

The UK Participation in COPS



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NCAS and University of Leeds

Memo of Understanding



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Therefore the steering boards of the current IHOP project, of the new research projects SPP 1167-PQP in Germany, and of CSIP in the UK unanimously consider a **close future cooperation** between participating bodies as most important in getting a significantly improved understanding and prediction of atmospheric processes over land surfaces.

The experimental campaigns of IHOP in 2002 and CSIP-pilot in 2004, and the planned Special Observation Periods CSIP in 2005, and of the SPP 1167-PQP in 2007 provide unique chances for coordinated research and addressing various aspects of the above topics. The surface and meteorological conditions of the experimental regions cover

- inner-continental dry flatlands (IHOP, Great Plains of the US),
- gentle orography under maritime influence (CSIP in Southern England),
- and a low mountain region (SPP 1167 COPS-IOP in Germany)

UK Contribution

- Proposal to NERC for post-doctoral scientists to analyse COPS data

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- NCAS (National Centre for Atmospheric Science) funding for participation in field project.

UK Proposal submitted to NERC

- Title: Convection over complex terrain (UK-COPS)

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- Science questions:
 - What are the pathways for heat, mass, water vapour and aerosols to enter terrain-locked convective cells?
 - How is the development of deep convection and precipitation over complex terrain influenced by the cloud/aerosol interaction?

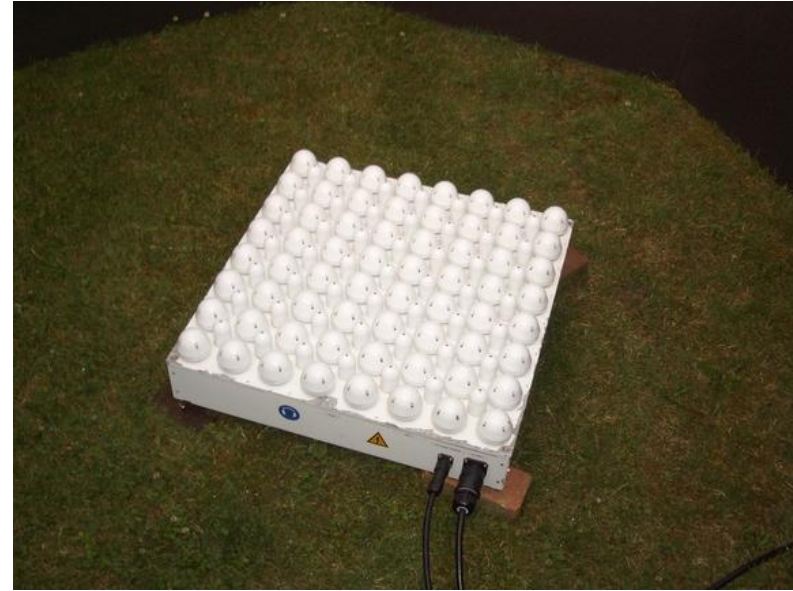
UK NERC Proposal

- Coordination by UFAM – Universities' Facility for Atmospheric Measurement, a section within NCAS – National Centre for Atmospheric Science
- Contributing institutions:
 - FZK: Ulrich Corsmeier
 - Hohenheim: Andreas Behrendt
 - Leeds: Stephen Mobbs, Alan Gadian, Alan Blyth, ...
 - Manchester: Hugh Coe, Tom Choularton, Martin Gallagher,...
 - Met Office: Phil Brown, Peter Clark,...
 - Reading: Stephen Belcher, Anthony Illingworth
 - Salford: Chris Collier, Fay Davies

UK Participation in Field Campaign: Instruments

Instrument	Scientists	Site
Wind profiler	Geraint Vaughan, Emily Norton	Archern Water treatment plant (R)
Small Doppler lidar	Chris Collier, Fay Davies	Archern Water treatment plant (R)
Radiometer		
AWS		
3 Sodars	Stephen Mobbs	1. Supersite R; 2. Gernsbach Bad Botenfer in Murg Valley; 3. Enzklosterle in east
10 AWSs (approx)	Stephen Mobbs, Victoria Smith, Jeremy Price (MO)	Murg Valley
G-B aerosols	Hugh Coe, Jimmy Crozier	Hornisgrinde (H)
2 Radiosonde stations	Victoria Smith, Rosie	Hornisgrinde (H), Rhine Valley site (R)

Instruments



GB Aerosols

Instrument	Measurement
SMPS	ASD: $d_p > 3 \text{ nm}$
SMPS	ASD: $d_p > 10 \text{ nm}$
OPC	ASD: $500 \text{ nm} < d_p < 20 \text{ }\mu\text{m}$
GRIMM OPC	ASD: $250 \text{ nm} < d_p < 32 \text{ }\mu\text{m}$
HTDMA	Hygroscopic prop of aerosols ($d_p > 350 \text{ nm}$)
DMT CCN	Cloud condensation nuclei
ToF AMS	Size-resolved mass of non-refractory component
INC	Ice nuclei

GB Aerosols (cont)

Instrument	Measurement
Multiangle absorption photometer (MAAP)	Black carbon mass
Single Particle Soot Photometer (SP2)	Black carbon mixing state
DMA	Size select aerosols at entrance of CCN and ToF-AMS for activity spectra and density info
Impactors (size resolved)	Subsequent ion chromatographic analyses using SEM.
CVI	Interface of CCN/INC with ToF-AMS and SP2 -> composition of droplet and ice-nucleated fractions for organic and inorganic semivolatiles, black carbon, and biologically-active particles.

FAAM BAE 146



FAAM BAE 146 - microphysics probes

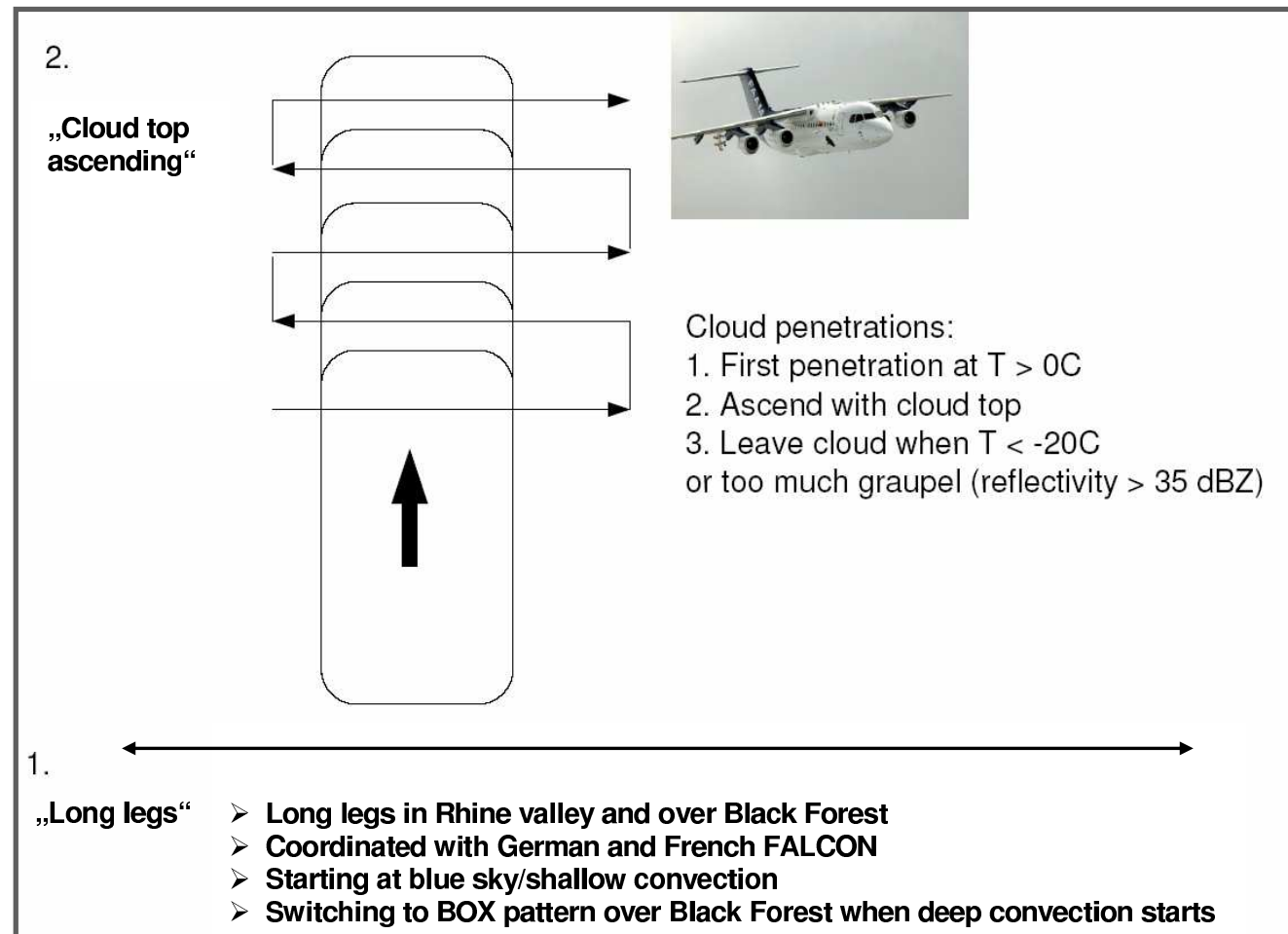


Instruments on the FAAM 146 aircraft

Instrument	Measurement
FFSSP	Cloud droplets
2D-C	Large cloud particles (25 - 800 μm)
2D-P	Precip (200 μm - 6.4 mm)
Cloud Particle Imager	Small cloud particles (10 μm - 5 mm)
Small Ice Detector (SID)	Small spheres vs non-spheres (2 μm min)
PCASP	Aerosols (0.1 - 10) μm
Aerosol Mass Spec	Size and composition of some aerosols
Filters	Size and composition of aerosols
CCN	Cloud Condensation Nuclei
IN	Ice Nuclei
Johnson-Williams	Cloud liquid water content
Nevzerov probe	Cloud and total water content
Turbulence probe	3D winds
Rosemount temperature	In-cloud temperature (cold cloud)
Hygrometer	Water vapour

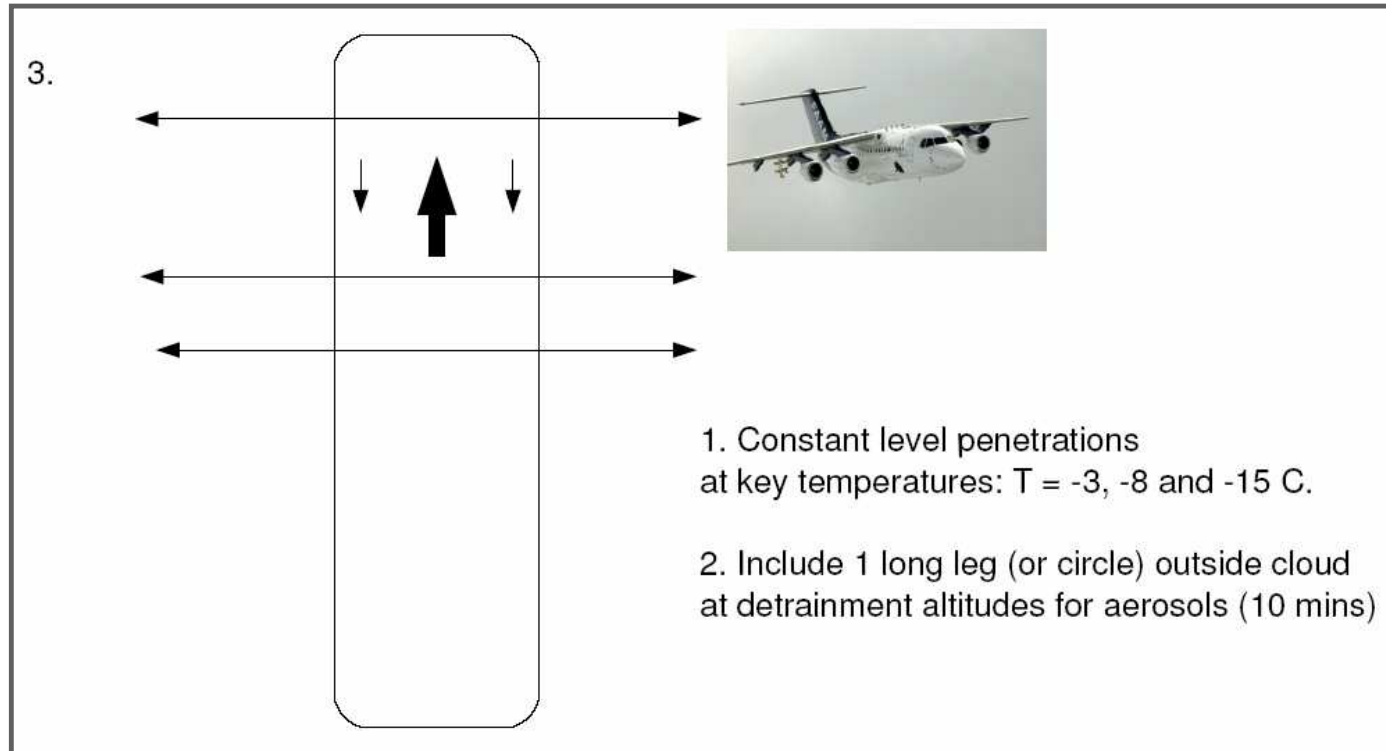
146 flight plans

Scenario: Forced Convection
Platform 4: BAE 146, G-LUXE
Mission: LONG LEG - BOX



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Way-points	Coordinates of waypoints	Remarks
D1 D5	7.3049 E, 47.7 N 7.9905 E, 48.8 N	Leg D is in the middle of the Rhine valley.
E1 E5	7.6329 E, 47.7 N 8.3214 E, 48.8 N	Leg E covers the western foothills of the Black Forest, including the Hornisgrinde (1160m) supersite.
F1 F5	7.9045 E, 47.7 N 8.5962 E, 48.8 N	Leg F covers the Black Forest mountain ridge, including the Feldberg (1500m).

Separation needs on legs D, E, F, (G)

DO 128: < FL 100 (.5 z_i, .9 z_i, .5 z_i)
 BAE 146: < FL 100 (.3 z_i, .8 z_i)

○ Supersites

