

Minutes of the planning meeting for the intercomparison campaign of water measurement methods

Karlsruhe, June 6, 2007

Purpose:

Bring together the atmospheric water measurement community including water vapour and total water measuring instruments.

Determine the instrument performances for static conditions (pressure-, temperature-, & water constant) and dynamic conditions (changing pressure, temperature, water, cloud density) for low water concentrations (1 - 20 ppm). Reasons for possible discrepancies will be investigated e.g. by variation of crucial parameters.

The participating instruments will be intercalibrated among each other at the AIDA chamber and optionally in comparison with an external H₂O reference source by PTB ("german NIST"). Scientific goals beyond instrument intercomparison may be addressed but priority has the intercomparison.

Type of intercomparison:

The intercomparison will have a formal part in which no exchange of data among the participants is allowed and single blind experiments will be performed. Two referees will collect the data immediately after each experiment and do the intercomparison. If data are not expected to be delivered within 24 hours after each measurement day, the PI should make a note in the questionnaire (see below) and/or to inform the referees. Suggested as referees are:

Dave Fahey (Dan Murphy, R. Gao und Eric Jensen)*

Tom Peter

Ottmar Möhler*

Ulrich Schurath

Thomas Leisner

Klaus Gierens

Horst Fischer

Rob MacKenzie

Steve Wofsy

Geraint Vaughan

Stefan Borrmann

*based on offline discussions after the workshop

Static “calibration” with defined amounts of water in AIDA at different temperatures and pressures:

- Constant temperature for each day, pressure & water variation
 - Temperatures: 230, 210, 200, 190, 185 K
 - Range of pressure: 50 – 500 hPa
 - Water concentrations: 1-20 ppm
 - Total pressure cycle: 50 $\Rightarrow$ 500 $\Rightarrow$ 50 hPa (5 steps up and down)
 - Starting water concentration 20 ppm at 50 hPa
 - End water concentration 2 ppm at 50 hPa
 - Possibility to characterise water absorption lines (TDL systems)
 - Possibility to calibrate w. r. to H₂O permeation source provided by PTB (“german NIST”) aside the AIDA experiments.

Dynamic expansion/compression experiments with different aerosol & cloud densities

- Adiabatic expansion without aerosol particles
 - Gas phase water = total water, only changes of r.h.
- Static periods with water containing aerosol
 - Salt aerosol with defined water content
 - Ice particles injected into the chamber (ice saturation)
- Ice, liquid & mixed phase clouds by adiabatic expansion
 - Starting temperatures: 230, 210, 200, 190, 185 K ?
 - Water concentrations: 1-100 ppm ?
 - Cooling rates: 0.1 – 4 K/min will be varied
 - Pressure ranges: 200-100 hPa ?

Time Table

[illegible]

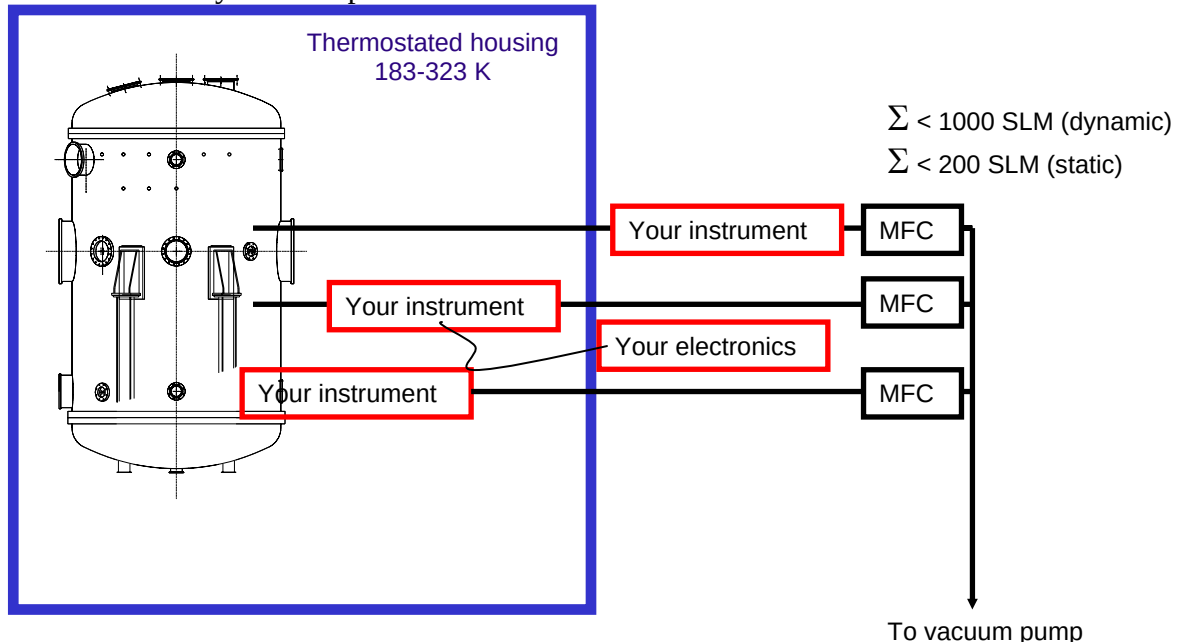
Participants

Participant	Instrument (name, type)	Connection to AIDA/Flow/technical requirements
Linnea Avallone	CLH, TDL	heated SST / 1.5 SLM
Zoltán Bozóki	Photoacoustic water sensor	heated SST
Theo Brauers	Vaisala Dew Point Sensor DM 500	heated SST / 1.0 SLM
Ulrich Bundke	Paddy dew point mirror	In AIDA or extractive 1-5 SLM, using permeation source
George Durry	TDL	
Volker Ebert, Harald Saathoff	TDL (1370 nm) for measurements in AIDA (gas phase water only)	glass fibre / White cell
	TDL (1370 nm) for measurements outside AIDA (total water)	heated SST / 5.0 SLM / Herriott cell
Robert Herman	JPL-Laser-Hygrometer	
Martina Krämer, Cornelius Schiller	FISH (one or two instruments)	heated SST / 5.0 SLM
	OJSTER-TDL	cold flow tube / 10 SLM
	dew point mirror Buck CR-1	heated SST / 2.0 SLM
	dew point mirror MBW-DP30	heated SST / 1.0 SLM
Ottmar Möhler	Dew point mirror MBW-373	heated SST / 1.0 SLM (1000 hPa) to 0.3 SLM (100 hPa)
Nikolai Sitnikov, Vladimir Yushkov	FLASH-B (Lyman- α)	Via flange, darkness required
Herrmann Smit	WV\$\$-II, closed TDL	heated SST / 3.0 SLM
Holger Vömel	CFH, Cryogenic frost point hygrometer	heated SST / ? SLM, liquid nitrogen
Frank Wienhold	Snow-White	Inside AIDA or flow tube
Jim Whiteway	Open-path TDL (no inlet: external absorption cell)	
Andreas Zahn	dew point mirror Buck CR-2 (Part of CARIBIC)	heated SST / 2.5 SLM (1000 hPa) to 0.5 SLM (200 hPa)
	2-channel photoacoustic system (Part of CARIBIC)	
	water isotope composition TDLAS (New development)	heated SST / 2.0 SLM
Mark Zondlo	HIAPER VCSEL TDL-System	Inside AIDA or in flow tube

Connecting the instruments to AIDA

It is possible to connect the instrument via heated steel tubes from the warm lab to AIDA. The instrument may be in a flow tube in the cold AIDA housing connected by a steel tube. The instrument may be inside ADIA e.g. mounted on a flange.

Maximum total sample flow rates may not exceed 200 SLM during quasi static conditions and 1000 SLM for dynamic experiments.



Date handling and format

- Data handling and analysis strategy
 - The data will be held either at ADIA or in Jülich
 - A password protected Wiki-page for exchange information on and data from the intercomparison workshop will be established
 - As logbook for the campaign either the AIDA online logbook or a logbook on the Wiki-page may be used
 - Access to the data only for participants
 - Who does the final intercomparison?
- The NASA AMES data format must be used:
 - For a description see: <http://badc.nerc.ac.uk/help/formats/NASA-Ames/>

Financing

- FZ-Karlsruhe will provide the cost for the AIDA facility and will give technical support for adaptation/connection of partner instruments to the chamber
- EUROCHAMP provides a limited amount for travel grants
- Founding from COST may come too late?
- Other sponsors (e.g. NSF) are sought

Acronyms suggested so far

- H₂O-InterCom
- WM2007 (water measurement 2007)
- aquaVIT (aqua-Verification-Intercomparison-Test)
- other suggestions are welcome

Questionnaire

All participants of the intercomparison measurements are asked to provide the requested information to the organisers as soon as possible.

Participant, affiliation, e-mail
Instrument (name, type)
Technical requirements (flow rates, power, gases, space, etc.)
Connection to AIDA desired (extractive, in situ, ...)
Major objectives for this activity
Dates of attendance during the campaign
Time required for delivering data to the referee