

Report of the 4th COPS Workshop

held on 25 and 26 September 2006
at University of Hohenheim

70 persons participated in the 4th COPS Workshop.

The list of the participants and copies of the presentations are available at the COPS webpage at http://www.uni-hohenheim.de/cops/4th_COPS_WS/4th_COPS_workshop.html.

1) Update on COPS Instrumentation

New exciting instrumentation will be available by our international partners during COPS. An overview can be found at

http://www.uni-hohenheim.de/cops/4th_COPS_WS/presentations/COPS_instruments.pdf which also contains an improved plan of the supersite set ups (see next page).

A list of all COPS instruments (status October 17) can be found in the appendix.

Instrument forms are sent out to international partners (necessary for COPS Operations Plan). The form is also available at http://www.uni-hohenheim.de/cops/Instrument_form_COPS.doc.

Data format:

- + NetCDF, similar to ARM data
- + Provide data to GTS via DWD: Interest of Met. Services confirmed, contact corresponding instrument PIs (UHOH), request logistical support, DAP action item

Lidar instrumentation should have overlap as low as possible for ABL measurements.

1.1 Groundbased instruments during COPS

Responsibilities:

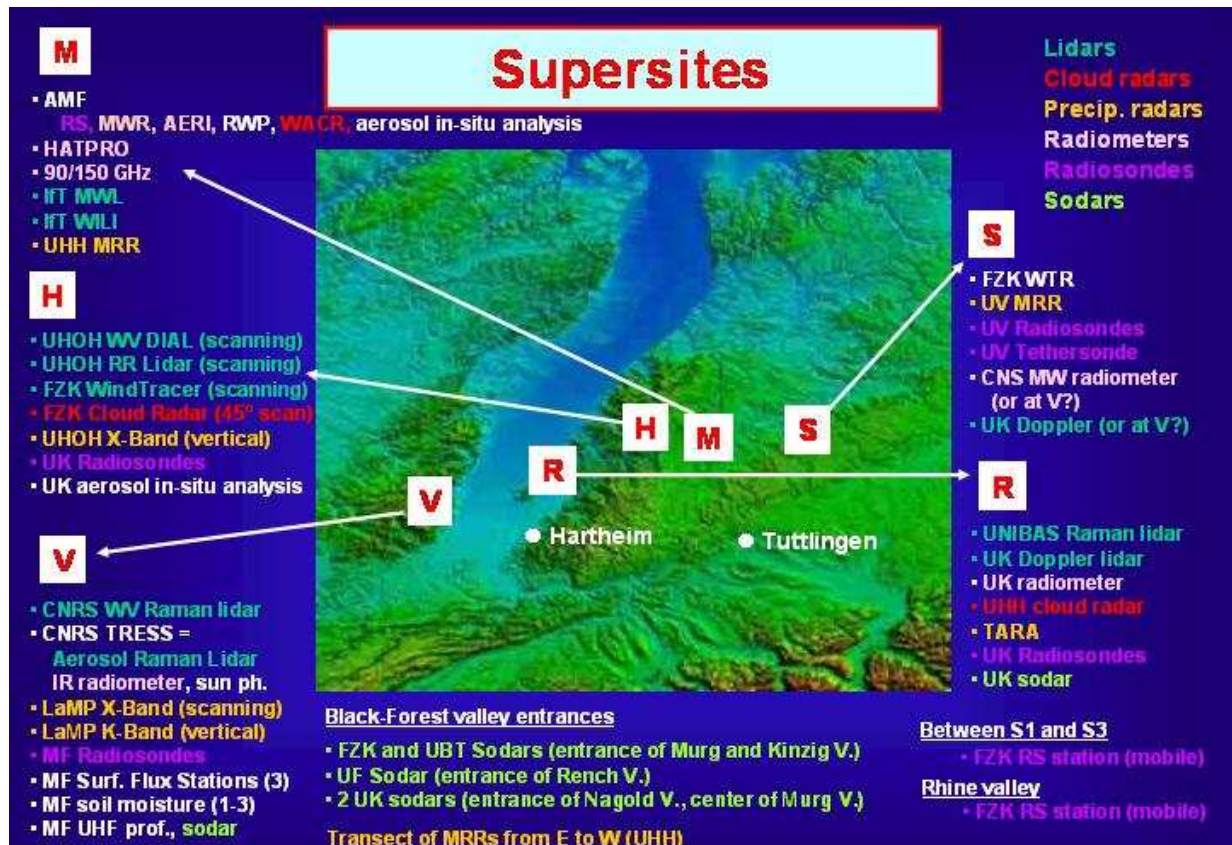
Overall coordination: Andreas Behrendt

Supersites

Supersite Hornisgrinde:	Suggestion: Ulrich Corsmeyer, Andreas Wieser
Supersite Murg Valley:	Kim Nitschke
Supersite Voges Mountains:	Cyrille Flamant, Joel van Baelen
Supersite Rhine Valley:	Paolo di Girolamo
Supersite Stuttgart (located most eastward):	Manfred Dorninger

Further notes:

- Priority: TARA at Hornisgrinde if logistically feasible
- MICCY available?
- Additional IR radiometers of ARM available



Networks

Issues concerning set up, distribution, and coordination of network activities:

- soil moisture, energy balance, GPS, rain gauges, met. stations at the same place
- otherwise transects through COPS region
- transects through valleys

Locations of MRRs, combine with wind profiler as far as possible

Energy Balance Stations: Norbert Kalthoff

GPS Network: Joel van Baelen, Galina Dick

Met. Stations: Manfred Dorninger, Norbert Kalthoff

MRR Network: Gerhard Peters

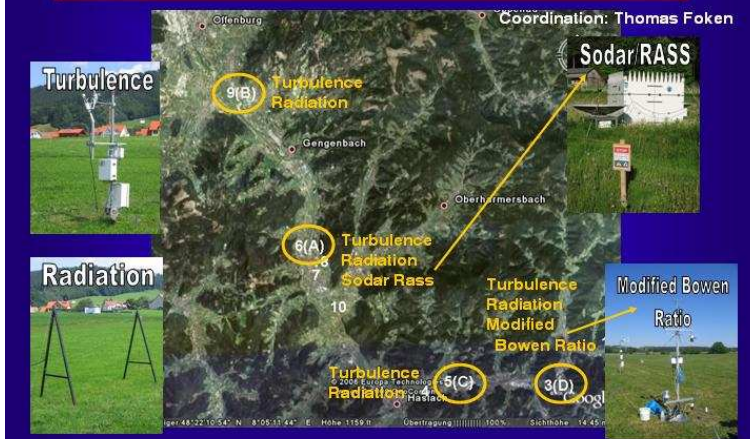
Rain gauge network: Suggestion: Martin Hagen, Armin Mathes

Soil Moisture Network: Christian Hauck

Turbulence network: Thomas Foken

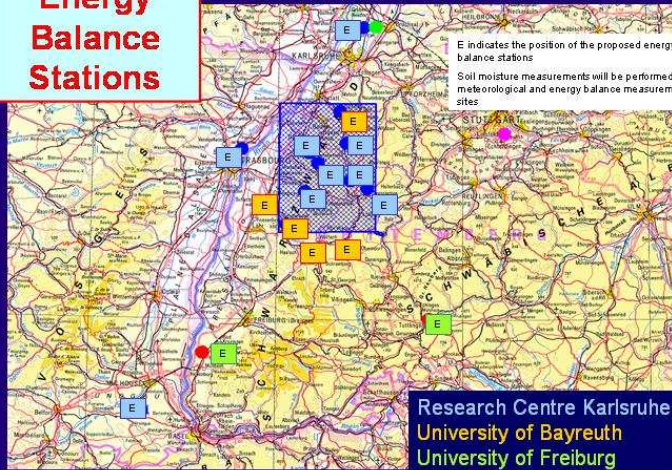
Networks: Draft for Operations Plan, November 15, 2006

Turbulence setup in the Kinzig Valley



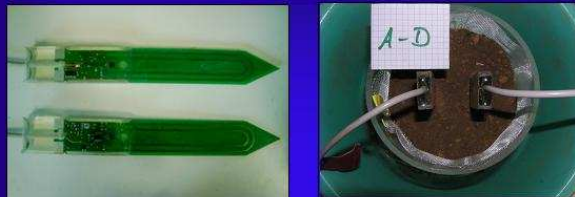
Energy Balance Stations

Coordination: Norbert Kalthoff



Soil Moisture Network

Coordination: Christian Hauck



Soil moisture sensors: SISOMOP (Simplified Soil Moisture Probe)

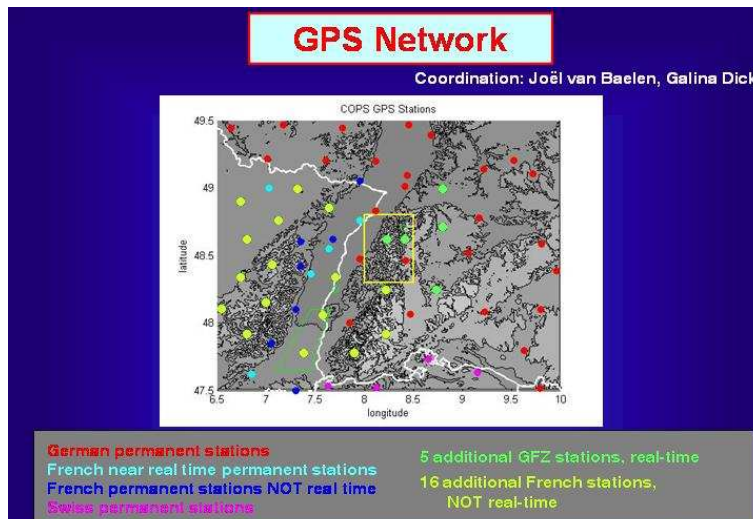
150 sensors at 50 stations

(a) 3 sensors at different depths OR (b) 3 - 4 sensors at surface

Coarse-grid network COPS region (operational March 2007)

High-resolution network

Northern Black Forest (operational during COPS)
coupled to energy balance and turbulence stations



1.2 Aircrafts available during COPS

Responsibilities:

Coordination of all by COPS Project Office

Aircraft missions: Christoph Kiemle, Cyrille Flamant, Stephen Mobbs, Ulrich Corsmeier

DLR Falcon (confirmed), 45 flight hours, end of June - early August, based in Oberpfaffenhofen, with DLR DIAL and Doppler lidar, 57 dropsondes

TU-BS Do 128 (confirmed), 100 flight hours, 35 flight days, mid of June - mid of August, based at Karlsruhe/Baden-Baden Airport

French SAFIRE FA20 (confirmed), 35 flight hours in July/August, with LEANDRE-II water vapor DIAL and 120 dropsondes

UK FAAM BAe 146 (confirmed), based in UK, 60-80 flight hours, for 3 months (with other commitments in between), 2-3 days detachments at Baden-Airpark

Within TRACKS:

Learjet, Max-Planck Institute for Chemistry Mainz, 20 flight hours

Zeppelin NT, Research Center Jülich (in preparation)

For additional flight hours of DLR Falcon, SAFIRE FA20, Do 128: **EUFAR proposals**

10 - 12 flight hours per proposal

proposal by "young" applicants for foreign aircraft

Applicants: Italy, Switzerland, Austria, etc., deadline: 6 months in advance of start of campaign

Support of students (check EUFAR website <http://www.eufar.net/?page=TA>)

Meeting to refine COPS missions will be held in November in Oberpfaffenhofen, organization: Christoph Kiemle.

Envisioned airborne platforms during COPS

✈ MPIC Learjet (max. 13 km): Chemistry + ?



✈ DLR Falcon (6 – 10 km AGL): WV DIAL, Doppler lidar (conical scanning), dropsondes, turb. fluxes

✈ SAFIRE F20 (6 – 10 km AGL): VW DIAL, dropsondes, p, T, q, u, v, w



✈ BAE 146 (max. 4 km), aerosol + cloud microphysics instrumentation



✈ Do128 (0.3 – 3 km AGL): T surface, upwelling & downwelling radiation and turb. fluxes



○ FZJ Zeppelin NT (max. 2 km): Chemistry + ?



Flight coordination & communication with Air Safety Control: Heinz Finkensteller, DLR



4th COPS Workshop, Hohenheim, 25 – 26 September 2006



June 2007 July 2007 August 2007



DLR Falcon
30 allocation days (weekends do not count unless IOP)
45 flight hours
+ additional operation by EUFAR?

Reservation:
11 June: implementation of instruments
18 June - 29 July: COPS deployment



DO128
35 allocation days
100 flight hours
+ additional operation by EUFAR?



SAFIRE F20
24 allocation days in July 2007 (tbd)
35 flight hours
+ additional operation by EUFAR?
120 dropsondes



FAAM BAe 146
Confirmed for 3 months
(but other commitments in between)
2 – 3 days detachments
60 – 80 science hours
Stationed in Cranfield, UK

1.3 S-POLKa

The NSF proposal lead by Tammy Weckwerth for S-POLKa was unfortunately declined. However, we are currently working with Tammy and Josh Wurman to submit a request for two DOWs.

2) Common Data Implementation Plan for COPS/GOP/D-PHASE

A draft was sent to the workshop participants before the workshop.

A copy can be found at

www.uni-hohenheim.de/cops/4th_COPS_WS/Data_implementation_plan_COPS_GOP_DPHASE_060919.pdf

The Data Implementation Plan will be refined during the next months.

COPS Archive:

Service email address: cops@zmaw.de

User information: cops.wdc-climate.de

3) COPS Operations Plan

The COPS OP is in preparation. A first draft will be distributed until October 31, as the outcome of the most proposals is clear.

4) COPS Operations Center

The COPS Operations Center is organized by Christian Barthlott of Research Center Karlsruhe, for details see

http://www.uni-hohenheim.de/cops/4th_COPS_WS/presentations/04_03_OC.pdf .

If logistically feasible, the COPS-OC will be located at Baden Airpark. A second possibility if, e.g., no sufficient internet connection can be installed at Baden Airpark, is to locate the COPS-OC at University of Karlsruhe.

5) International coordination

see presentations on at COPS webpage.

The status of D-PHASE (http://www.map.meteoswiss.ch/map-doc/dphase/dphase_info.htm) is described at

http://www.uni-hohenheim.de/cops/4th_COPS_WS/presentations/04_01_d-phase.ppt

6) Miscellaneous

- Contracts and transfer of DFG funding (UHOH, in preparation, contracts will be send to all PIs in the next days)

- Ground-based instrument logistics have been started

Note: **The instrument PIs are responsible for getting the permissions to operate their instrument (radar, lidar etc.)**

- Next COPS Workshop: 3 days end of March or early April, 2007, exact date will be proposed soon.

- MSG rapid scans (Wolfgang Bennisch, Science Representative, DWD has been contacted)

- ESF sponsorship (networking: European observatory)

DWD:

- LMK, research radars and GII in NINJO (reflectivity)
- French weather radars in NINJO
- Satellite data in real time
- Forecaster

An official request has been submitted.

Other Met. Services:

- Surface and radar data, coordinate with SPP activities
- Forecaster requested from DWD. Meteo France, Meteo Swiss, and UK Met Office will also be asked.

Data assimilation:

GPS assimilation in preparation in collaboration with UHOH, GFZ, and LMP in France.

Communication:

- Radio link from aircraft, actual flight pattern, further details to be discussed at November aircraft PI meeting.
- Conference phone in operations center
- Each PI must be reachable per phone or cell phone (dial in during mission decision process and mission performance)

Forecast visualization:

a) Deterministic (3 models?):

- Coverage
- Time resolution: 15min
- Duration: forecast time
- Surface pressure, temperature, humidity, wind field
- 850-hPa geopotential + wind field + humidity
- 700 hPa geopotential + wind field + humidity
- 500-hPa geopotential + wind field + humidity
- 250 hPa geopotential + wind field + humidity
- CAPE
- CIN
- Instability indices
- Clouds
- Precipitation
- Height of 1.5 PVU surface
- Vertical cross sections along COPS transect
- Meteograms

b) Ensemble results (2 systems?):

- Clouds
- Precipitation

c) Alerts: extreme events, large precipitation

Mission planning in OP:

- WG Chairs and ISSC provide first draft in OP

Time schedule:

- THORPEX Meeting: October 9-11, 2006
- D-PHASE Meeting: November 6-8, 2006
- THORPEX Science Conference: December 4-8, 2006

- Draft OP: December 20, 2006

- GOP archive test run: November 2006
- GOP: January 1 - December 31, 2007
- D-PHASE Test Phase: End of February 2007
- AMF operational: April 2007
- COPS archive test run: April 2007
- COPS instrument preparation: May 2007
- COPS Operations Center preparation: May 2007
- COPS performance: June - August 2007
- D-PHASE performance: June - November 2007
- COPS data archiving phase: Until March, 2008
- ETReC07: around July 2007

- Next COPS workshop: 3 days end of March or early April, 2007, the exact date will be proposed soon

Appendix. COPS Instruments

COPS Instruments

Status October 17, 2006

For an overview, see

http://www.uni-hohenheim.de/cops/4th_COPS_WS/presentations/COPS_instruments.pdf

Germany

For details, see presentations at 3rd COPS workshop

http://www.uni-hohenheim.de/cops/3rd_COPS_WS/3rd_COPS_workshop.html

Instrument	Measured Parameters/Type	PI	Institution	Comments
Airborne				
DLR Falcon	Aircraft + WV DIAL + Doppler Lidar + Dropsondes	Ehret	DLR	Confirmed
DO 128	Aircraft, in-situ meteorological and turbulent flux measurements, surface temperature	Corsmeier	FZK, in cooperation with TU-BS	Confirmed
SAFIRE Falcon 20	Aircraft + WV DIAL + Dropsondes; 24 day in July 2007, 35 flight hours, 120 dropsondes	Flamant	CNRS	Confirmed
Ground-based Lidars				
UHOH Water Vapor DIAL, scanning	4D high-resolution, high-accuracy water vapor, aerosol backscatter, wind field by aerosol tracking, cloud structure	Wulfmeyer	U. Hohenheim + IfT + U. Potsdam + DLR	Confirmed
UHOH Rotational Raman Lidar, scanning	Temperature & aerosol profiles, cloud structure	Behrendt	U. Hohenheim/ COSI-TRACKS	Confirmed
WindTracer, scanning	LOS wind & aerosol profiles, cloud structure	Wieser	FZK	Confirmed
MWL & WiLi	Multi-wavelength aerosol optical properties, depolarization + vertical wind + radiosondes	Althausen	IfT	Confirmed
Radiometers				
HATPRO, scanning	MW radiometer, temperature and water vapor profiling, stability index, LWP	Crewell	U. Munich	Confirmed
MICCY, scanning	MW + IR radiometer, temperature and water vapor profiling, stability index, LWP	Simmer	U. Bonn	Funding confirmed but needs repair

Radars				
POLDIRAD, C-Band, Dopplerized, scanning	Rain rate, hydrometeor distribution, LOS wind, drop size distribution	Hagen	DLR	Confirmed
Karlsruhe Radar, C-Band, Dopplerized	Weather Radar, C-band, scanning	Beheng	FZK	Confirmed
UHOH X-Band	Precip radar	Schaberl	U.Hohenheim	Confirmed
IMK Cloud Radar	Cloud Radar	Beheng	FZK	Confirmed
UHH Cloud Radar	Cloud radar	Peters	U. Hamburg	Confirmed
MRRs	Micro Rain Radars (funded within GOP for 12 months)	Peters	U. Hamburg	Confirmed
GPS				
GPS Network	GPS, 5 additional stations for COPS	Gendt	GFZ	Confirmed
WTR + Sodar + RASS				
WTR	Mobile wind temperature radar	Vogt	FZK	Confirmed
2 Sodars	Sodar	Kalthoff	FZK	Confirmed
Sodar-RASS	Sodar, RASS	Foken	U. Bayreuth	Confirmed
Flat array sodar	Sodar	Mayer	U. Freiburg	Confirmed
Surface in-situ				
2 Energy balance stations		Kalthoff	FZK	Confirmed
5 Turb. Towers		Kalthoff	FZK	Confirmed
SISOMOP	Soil Moisture sensors	Hauck	FZK	Confirmed
Rad.-Turb. Cluster	3 Energy balance stations + Bowen ratio system + Scintillometer	Foken	U. Bayreuth	Confirmed
12 Automatic Weather Stations		Smith	U. München	Confirmed
Masts + tethered balloons				
4 MMM	Micro-Meteorology-masts, comb. w. Drop-up sondes	Kalthoff	FZK	Confirmed
12-m Mast		Foken	U. Bayreuth	Confirmed
Hartheim site		Mayer	U. Freiburg	Confirmed
Tuttlingen site		Mayer	U. Freiburg	Confirmed

Radiosonde stations				
2 Mobile RS Stations		Kalthoff	FZK	Confirmed
Drop-up sondes	Advanced radiosondes (30 sondes, 5 kits)	Corsmeier	FZK	Confirmed
Precip. measurements				
10 high-precision precipitation meas. systems	OTT	Ahrens	U. Frankfurt	Confirmed
Networks				
Routine Observations of DWD			DWD	Confirmed
Routine Observations of Landesamt für Umweltschutz Baden – Württemberg (LUBW)	100 precipitation measurement stations, with 35-40 stations with measure also humidity, pressure, temperature, wind, and solar radiation (not every parameter measured at every station); 2 soil-moisture stations; see http://www2.lfu.baden-wuerttemberg.de/lfu/hvz/	Schulz	Landesamt für Umweltschutz Baden – Württemberg (LUBW)	Confirmed

France

http://www.uni-hohenheim.de/cops/4th_COPS_WS/presentations/02_01_France.ppt

Instrument	Measured Parameters/Type	PI	Institution	Comments
Airborne				
SAFIRE Falcon 20	Aircraft + WV DIAL + Dropsondes; 24 days in July/August 2007, 35 flight hours, 120 dropsondes	Flamant	CNRS	Confirmed
Groundbased				
TReSS	Mini Raman lidar, sun photometer, IR radiometer, full-sky camera	Flamant	CNRS	Confirmed
Raman lidar		Flamant	CNRS	Confirmed
Radiosondes station		Boutier	Météo France	Confirmed
UHF + sodar		Boutier	Météo France	Confirmed
3 Surface Flux stations		Boutier	Météo France	Confirmed
1-3 soil		Flamant	CNRS	Confirmed

moisture stations				
X-band radar	Horizontal scanning	Van Baelen	CNRS	Confirmed
K-band radar	vertical	Van Baelen	CNRS	Confirmed
16+ GPS stations		Van Baelen	CNRS	Confirmed
Upstream site SIRTA, Paliseau	http://sirta.ipsl.polytechnique.fr	Flamant	CNRS	Confirmed
Routine Observations of Météo France		Boutier	Météo France	Confirmed
Additional Disdrometers ?				
Additional Rain gauges ?				

UK

http://www.uni-hohenheim.de/cops/4th_COPS_WS/presentations/01_03_UK.ppt

Instrument	Measured Parameters/Type	PI	Institution	Comments
Airborne				
FAAM BAe 146	Aircraft + cloud and aerosol analysis instrumentation 3 months, 2-3 days detachments, 60-80 science hours, stationed in Cranfield, UK			Confirmed
Groundbased				
2 Doppler lidars	Winds aerosol backscatter		U. Salford, U. Reading	Clear
MW Radiometer	T, RH (14 channels, scanning)		U. Salford	Clear
2 towers	3D winds, turb & rad fluxes		U. Leeds	Clear
Wind profiler	3D winds		U. Manchester	Possible
2-3 radiosonde stations	T, T _D , winds		U. Leeds, U. Manchester, U. Reading	Possible
3 sodars	Winds		U. Leeds	Possible
GB aerosol, chem	Volatility, size & cnc, opt. Thick, O ₃		U. Manchester, U. Leeds	Possible
10 automated weather stations	T, RH, winds		U. Leeds	Possible

Austria

For the site set up see

http://www.uni-hohenheim.de/cops/4th_COPS_WS/presentations/02_02_Dorninger.ppt

Instrument	Measured Parameters/Type	PI	Institution	Comments
Groundbased				
Supersite S				
Surfafe energy balance system	Scintec	Dorninger, Steinacker	U. Vienna	Confirmed
Disdrometer	OTT	Dorninger, Steinacker	U. Vienna	Confirmed
Micro Rain Radar (MRR)	METEK, vertical	Dorninger, Steinacker	U. Vienna	Confirmed
Tethersonde system	Vaisala, 4 sensors	Dorninger, Steinacker	U. Vienna	Confirmed
Site 2 (near Nagold valley)				
15 temperature stations	Hobo	Dorninger, Steinacker	U. Vienna	Confirmed
3 automated weather stations	Hobo	Dorninger, Steinacker	U. Vienna	Confirmed
3D SONIC anemometer	GILL	Dorninger, Steinacker	U. Vienna	Confirmed
Mobile station on a car	Vailsala	Dorninger, Steinacker	U. Vienna	Confirmed
Site 3 (near Tübingen)				
100 automatic weather stations	Hobo	Dorninger, Steinacker	U. Vienna	Confirmed
3 automatic weather stations	MAWS	Dorninger, Steinacker	U. Vienna	Confirmed
Site 4 (near Horb)				
1 Radiosonde system	MeteoLabor, 60 sondes	Dorninger, Steinacker	U. Vienna	Confirmed
Site tbd				
1 Mobile vertical pointing radar	METEK	Dorninger, Steinacker	U. Vienna	Confirmed

USA

www.uni-hohenheim.de/cops/3rd_COPS_WS/presentations/02%2003%20Dave%20Turner.ppt

Instrument	Measured Parameters/Type	PI	Institution	Comments
Groundbased				
ARM Mobile Facility	http://www.arm.gov/sites/amf.stm	Wulfmeyer	UHOH	Confirmed
DOWs	Doppler on weels	Weckwerth	NCAR	

Italy

www.uni-hohenheim.de/cops/3rd_COPS_WS/presentations/03%2020%20Paolo%20Di%20Girolamo.ppt

www.uni-hohenheim.de/cops/3rd_COPS_WS/presentations/03%2021%20Aldo%20Amodeo.pps

Instrument	Measured Parameters/Type	PI	Institution	Comments
Groundbased				
BASIL	Raman lidar; WV, T, aerosols; verical	Di Girolamo	UNIBAS	
MW Radiometer	T, WV, LW profiles; TP/WVP-3000	Pappalardo	CNR	

The Netherlands

www.uni-hohenheim.de/cops/1st_COPS_WS/presentations/Russenberg_Cabouw%20instrumentation.pdf

Instrument	Measured Parameters/Type	PI	Institution	Comments
Groundbased				
TARA		Russchenberg	TU Delft	

EUMETSAT

www.uni-hohenheim.de/cops/3rd_COPS_WS/presentations/02%2008%20Marianne%20Koenig.ppt

Instrument	Measured Parameters/Type	PI	Institution	Comments
Special satellite products				
MSG	Rapid scans			
MSG	Global Instability Index (GII)			
MSG	Cloud microphysical parameters			
Metop: IASI, GRAS, MHS	Several; COPS data for validation			