# Pre-Processing of the AMDAR data at HMS

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## 1. Reception of the AMDAR data at HMS

The AMDAR (Aircraft Meteorological Data Reporting) telegrams contain the results of aircraft measurements. These measurements provide accurate data on wind and temperature at high levels in finer, compared to radiosonde data, time resolution. Using AMDAR data, we expect to improve the quality of the products of the ALADIN 3d-var system and, consequently, the accuracy of the forecast. We receive AMDAR data separately from each aircraft every hour or even more frequently through the Global Telecommunication System (GTS) in one or more telegrams. We store each telegram in a separate file. At present AMDAR data are saved into 1000-1500 small files per day, their number is increasing rapidly. The AMDAR telegrams are stored in two formats : ASCII and BUFR. They contain the aircraft flight number, the measurement time (days, hours, minutes in ASCII and years, months, days, hours and minutes in BUFR formats), the stage of the flight (take off, landing or other stages) and the meteorological parameters - mainly wind speed, wind direction and temperature. The ASCII telegrams contain other meteorological data like turbulence and vertical wind gust, but we do not use them in 3d-var.

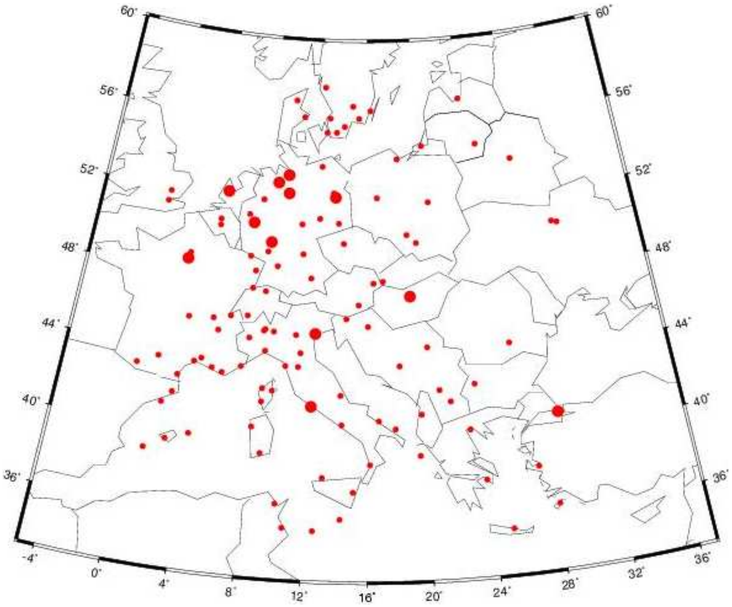


Figure 1 : Location of airports in the ALADIN-HU domain. Bold dots indicate places with big amount of AMDAR measurements.

## 2. Pre-processing of the AMDAR data for the 3d-var system

The AMDAR data are pre-processed for 3d-var every 6 hours. The pre-processing interval is ±3 hours. Thus, for producing the 12 h UTC analysis, for instance, we consider AMDAR data received between 9 and 15 h UTC. Figure 1 shows the airports in the ALADIN/HU domain. Bold dots indicate places (Frankfurt, Cologne, Hamburg, Berlin, Hanover, Bremen, Rome, Paris, Amsterdam, Venice, Istanbul and Budapest), where the amount of measurements during the study period (2003.02.25 - 2003.03.01) was outstandingly big. Figures 2-3 present the spatial locations of all the measurements for a 24 hours time-interval, corresponding to four (12, 18, 00 and 06 h UTC) analysis times. As can be seen in the figures, most of aircraft measurements are performed over

Western Europe. Considering the amount and spatial distribution of the aircraft data we concluded, that AMDAR data might give important additional information for the ALADIN 3d-var system. It is clear that the amount of aircraft data on the Eastern part of the ALADIN-HU domain is very small. Recently we are working on the assimilation of AMDAR data into the 3d-var system and on corresponding impact studies. We use the *"OULAN-BATOR-OBSORT-toODB"* pre-processing chain to insert the AMDAR data into ODB.

Preliminary results of the impact study on the use of AMDAR data in the 3d-var ALADIN/HU are expected until the end of this year.

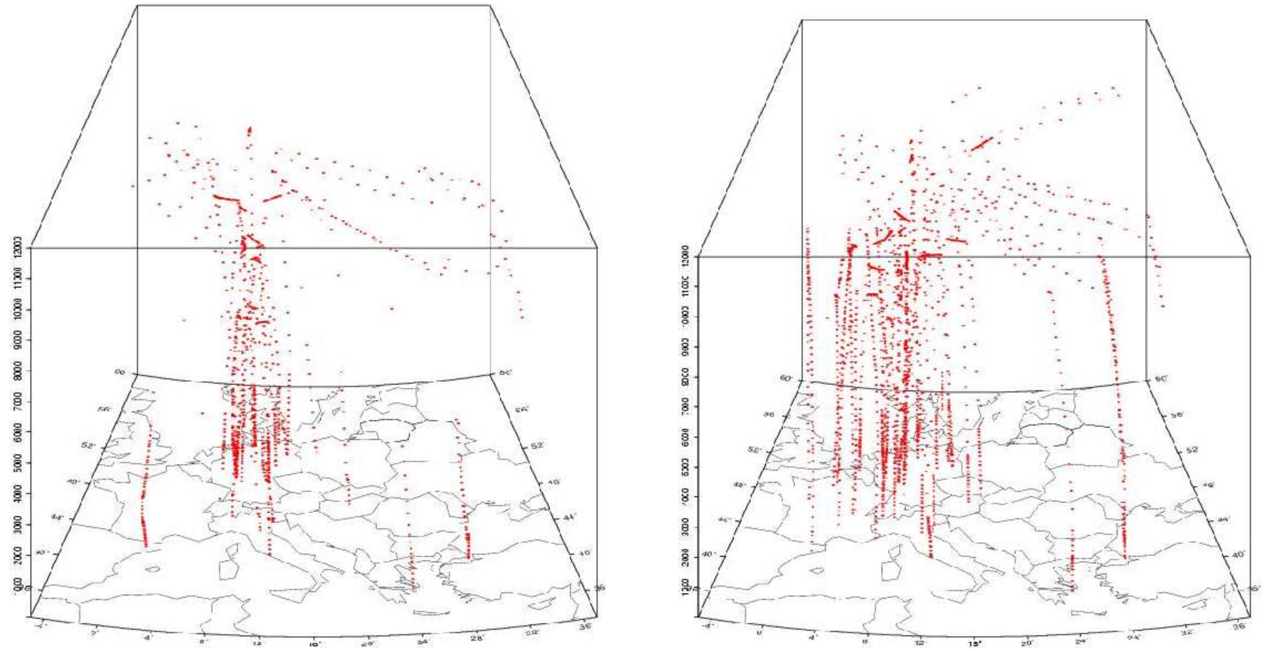

Figure 2 : Tree-dimensional distribution of AMDAR measurements (during landing and take off) over ALADIN/HU domain within a ±3 hour interval at 00 UTC (left) and 06 UTC (right) (2003.02.26) assimilation time.

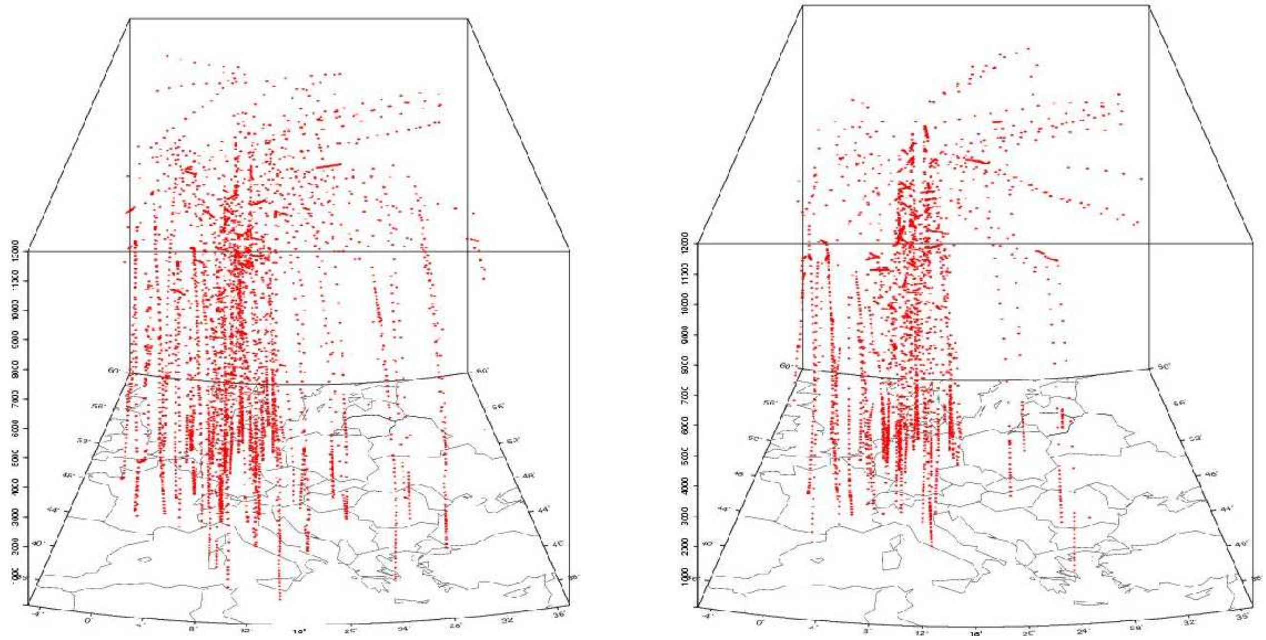

Figure 3 : Tree-dimensional distribution of AMDAR measurements (during landing and take off) over ALADIN/HU domain within a ±3 hour interval at 12 UTC (left) and 18 UTC (right) (2003.02.25) assimilation time.