Manfred Wendisch, Jean-Louis Brenguier

A high-level textbook on

Airborne Measurements – Methods and Instruments

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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.

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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.

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Meeting in Warsaw, February 2009

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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)**

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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.

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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.