

HIRLAM – ALADIN workshop
Data assimilation general discussion

07.05.2012

The main questions raised and partly discussed:

1) Blending of large scales

We have several techniques to smoothly mix host model large scales with LAM fine scales (DFI blending, Jk term, large scale mixing). All of these techniques depend on the arbitrary choice of scale limits to be taken from the both (low and high resolution) models. Do we have any physical approach how to make this choice?

2) Flow dependent techniques

We have several techniques to introduce flow dependence to the analysis increments (hybrid assimilation, wavelets, “rainy” and “dry” sampling, 4DVAR) most of them benefiting from the ensemble (EnVar, ETKF) techniques. Are these techniques complementary or rather just different approaches to be examined? Is 4DVAR really relevant for high resolution with complex physics (for which no corresponding TL version exist) including frequent updates? Is an “ensemble” 4DVAR (where the Jacobian of the model operator could be estimated from differences between full non-linear runs with small initial perturbations) a relevant idea to avoid using TL codes?

3) Balance in the initial fields

Based on Jan Barkmeijer's presentation humidity increments implied by radar assimilation vanish very quickly in the AROME forecast (it seems that noise coming from different possible sources take similar size as the increment itself). Is this comes from imbalances in the initial conditions (lack of initialization, presence of spin up)? We know that in several cases radar assimilation improves precipitation and wind forecasts in AROME/France. So is the feature shown by Jan weather dependent?

Similarly, it was shown by Carlos Geijo that the impact of field alignment on humidity also vanishes very quickly (within 5 minutes) in the forecast. Is this due to the lack of balances implied by the alignment (univariate treatment)?

It was mentioned that field alignment (accounting for phase errors) should be complementary to variational assimilation, which might be done last ensuring the usual balances in the analysis.

4) Surface assimilation

The work done on surface assimilation was underrepresented in the assimilation section of the workshop (2 talks). It was explained that indeed there are many activities related to surface assimilation mainly in the framework of SURFEX and participants were encourage to share their experiences.