INTRODUCTION

The ACTRIS-2 JRA1 focuses on reducing the uncertainty in the determination of the aerosol light absorption by optimizing advanced remote sensing and in-situ methods. Dedicated campaigns have been organized to set up closure studies between remote sensing retrievals and in-situ measurements with the purpose to lead to a better aerosol absorption characterization. Here we present the challenges we face towards the fulfillment of this goal.

LIMITATIONS REALIZED DURING ACTRIS-2 JRA1 CAMPAIGNS

1. Remote sensing algorithms combining lidar with sunphotometer measurements require cloud-free measurements.

Melpitz and Athens campaigns were mostly cloudy.

2. The absorption retrieval from remote sensing algorithms requires large AODs (for GARRLiC retrieval estimated at >0.3 at 440 nm).

Melpitz and Athens campaign AODs <0.2 at 440 nm.

3. Limitations in remote sensing-in-situ comparison due to lidar overlap and low UAV flight height.

During Melpitz and Athens campaigns most of the particles are within the lidar overlap region. During Athens campaign the UAV flight altitude was lower than the overlap height.

4. UAV measurement issues.

The in situ measurements from AE51 showed large discrepancies for ascending and descending flights in some cases, and compared to the (more accurate) DWP.

RECOMMENDATIONS FOR FUTURE CAMPAIGNS

- Special care in campaign planning: avoid cloudy seasons and/or no-absorbing atmospheres.
- Obtain lidar information in overlap region, applying different methods (e.g. near-field/far-field signal gluing, overlap correction).
- Aim for higher UAV flight altitudes (as in Cyprus and Melpitz campaigns).
- Extensive characterization of in situ airborne measurements. Use of multiple airborne platforms and surface instrumentation.
- Investigate GARRLiC vertical structure in the PBL.