

**A high-level textbook on  
Airborne Measurements –  
Methods and Instruments**

## Objectives of the Book

- ▲ Overview of existing airborne measurement or retrieval principles and techniques.
- ▲ To help understand related
  - Problems (e.g., sources of uncertainties),
  - Limitations (e.g., size/wavelength range),
  - Suitability (select proper type).
- ▲ Quantify measurement/retrieval errors.
- ▲ Unbiased evaluation of commercial instruments.
- ▲ Describe/suggest calibration techniques.
- ▲ Identify major gaps, suggest approaches for new instruments.

## Target Audience

- ▶ Graduate students.
- ▶ University teachers.
- ▶ Newcomers.
- ▶ Scientists (looking for additional airborne data, e.g., for validation or analysis of their own measurements) experienced in:
  - Airborne in situ or remote sensing,
  - Ground-based remote sensing, and
  - Satellite remote sensing.
- ▶ Modellers (evaluate their model input).
- ▶ Project managers, PIs.
- ▶ Reviewers of papers and proposals.

## Meeting in Warsaw, February 2009

## List of Chapters and Chapter Leaders

- 1. Introduction** (Wendisch, Brenguier)
- 2. Basic Thermodynamic and Dynamic Parameters** (Lenschow, M. Esposito)
- 3. Gas Phase Measurements** (McQuaid, Schlager)
- 4. Particle Sampling Issues** (Krämer, Twohy)
- 5. In Situ Measurements of Aerosol Particles** (Petzold, Coe)
- 6. In Situ Characterization of Clouds and Precipitation Particles** (Brenguier, Baumgardner)
- 7. Radiation Measurements** (Wendisch, Pilewskie)
- 8. Hyperspectral Remote Sensing** (Eyal Ben-Dor, Müller)
- 9. Active Remote Sensing** (Pelon, Vali)

# Review Process

- ▶ Within EUFAR (via web site access)
- ▶ Externally (Independent)
  - Reviewer Chairs:
    - Dave Fahey** (NOAA)
    - and
    - Ulrich Schumann** (DLR)

# General Procedure, Responsibilities

▲ We have:

- Editors (**E**) (MW and JLB),
- Chapter Leaders (**CL**),
- Section Authors (**SA**), and
- Reviewer Chairs (**RC**).

Editors (**E**)  
Chapter Leaders (**CL**)  
Section Authors (**SA**)  
Reviewer Chairs (**RC**)

# General Procedure, Responsibilities

▲ **CL** submit final Table of Chapter Contents and **SA** list to **E**.

▲ **E** submit book proposal to Wiley. **E** contact **RC**.

▲ **SA** write/revise sections, submit to EUFAR web site and **CL**.

▲ **CL** compile their chapter, submit chapter to EUFAR web site. **CL** & **SA** interact.

▲ **E** compile book, submit to EUFAR web site. Meeting or Telconf.

▲ **RC** request reviews.

▲ **RC** receive & distribute reviews.

▲ Meeting (or Teleconf), if necessary.

▲ **E** submit to publisher.

Editors (**E**)

Chapter Leaders (**CL**)

Section Authors (**SA**)

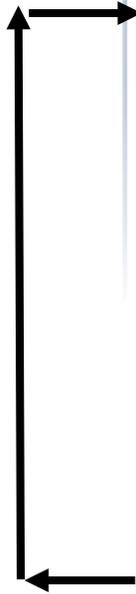
Reviewer Chairs (**RC**)



# General Procedure, Responsibilities

- ▲ **CL** submit final Table of Chapter Contents and **SA** list to **E**. **(End of March 2009)**
- ▲ **E** submit book proposal to Wiley. **E** contact **RC**. **(End of April 2009)**
- ▲ **SA** write/revise sections, submit to EUFAR web site and **CL**. **(1: End of December 2009)**
- ▲ **CL** compile their chapter, submit chapter to EUFAR web site. **CL & SA** interact. **(1: End of April 2010)**
- ▲ **E** compile book, submit to EUFAR web site. Meeting or Telconf. **(1: End of July 2010)**
- ▲ **RC** request reviews. **(September 2010)**
- ▲ **RC** receive & distribute reviews. **(December 2010)**
- ▲ Meeting (or Teleconf), if necessary. **(Feb. 2011)**
- ▲ **E** submit to publisher. **(June 2011)**

**E** Editors (**E**)  
**CL** Chapter Leaders (**CL**)  
**SA** Section Authors (**SA**)  
**RC** Reviewer Chairs (**RC**)



# Problems

- ▶ Rapid development of this field:
  - *Speedy development of new probes,*
  - *Modifications of existing instruments.*
- ▶ Balance between being
  - *Too general (just describe principles),*
  - *Too specific (collection of manuals for existing probes).*
- ▶ Compromise: Presentation of existing principles, illustrated with examples of instruments currently used.

## Section Structure

- a) **Measurement Principles:** Provides all the basics to understand how measurements are performed
- b) **Implementation on Airborne Platforms:** Describes the measurement techniques and the instruments.
- c) **Data Processing and interpretation:** Briefly describes the theories and the way data are processed, with recommendations on how this type of data shall be interpreted
- d) **Limitations, Uncertainties, Error Propagation**  
Review of error sources, error propagation and resulting uncertainty on each parameter
- e) **Calibration & Maintenance:** Review of the various techniques and facilities
- f) **Gaps & Emerging Technologies:** aims at guiding instrument developers to find new technologies to explore
- g) **Summary:** shall not duplicate the chapter summary, rather discuss that specific section with regards to the others in the chapter and how it fits into the field.