EMS Annual Meeting Abstracts,
Vol. 6, EMS2009-222, 2009
9th EMS / 9th ECAM

9th EMS Annual Meeting
9th European Conference on Applications of Meteorology
High resolution meteorology
- applications and services

Adaptive observation with drifting platforms

A. Doerenbecher (1), O. Pannekoucke (1), N. Verdier (2), C. Basdevant (3), P. Drobinski (3), C. Fesquet (3), and P. Durand (4)

(1) METEO-FRANCE, TOULOUSE, France, (2) CNES, TOULOUSE, France, (3) IPSL/LMD, PALAISEAU, France, (4) OMP/LA, TOULOUSE, France

The BAMED (Balloons in the Mediterranean) project aims at developping in-situ drifting observing platforms onboard pressurized balloons to be deployed during HyMeX. HyMeX, known as "Hydrological cycle in the Mediterranean Experiment", is an international, multiscale and multidisciplinary experiment including an observing campaign to start in 2012. The BAMED project is lead by the LMD/IPSL (Laboratoire de Météorologie Dynamique), in collaboration with CNES (Centre National d'Etudes Saptiales) and CNRM (Centre National de Recherche en Météorologie). BAMED is supported by the CNES/TOSCA and INSU/LEFE.

Within HyMeX, a special attention is dedicated to the predictability of high impact weather events in the Mediterranean basin. Heavy precipitation and wind storms are typical events to focus on. The deployment of specific observing systems during the campaign to observe phenomena with reduced predictability addresses adaptive observation issue. Consequently, BAMED is three-fold: the project includes balloons technical developments at CNES, trajectory modelling at LMD and adaptive observation at CNRM. The objective is to built an efficient and flexible component of the HyMeX observing system.

The CNES develops boundary layer pressurized balloons (BLPBs), which can drift above the sea, collecting data that benefit numerical weather prediction systems. Indeed, the prediction of heavy precipitation events lacks of in-situ measurements in the oceanic boundary layer. However, the balloons will be useful if they drift through some so-called sensitive areas. Moreover the control of the flight of such drifting platforms is very limited at a time and location of the launch of the platform. Because the Mediterranean basin is closed and relatively small compared to atmospheric features, the time spent by BLPBs within the basin is expected to be less than 3 days. The dates and the coastal locations of launching these balloons must be thoroughly selected to allow the balloon to drift into the area of interest and prevent the balloon leaving the basin too quickly. Possible launching sites are evaluated through some trajectography and adaptive observation studies on a selection of typical Mediterranean cases.

However, a comprehensive adaptive observation system for the Mediterranean basin shall also monitor the predictability of the upstream flow, at larger scales. The only drifting platform that sample the whole troposphere is the CNES-NCAR driftsonde: a stratospheric balloon-carried gondola drop sondes on demand. Such a platform is thought to be helpful, and to benefit also T-NAWDEX, if deployed above the North Atlantic Ocean.

A specific targeting guidance tool for drifting platforms has to be set up. This tool is based on the Kalman Filter Sensitivity (KFS) and coupled with accurate trajectory prediction. The KFS predicts areas where additional observations will most benefit the subsequent forecast, accounting for the assimilation of the routine observations. Monitoring of drifting balloons within an adaptive observation approach is a challenge: new tools, new scales, management of the uncertainties related to the balloons' predicted trajectories and anticipation of the cumulative effect of observations being spread over several assimilation cycles.

The adaptive observation aspects of BAMED will be described.