

INTRODUCTION

The ECMWF has, over the years, organised and benefitted from a series of workshops covering a variety of aspects of its operational and research activities. This workshop discusses the processing of observational data from the points of view of availability, processing before presentation to the analysis system, and quality control at all stages of the analysis.

The main function of most meteorological services is to take meteorological observations and to produce weather forecasts based on these observations. The cost of making meteorological observations is enormous compared to the cost of using the observations, even on the most expensive computers.

Problems in the areas of pre-processing and quality control of the observations can have a substantial impact on the quality of the objective analyses and the ensuing forecasts, which are the main products of a forecast centre.

Despite their importance, these areas have received inadequate attention. There are probably many reasons for this relative neglect, but the lack of a powerful and general technique for identifying problems was certainly one reason. Without such a technique, efforts to streamline one's procedures were based on serendipitous identification of problems, and ad-hoc solutions to these problems.

Current data assimilation systems produce background fields for analyses which are sufficiently accurate to provide a standard of comparison for both real-time quality control and long term monitoring of the behaviour of the observing systems. The overall accuracy of the assimilation system also provides powerful diagnostic tools for the study of problems of the assimilation system itself in particular areas of the atmosphere. This overall accuracy depends on the good performance of all the components of the assimilation system including the quality control, analysis, initialisation and forecast procedures. These procedures give accurate analyses of the observations and provide accurate extrapolations in time. As a result, the background field for the next analysis is also accurate.

In the light of these new possibilities, and taking account of the major revision of the ECMWF analysis system that is currently underway, it was decided to organise a workshop around the related themes of data availability, data quality control in both real-time and in the longer term, and the pre-processing (including pre-selection) and main data selection algorithms used in the operational suite.

Following the presentation of invited papers two working groups were formed to discuss:

- the availability, quality and monitoring of meteorological observations;

- the quality control and selection algorithms in operational data assimilation.

Each working group prepared a report with recommendations for future work at ECMWF. During the discussions in the first working group some general aspects of availability, quality and monitoring of observations were raised; recommendations were made which should have an impact on the work of the WMO and the whole meteorological community going beyond the scope of ECMWF and its Member States. In particular the possibility of collaboration between ECMWF, other forecast centres, and WMO to diagnose problems in the availability and quality of observational data was considered.

The second working group concentrated on problems which affect the ECMWF operational data assimilation system. In the course of their discussions the importance of the ECMWF Data Assimilation Database (DADB) as a basic research resource was repeatedly emphasised. As a result it was thought worthwhile to include in the proceedings a separate section about the objectives and applications of the database, together with a brief discussion of the technical considerations affecting an improved design of the database.

ECMWF is grateful to the participants for their valuable and stimulating contributions to the formal and informal sessions of the workshop.