1. INTRODUCTION

The organisation of seminars and workshops is an important part of the research activity of the Centre. This publication contains the proceedings of a workshop on "Current Problems in Data Assimilation", which was held at the Centre from 8-10 Nov. 1982. The timing of the workshop was opportune as it came at an important stage in the evolution of the Centre's plans for the development of the data assimilation suite.

Over the last three years the data assimilation group has established the Data Assimilation Suite as a robust operational tool. They have also had the unique experience of involvement in the FGGE IIIb analysis project, together with the numerous data impact studies carried out by the FGGE group. For the last year or more the group has been carrying through a critical review of the performance of the analysis suite, of the validity of the underlying assumptions of the system, and of its capacity for further development. Some clear themes run through this review. There are theoretical and experimental studies of the factors which control the resolution of an analysis system at short scales. There are also studies of the response of analysis systems to data on very large scales, particularly in the tropics. The purpose of this review is to make a considered preparation for a new high resoltuion model to be introduced in 1985.

The workshop was intended to have a dual purpose - to discuss with outside experts the results of our own research work, and secondly to benefit from their research work in the same field. Because we are planning a substantial increase in the resolution of our analysis and forecast system, we were pleased to have the participation of several colleagues who are concerned with analysis on resolutions which are significantly higher than those we are currently contemplating in order to have the benefit of their experience.

The workshop was organised in the usual way. In the first sessions the invited experts and the Centre's scientists presented papers on their research work. In the later sessions selected topics were discussed in working groups. The purpose of the discussions was to clarify the definition of the most important areas for further work and to make recommendations as to the most fruitful lines of research. Most of these recommendations are directed towards the Centre's activity, where the goal is to provide analyses for a global model in 1985 which will have a resolution of order Triangular Truncation 100, and a physical grid spacing of 100-150 km at the equator. However some of the recommendations are addressed towards those, including some of the participants, who are engaged in the development of analysis systems for regional models with grid-spacings of 50 km or less. Such analysis systems are currently under development in several institutions.

The discussions were organised under three headings as follows

1. Analysis for global or hemispheric models
2. Analysis for fine mesh models
3. Tropical analysis

These headings formed natural categories for the main concerns of the workshop. The discussions are summarised in the following sections, together with the recommendations of the workshop. The sections on the workshop discussions are then followed by the papers presented at the workshop. The Centre is grateful to all the participants for their contributions to the workshop.