Abstract

The AMDAR data contain valuable information about the state of atmosphere, because of their special resolution in space, and in time. This data make the analysis and the prediction more exact. We hope, the AMDAR data agree to ALADIN/HU numerical weather prediction model's development, in the Hungarian Meteorological Service.

In the data assimilation methods in models with limited area – in accordance with the global models – we have to solve two problems. We have to manage the later reports, and the singularities, which are from the high resolution. In the first case we have to pay attention the difference between AMDAR reports reference time, and the observation time. In the second case, we have to thin the observations in space and in time with priority of quality. In this case, quality means the observations time's difference to analysis time. In the next, we could read a short description of the method, which is solving the previous problems.

Description of the new data screening

First we have to build a new data screening system according to our requirements. I have modified an algorithm, which was selecting the observations in the limited area. The modified program can select the observations in time interval too, for explaining the first problem of ours. The time interval size is able to set in the script. For the second problem, I have written a new algorithm, which can thin observations, with regard to time distance from analysis time, and the model's resolution. Next, I introduce shortly the new programs.

Description of the CUT-OFF algorithm

The name of algorithm come from the size of analysis interval radius, because in the HMS's model, the ALADIN/HU has a similar sized CUT-OFF interval as an analysis interval radius. This program selects observations in an analysis window (figure 1), which can be set. The observations - witches are out this window - are going to be waste. About our experiences the size of analysis window has a linear relation with the observations number, but the analysis and the forecast will be better with shorter windows.

Description of thinning algorithm (selection in box)

This algorithm can thin observations with regard to time distance from analysis time, and actual resolution in space. In the first step (figure 2/a) the program distribute the model area to boxes, among the model resolution, and the model levels too. This distribution is equidistance and changeable, we can set the boxes sizes in the script. While the testing period I choose two different projections for the horizontal distribution. One of these the Lambert projection, and the other is stereographical projection. After this distribution, in the second step (figure 2/b-c) the program is finding the correct box for the observations, report to report. In the third step (figure 2/d-f) it is selecting an observation in the box, which is the closest to the analysis time, after that it is searching the closest profile to that, box to box. Profile is a series of observation by an aircraft. We can identify the profiles about the station numbers (route number), and about the flying modes (climbing, descending, travelling). The selected reports are getting active status, the unselected reports are getting inactive status, and these are going to be waste. About our experience, the optimal box size is about twice a models bars-range.

Figures

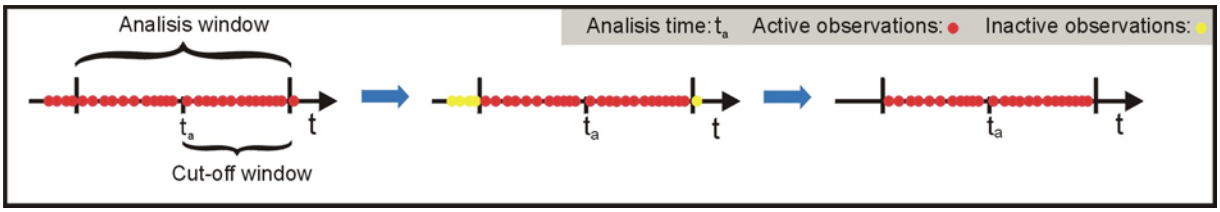

Fig 1. The cut-off algorithm's work in time

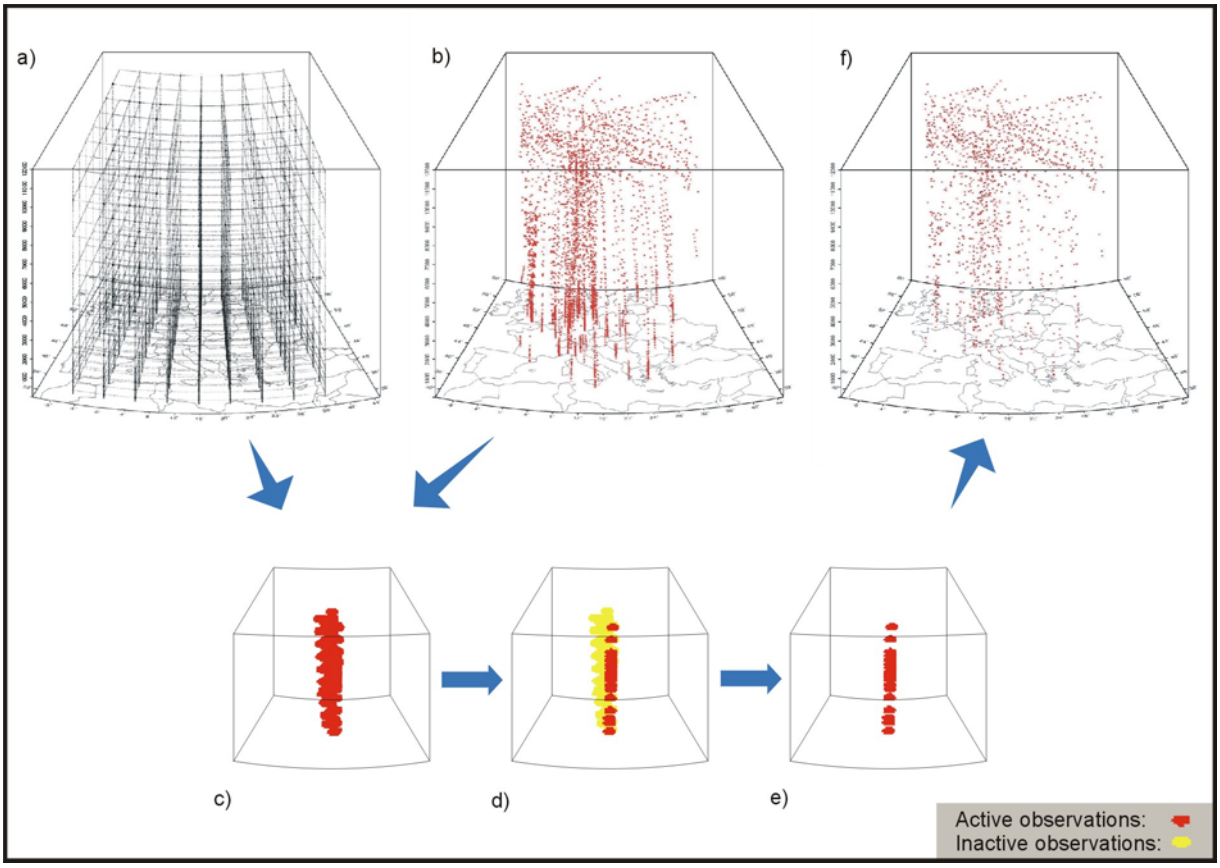

Fig 2. a-f. The new thinning algorithm's work in space