

C-130 Flight Plan Refinement

- Cross-section
 - lose MASTER? return leg at 3 km?
 - length of outbound legs? number of levels?
- POC-drift/lagrangian
 - fewer levels in stack (subcloud, cloud base, cloud top, free-troposphere)
 - run length 16 minutes, impactor aggregation
- Cosampling with RHB
 - strawman

C-130 Cross-Section Sampling

20°S, 70-85°W

- **GOAL: Repeatable characterization of lower tropospheric structure, clouds, aerosols/chemistry, surface fluxes along 20°S**
- **Probably 5 flights with this plan**
- **Same time of day? Depart at 03 hr local, return 12 hr.**

C-130 Cross-Section Sampling

20°S, 70-85°W

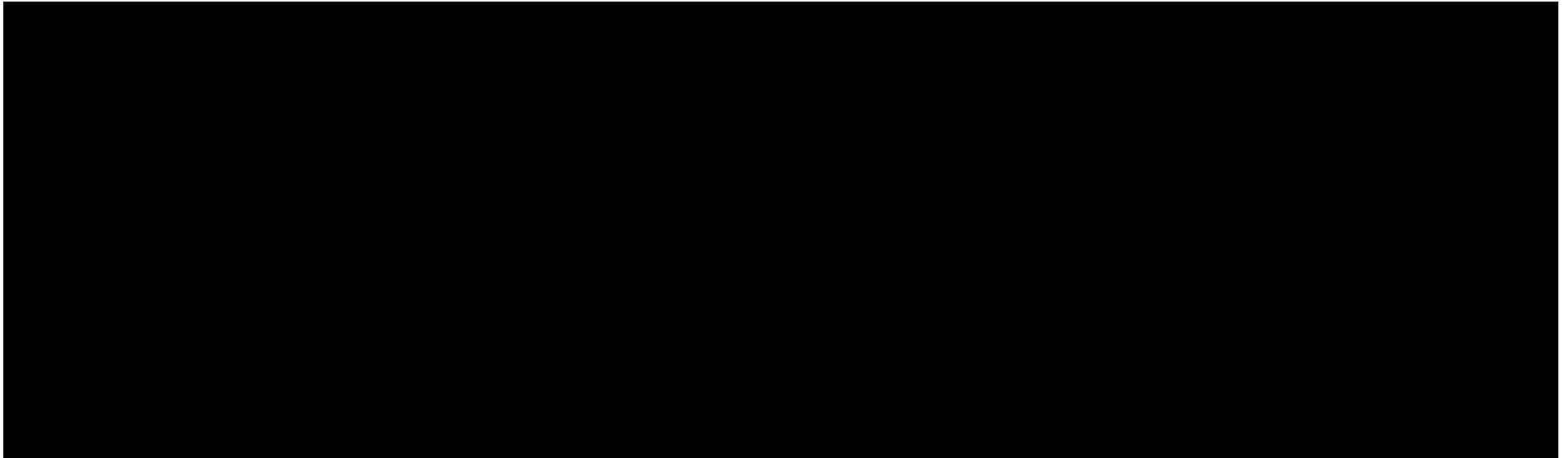
below cloud: LWP, subcloud aerosol/chemistry, MBL turbulence, WCR, cloud base

in cloud: microphysics/turbulence/chemistry, WCR

above cloud: WCR, MASTER, FT aerosols

C-130 Cross-Section Sampling - New

20°S, 70-85°W

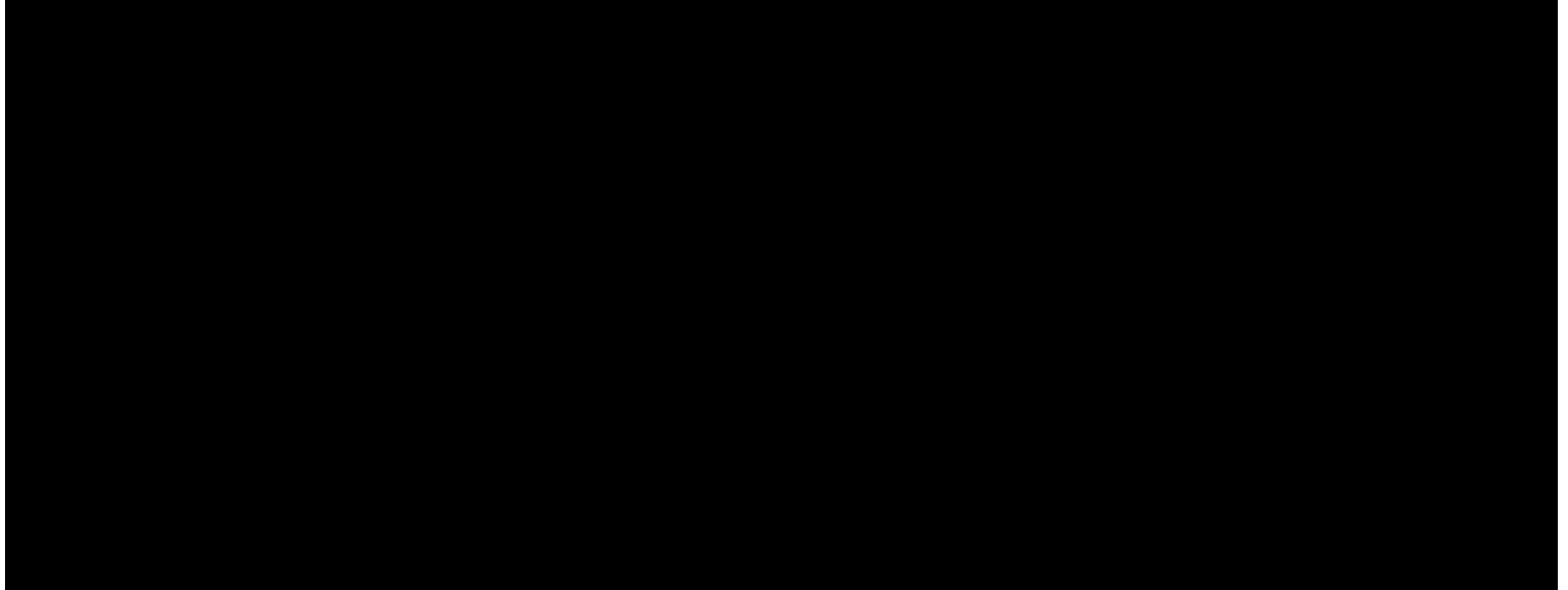


below cloud: LWP, subcloud aerosol/chemistry, MBL turbulence, WCR, cloud base

in cloud: microphysics/turbulence/chemistry, WCR

above cloud: WCR, MASTER, FT aerosols

POC-Drift missions (C-130 + others)

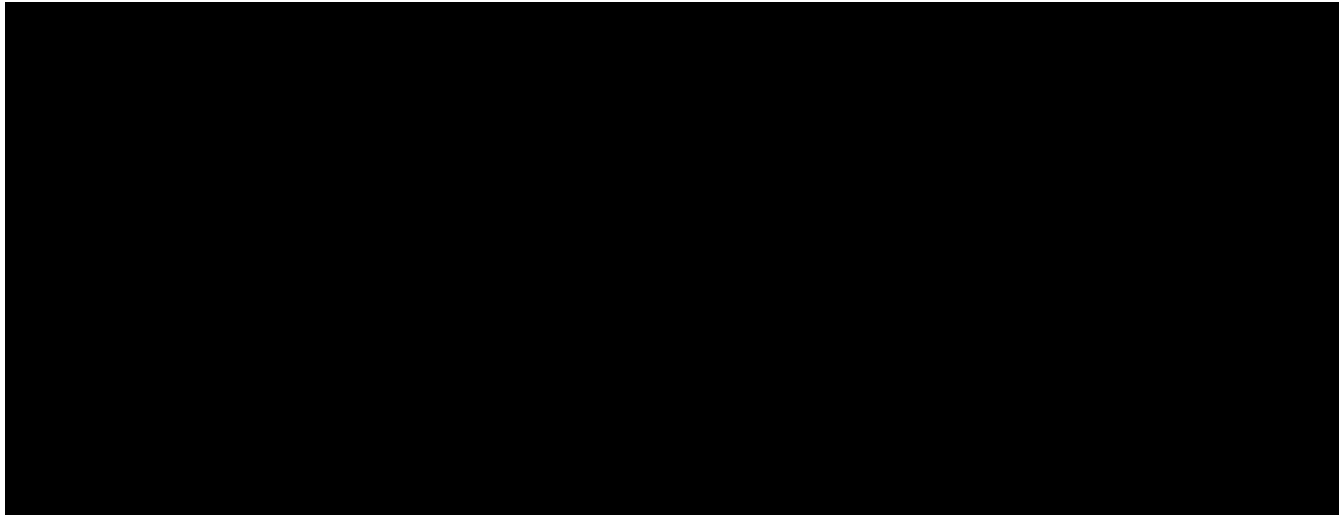


below cloud: LWP, subcloud aerosol/chemistry, MBL
turbulence, WCR, cloud base

in cloud: microphysics/turbulence/chemistry, WCR

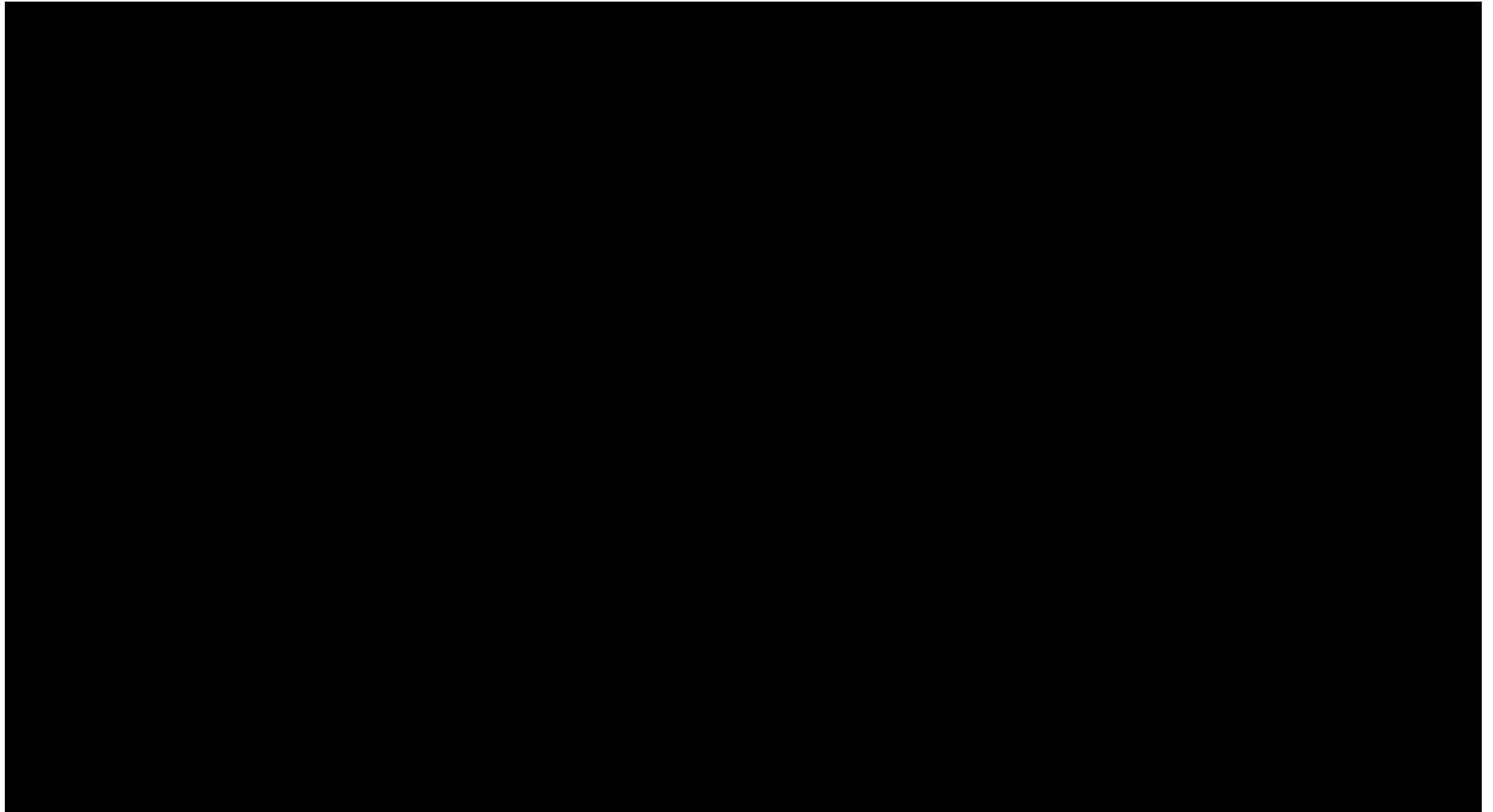
above cloud: WCR, MASTER, FT aerosols

POC-Drift missions (probably 4/5 flights)



- 100 km long runs (16 minutes) crossing boundary between open and closed cells, drift with the mean wind
- Three stacks: legs below cloud, cloud base, in cloud, cloud top, above cloud (100 mins including profile)
- Profiles after each stack at least 1 or 2 in clear sky if possible
- Synergy with ship
- Multi-flight, multi-aircraft sampling (Lagrangian), possible RHB synergy
- Some during day, some night

Repeatable cosampling with RHB



What will we get?

- Unique dataset combining strengths of C-130 and RHB
 - important intercomparison opportunities
 - 3D dynamics of the drizzling cells from 90° C-band RHI/WCR samples around the circles
 - subcloud leg: aerosol characterization, LWP, cloud base
 - cloud leg: *in-situ* cloud microphysics and turbulence
 - FT leg: horizontal structure of drizzling cells from WCR and C-band RHI scans, aerosol characterization

How often?

- All cross-section flights
- POC-drift lagrangian flights?

SST Mission

- Map out horizontal variability of SST using C-130
- Feasible?

C-130 Payload Issues

- Proposed instruments
- What can be sampled where (below/above cloud)

NSF C-130 Payload

- **Standard instruments:** Microphysics, Turbulence, Thermodynamics suite
- **Remote sensing:** Wyoming Cloud Radar (zenith+nadir+slant), Cloud Lidar (zenith), Microwave radiometer (183 GHz, zenith), MODIS Airborne Simulator (MASTER, nadir), BBRs
- **Chemistry/aerosols/clouds:** LDMA, RDMA, ToF Mass Spec, nephelometer, PSAP, CN counters (+ultrafine), CCN, CVI, Cloud water collector, Impactors, PDPA, 2D-S, fast FSSP
- **Dropsondes**

IN-CLOUD THERMODYNAMICS/MICROPHYSICS

<i>Instrument</i>	<i>Requirement</i>	<i>Contact</i>
PVM-100 Liquid Water	wing store	NCAR / RAF
SPP-100	wing store	NCAR / RAF
SPP-200	wing store	NCAR / RAF
SPP-300	wing store	NCAR / RAF
PMS-260X	wing store	NCAR / RAF
PMS-2D:C	wing store	NCAR / RAF
OPHIR Radiometric Tem	wing pod	NCAR / RAF
SPEC 2D-S Cloud Imager	wing store	SPEC Inc

Potential others:

PDPA	wing store	Chuang/UCSC
Fast FSSP (FFSSP)	wing store	
Brenguier/ Meteo France		

GAS PHASE CHEMISTRY

<i>Instrument</i>	<i>Requirement</i>	<i>Contact</i>
APIMS – SO ₂ Bandy?	yes-belly 1	Alan
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UV Resonance Fluor. – CO RAF	share	NCAR /
TECO – O ₃ (slow) NO chemiluminescence	share	NCAR / RAF
– O ₃ (fast) RAF	share	NCAR /

IN-CLOUD CHEMISTRY

<i>Instrument</i>	<i>Requirement</i>	<i>Contact</i>
Liquid Water Collector CVI Twohy/OSU	wing store yes-L1	Jeff Collett/CSU Cindy

REMOTE SENSING and OTHER

<i>Instrument</i>	<i>Requirement</i>	<i>Contact</i>
Wyoming Cloud Radar (WCR)	yes-16" up	Leon/UWYO
Wyoming Cloud Lidar	yes- 8" up	Leon/UWYO
Wyoming Microwave Radiometer (183 GHz)	wing store	Leon/UWYO
NASA MASTER	AIMR slot ??	Platnick
Differential GPS	n/a	NCAR / RAF
Dropsondes	ramp	NCAR /
RAF		

<i>Instrument</i>	<i>Requirement</i>	<i>Contact</i>
5 stage MOI & APS on LTI Inlet Huebert/Hawaii	yes-R2	
Total Aerosol Sampler	yes-L3	Huebert
Wyoming CCN Counter	inlet?	Snider/UWYO
Streaker on LTI, SEM, TEM Anderson/ASU	LTI	
PC-BOSS, EGA analysis	no	Huebert
TSI 3010, 3025 CN counter Howell&Clarke	yes-R1 (SDI)	
DMPS and APS	SDI	Howell&Clarke
PSAP Howell&Clarke	SDI	
3 wavelength TSI nephelometer	SDI	Howell&Clarke
Real time AMS	SDI	Howell&Clarke
Giant Aerosol Impactor Jensen/NCAR	yes-16" down	