TOVS PROCESSING IN FINLAND AND A CASE STUDY ON TOVS QUALITY IN A DATA ASSIMILATION CYCLE

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The need for high resolution data has been recently increased by the development of a Nordic high resolution analysis and forecasting system, called HIRLAM. The rather sparse conventional upper air observing system cannot describe enough mesoscale details and therefore model initial states do contain relatively large errors, which then probagate and amplify through the subsequent forecast. The need for data is both in time and space, but most urgent datavoid areas are found over the North Atlantic, the North Sea and the Baltic.

At the moment the VAX-version of the ITPP is being implemented and testing of local retrieval sounding system has started. Emphasis will be in the beginning put on the evaluation of the system performance over the complex surface conditions in and around Scandinavia.

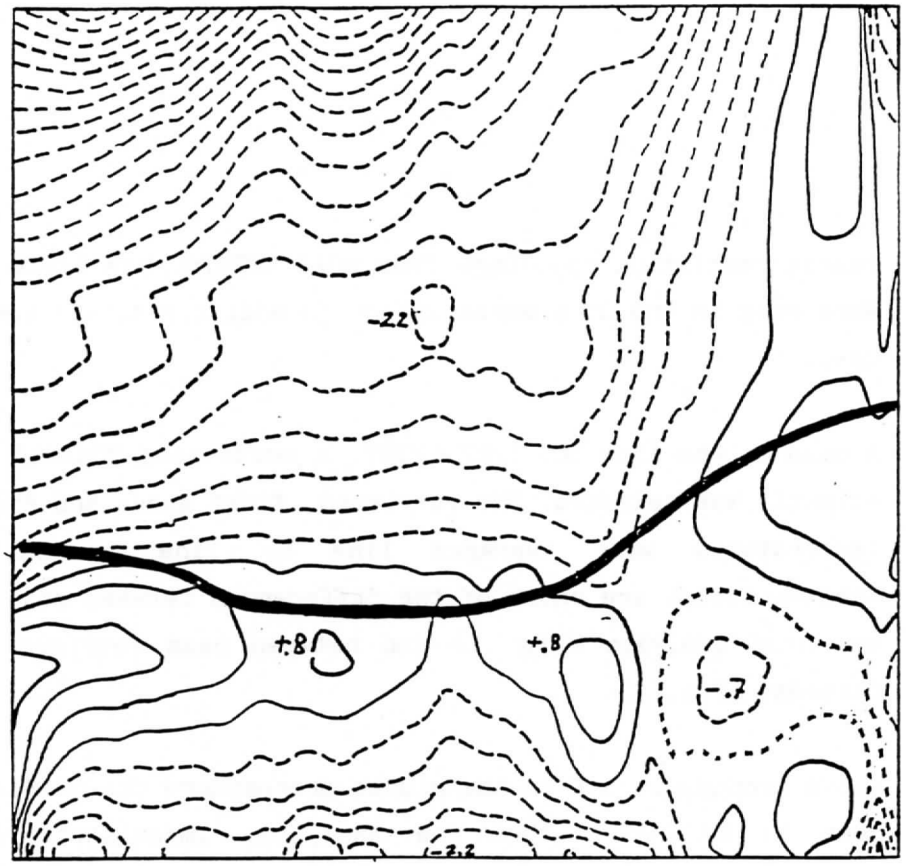
In a cooperation project with the British Meteorological Institute a case study was made to investigate differences between retrievals, first quess forecast and analysis within a data-assimilation cycle. The retrievals were produced by the BMO LASS system using the physical retrieval method developed by J.Eyre. These data were only used as diagnostic tool, while the

coarse resolution soundings from NOAA/NESDIS, available from GTS, were used in the data assimilation in addition to all conventional data.

A case on the 13th Oct 1987 12GMT, a southbound NOAA-10 pass over Atlantic was selected. The retrieved, first guess and the analyzed temperatures were averaged line by line on all levels. Cross-sections are shown of the differences between mean retrieval and mean analyses (Fig. 1) and between mean retrieval and mean forecast (Fig. 2).

Above tropopause and in the middle troposphere the LASS retrievals seem to be colder than the analysis. Immediately under the tropopause they however are significantly warmer than the analysis. Explanation for this could be, that the NESDIS coarse resolution soundings have too smooth tropopause and analysis follows this or that the analysis does the smoothing. The difference to the forecast shows a fairly large scale structure, the small scales being absorbed to LASS retrievals from the forecast. The difference also seems to be less dependent on the tropopause level than was the case with the difference to the analysis. Here the difference can partly be explained by the systematic error of the model and partly by the systematic retrieval error. In short we can say that there is a large inconsistency in the way tropause is described by analysis, by the retrieval scheme and by forecast model. In order to improve the forecast skill effort should be made to have higher resolution data and more levels in forecast models around tropopause.

$\overline{T}_{Retrieval} - \overline{T}_{First\ guess}$



10 hPa

1000 hPa

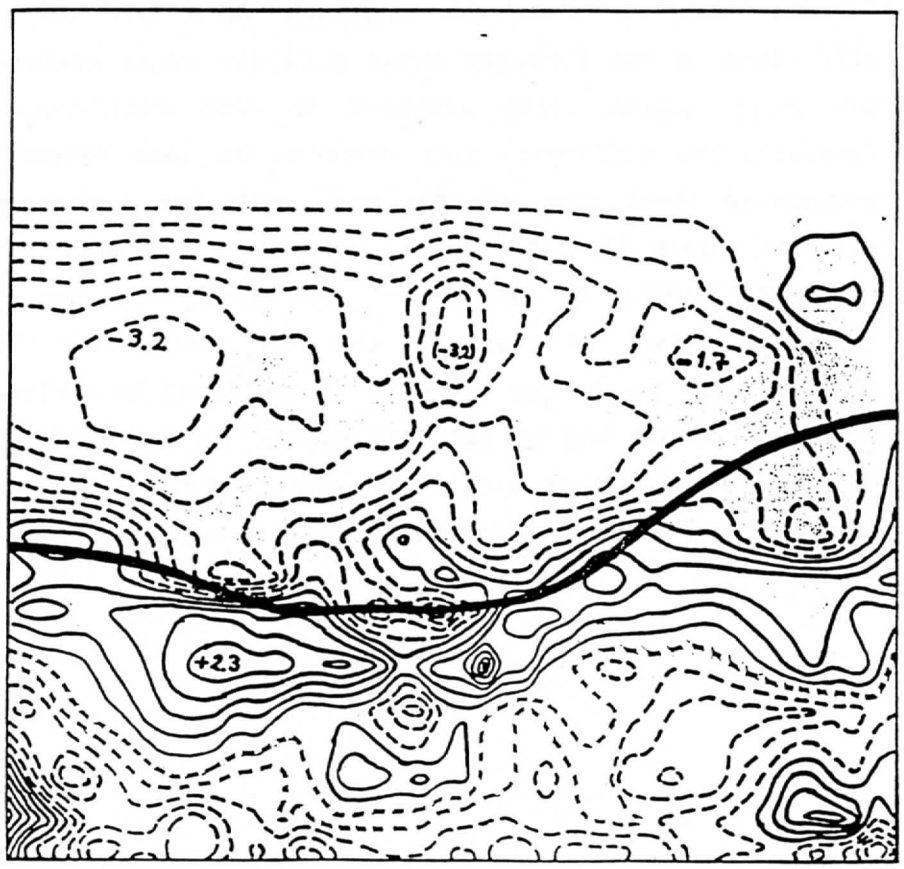
Mean analyzed tropopause level

77°N

Fig. 2

30°N

$\overline{T}_{Retrieval} - \overline{T}_{Analysis}$



10 hPa

1000 hPa

Mean analyzed tropopause level

77°N

Fig.1

30°N

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