

Introduction

The first four dimensional variational (4D-Var) data assimilation system was put in operations at ECMWF on November, 25 1997. Two days later (27-11-1997), the Tropical Rainfall Measuring Mission (TRMM) satellite was successfully launched from the Tanegashima Space Center (Japan). These two important events of the atmospheric science have opened a new era for satellite measurements (TRMM being the first mission with a spaceborne rain radar) and for their use in numerical weather prediction (4D-Var being more efficient than previous analysis systems for the assimilation of satellite data).

Over tropical regions, the latent heat release by cumulus clouds plays a dominant role on the large-scale circulation and conventional data are very sparse. In consequence, the possibility of using TRMM data for model validations and data assimilation looked very appealing due to the improved quality of rain measurements over this important region of the globe. A 3-year EU-ESA funded programme entitled "EuroTRMM" was initiated by P. Baptista (ESA/ESTEC) and J. Testud (CNRS/CETP) to exploit TRMM data in terms of validation and improvement of rain products. Another important aspect of this European collaboration was to demonstrate the interest of the TRMM products for numerical modelling (evaluation of physical parameterizations and use in data assimilation). At ECMWF, this programme was an opportunity to initiate developments on the assimilation of satellite observations containing information about clouds and precipitation.

The Workshop was jointly organized by ECMWF and the coordinators of EuroTRMM. The proceedings contain a description of the key results obtained by the various European laboratories involved in this 3-year collaboration. They also include recent developments performed outside ECMWF on the assimilation of rainfall rates. Even though less mature than the assimilation of precipitation, the interest for cloud assimilation is growing in the scientific community by the advent of new satellite explorer missions with active instruments (radar/lidar). Several presentations were devoted to explore this area of research. The task of the four working groups was to identify the observational data sets that could be used for data assimilation, the necessary developments in terms of physical parameterization schemes and retrieval methods, and the improvements required to data assimilation systems for a better usage of cloud and precipitation data. Their discussions are summarized in the following four reports.

ECMWF thanks all the participants for their contribution to this successful Workshop on a very challenging but also promising subject. EuroTRMM acknowledge the essential contribution of NASA and NASDA to the success of this European project by providing the TRMM data.