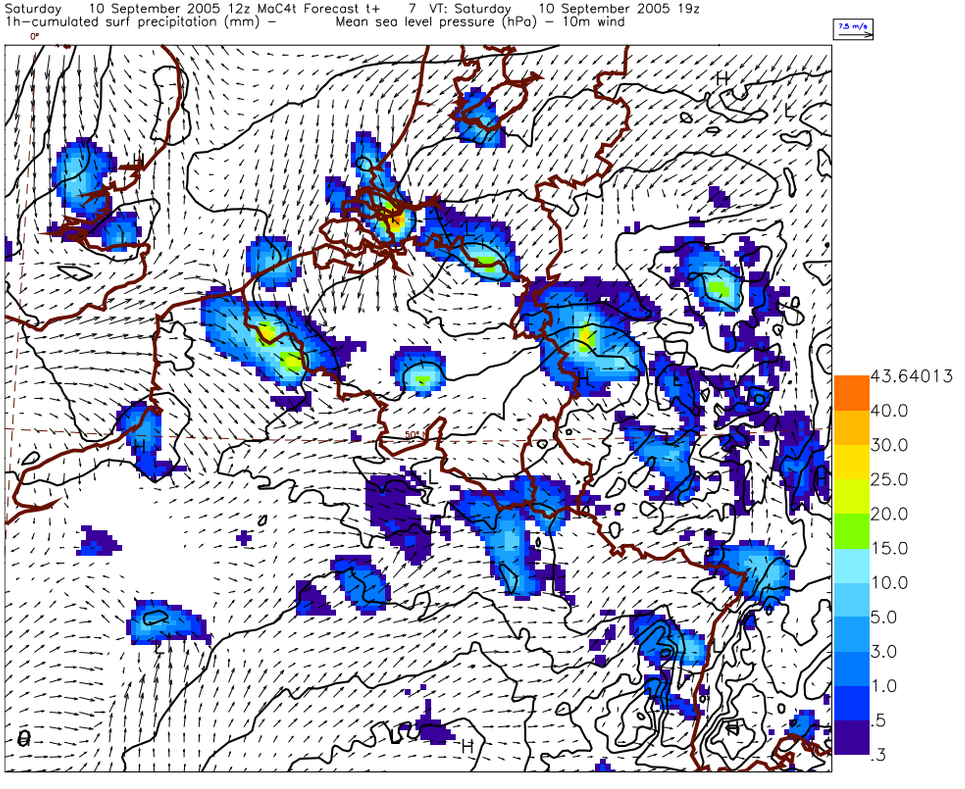


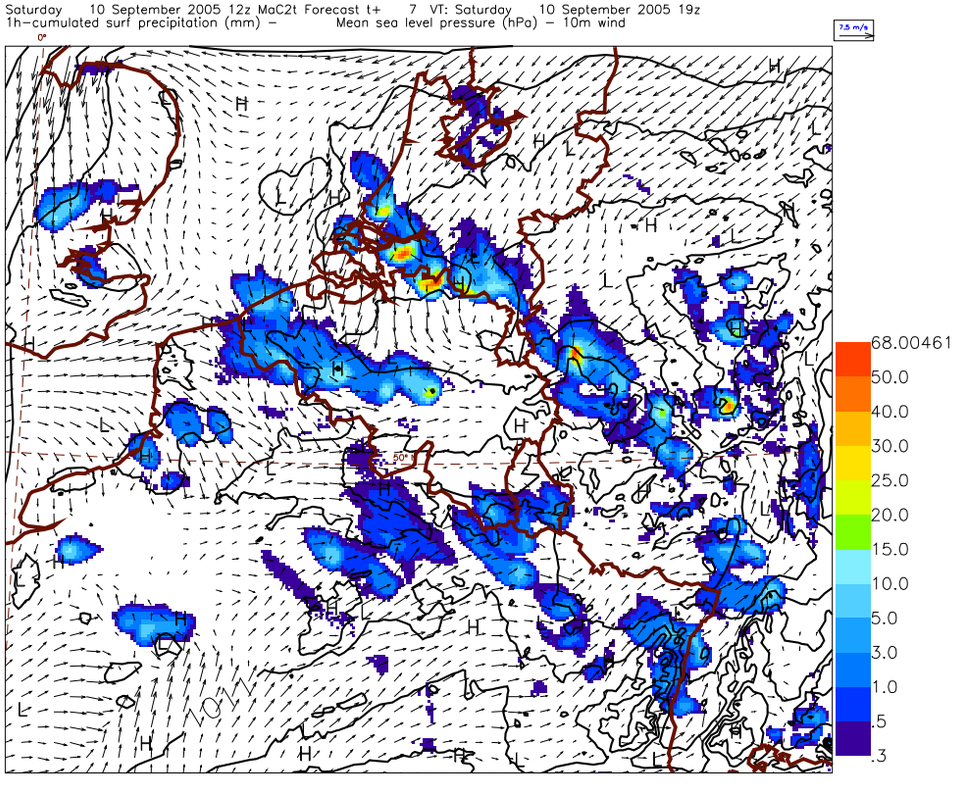


instantaneous radar picture

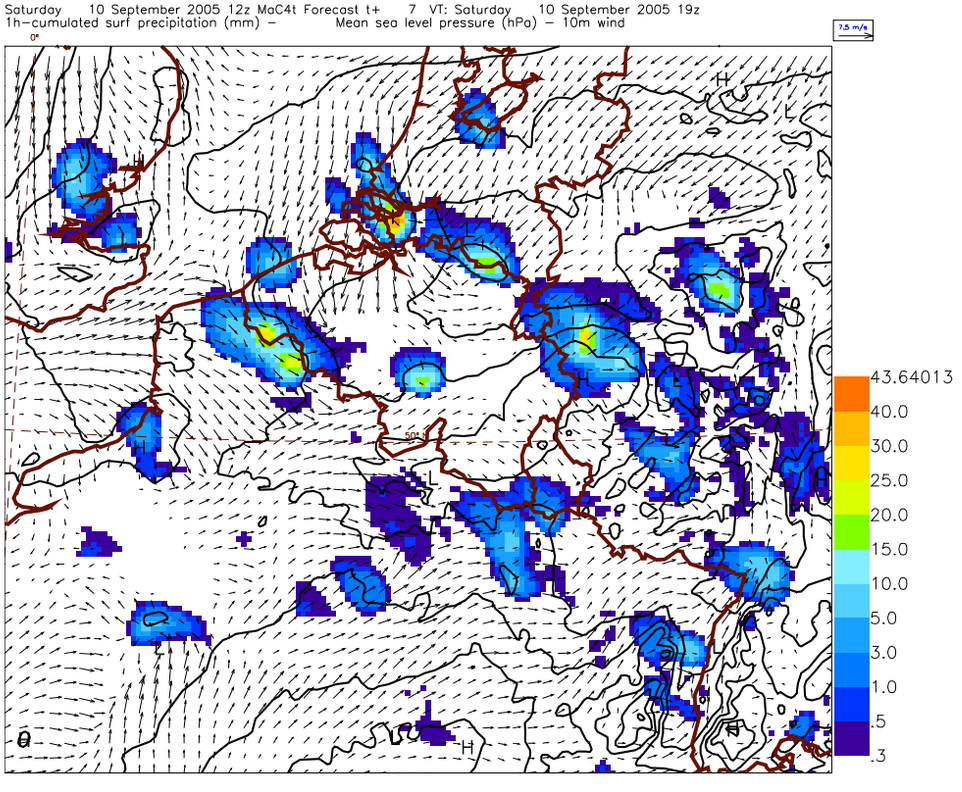
4.0km 1h-precipitation, mslp, 10m-wind

RMI

Precipitation fields



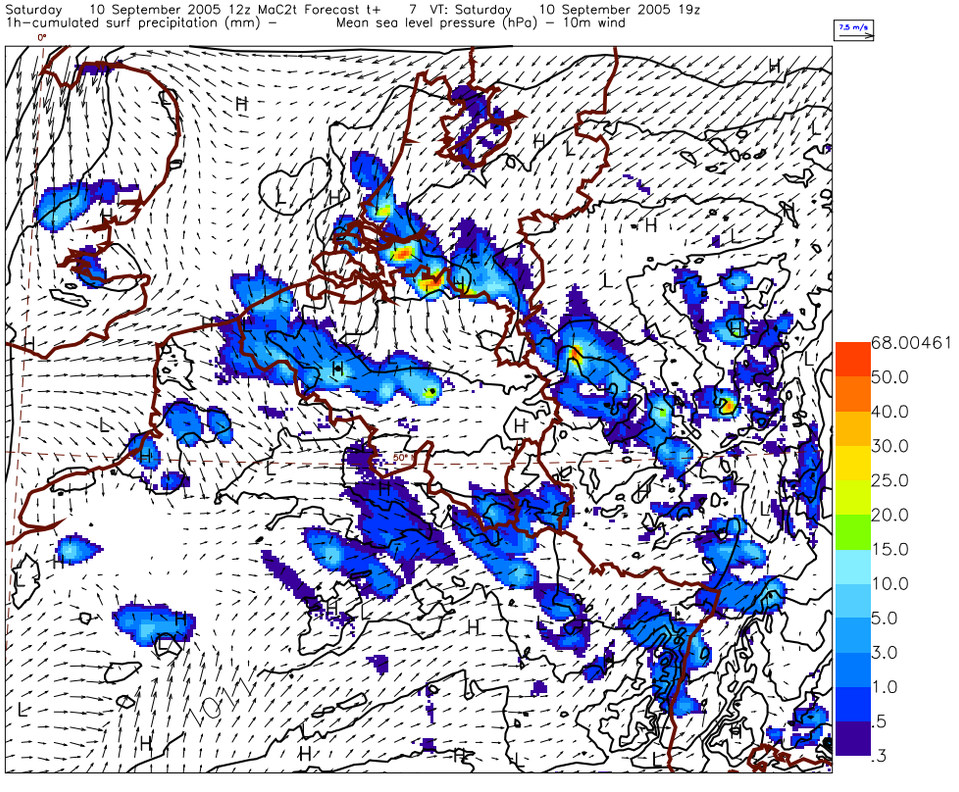
2.2km 1h-precipitation, mslp, 10m-wind



4.0km 1h-precipitation, mslp, 10m-wind

RMI

Precipitation fields



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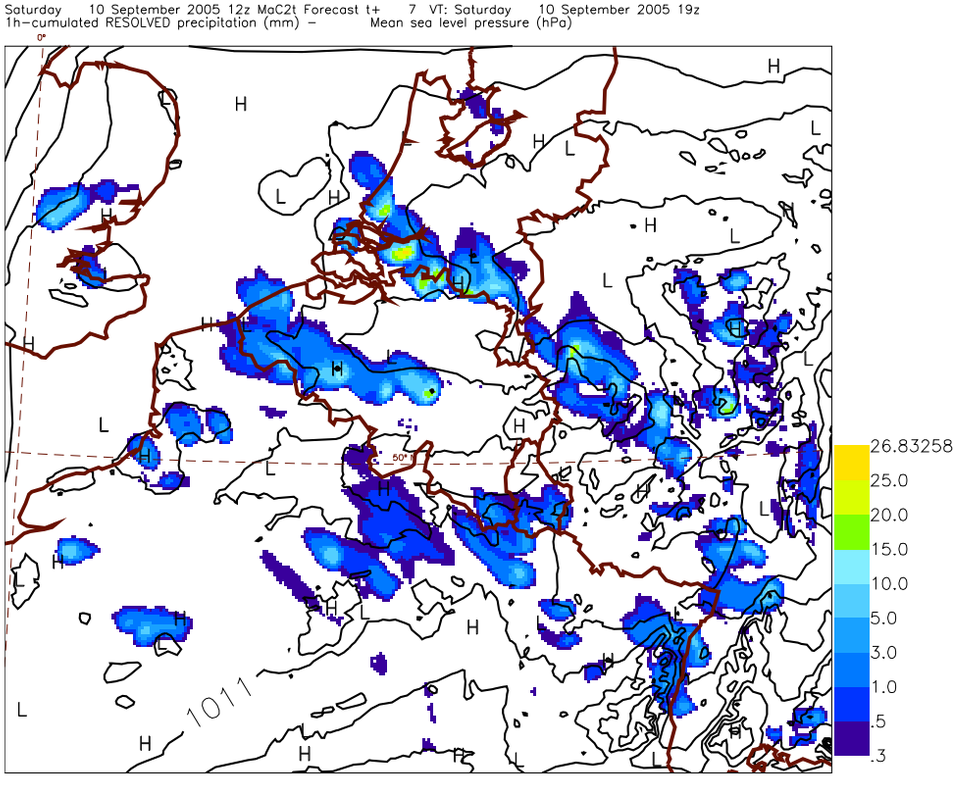

2.2km 1h resolved precipitation

RMI

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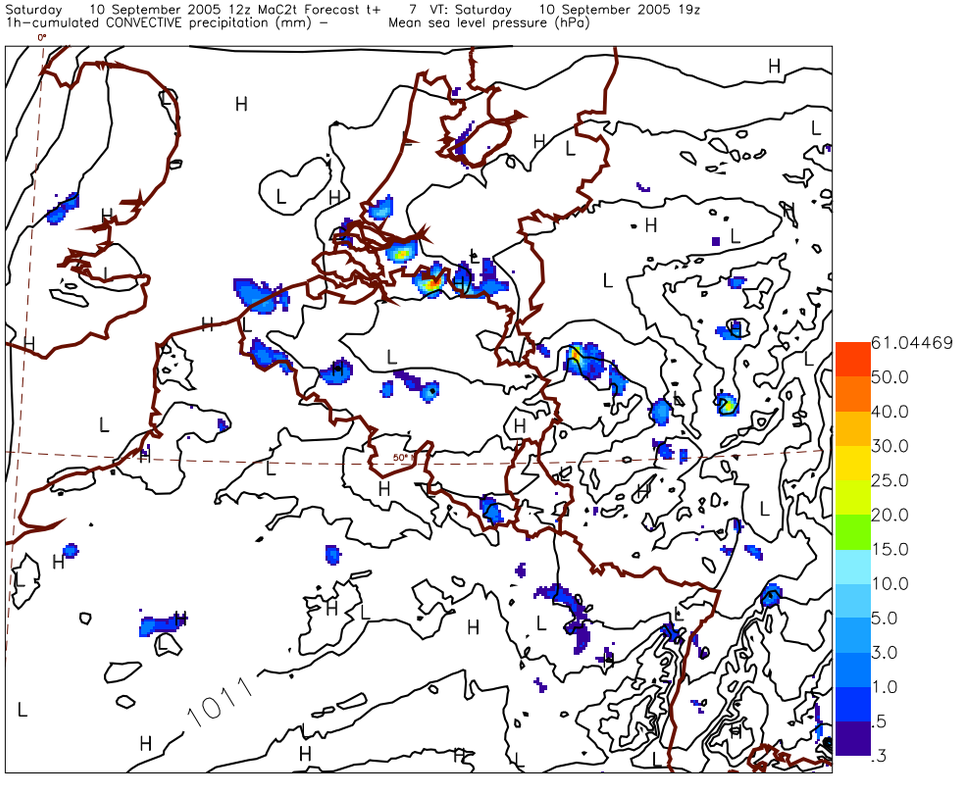
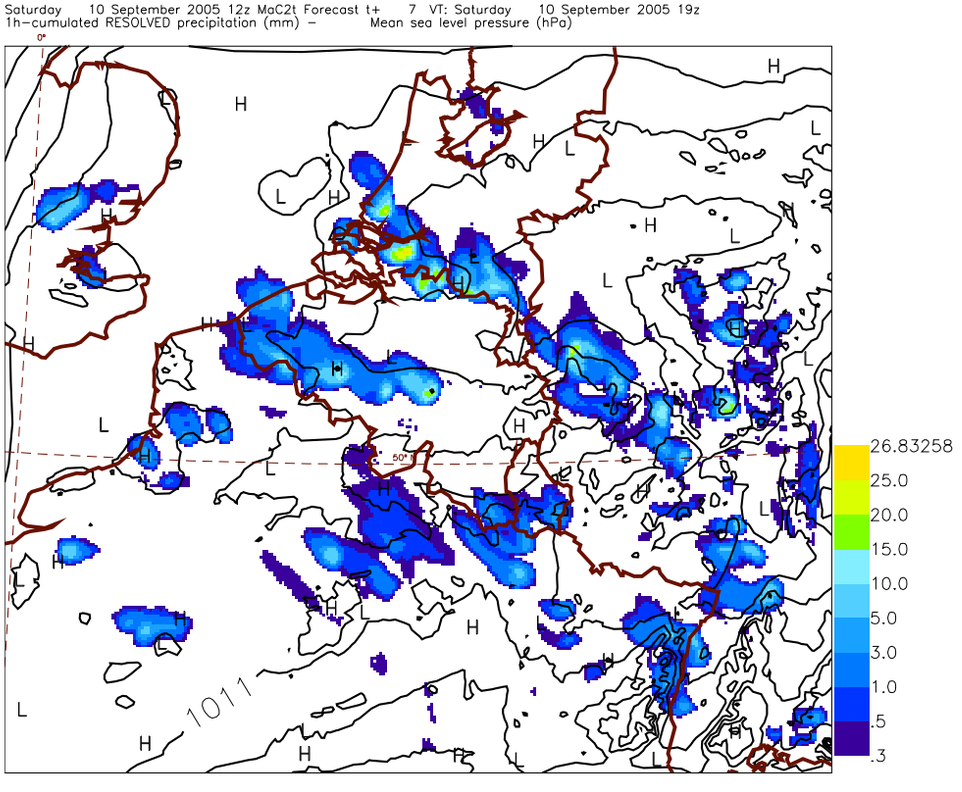


2.2km 1h convective precipitation



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RMI