

Wafaa SADIKI defended her thesis

"A posteriori verification of analysis and assimilation algorithms and study of the statistical properties of the adjoint solutions"

in Toulouse in April 2005.

The theory of data assimilation consists of making a combination between a background state of the atmosphere and observations using "*constraints*". The formulation of any assimilation system requires the knowledge of the weights attributed to each source of information, namely the background errors and observational errors. These errors are specified implicitly or explicitly by appropriate error covariance matrices.

The system of interest is the limited area 3d-Var analysis of ALADIN. The aim is, on the one hand, to study the properties of background error covariances in a limited area model like ALADIN and, on the other hand, to apply the *a posteriori* diagnostics in a real data observation environment, in order to calibrate the background and observational error standard deviation parameters for a mesoscale analysis.

Firstly, we show that, for the large scales, the background errors are controlled by the ARP\EGE global model. Secondly, new results on the *a posteriori* diagnostics are obtained, namely an underestimation of the background error variance, and an overestimation of the observational error variance. Moreover, the *a posteriori* diagnostics are adapted to the frame of a limited amount of observations using *ergodic* properties of the signals.

These promising results suggest that the procedure should be tested on various other analysis systems, or on one given assimilation system when significant modifications are brought to it, such as new observations or new *a priori* background error statistics.