Overview Papers

ACTIVATE

- Broad campaign summary
- Meteorology overview (Shook/Scarino et al.)
- Modeling summary? (LES/SCM/GCM intercomparison activities)

Each of these takes a lot of time and planning, so let's prioritize after looking at examples…

Campaign Summary Examples

ACTIVATE

Earth Syst. Sci. Data, 13, 4067–4119, 2021
https://doi.org/10.5194/essd-13-4067-2021

Open Access Earth System Science Data

EUREC⁴A

Bjorn Stevens[1], Sandrine Bony[2], David Farrell[3], Felix Ament[4,1], Alan Blyth[5], Christopher Fairall[6], Johannes Karstensen[7], Patricia K. Quinn[8], Sabrina Speich[9], Claudia Acquistapace[10], Franziska Aemisegger[11], Anna Lea Albright[2], Hugo Bellenger[2], Eberhard Bodenschatz[12], Kathy-Ann Caesar[3], Rebecca Chewitt-Lucas[3], Gijs de Boer[13,6], Julien Delanoë[14], Leif Denby[15], Florian Ewald[16], Benjamin Fildier[9], Marvin Forde[3], Geet George[1], Silke Gross[16], Martin Hagen[16], Andrea Hausold[16], Karen J. Heywood[17], Lutz Hirsch[1], Marek Jacob[10], Friedhelm Jansen[1], Stefan Kinne[1], Daniel Klocke[18], Tobias Kölling[19,1], Heike Konow[4], Marie Lothon[20], Wiebke Mohr[21], Ann Kristin Naumann[1,22], Louise Nuijens[23], Léa Olivier[24], Robert Pincus[13,6], Mira Pöhlker[25], Gilles Reverdin[24], Gregory Roberts[26,27], Sabrina Schnitt[10], Hauke Schulz[1], A. Pier Siebesma[23], Claudia Christine Stephan[1], Peter Sullivan[28], Ludovic Touzé-Peiffer[2], Jessica Vial[2], Raphaela Vogel[2], Paquita Zuidema[29], Nicola Alexander[3], Lyndon Alves[30], Sophian Arixi[26], Hamish Asmath[31], Gholamhossein Bagheri[12], Katharina Baier[1], Adriana Bailey[28], Dariusz Baranowski[32], Alexandre Baron[33], Sébastien Barrau[26], Paul A. Barrett[34], Frédéric Batier[35], Andreas Behrendt[36], Arne Bendinger[7], Florent Beucher[26], Sebastien Bigorre[37], Edmund Blades[38], Peter Blossey[39], Olivier Bock[40], Steven Böing[15], Pierre Bosser[41], Denis Bourras[42], Pascale Bouruet-Aubertot[24], Keith Bower[43], Pierre Branellec[44], Hubert Branger[45], Michal Brennek[46], Alan Brewer[47], Pierre-Etienne Brilouet [20], Björn Brügmann[1], Stefan A. Buehler[4], Elmo Burke[48], Ralph Burton[5], Radiance Calmer[13], Jean-Christophe Canonici[49], Xavier Carton[50], Gregory Cato Jr.[51], Jude Andre Charles[52], Patrick Chazette[33], Yanxu Chen[9], Michal T. Chilinski[46], Thomas Choularton[43], Patrick Chuang[53], Shamal Clarke[54], Hugh Coe[43], Céline Cornet[55], Pierre Coutris[56], Fleur Couvreux[26], Susanne Crewell[10], Timothy Cronin[57], Zhiqiang Cui[15], Yannis Cuypers[24], Alton Daley[3], Gillian M. Damerell[17], Thibaut Dauhut[1], Hartwig Deneke[58], Jean-Philippe Desbios[49], Steffen Dörner[25], Sebastian Donner[25], Vincent Douet[59], Kyla Drushka[60], Marina Dütsch[61,62], André Ehrlich[63], Kerry Emanuel[57], Alexandros Emmanouilidis[63], Jean-Claude Etienne[26], Sheryl Etienne-Leblanc[64], Ghislain Faure[26], Graham Feingold[47], Luca Ferrero[65], Andreas Fix[16], Cyrille Flamant[66], Piotr Jacek Flatau[27], Gregory R. Foltz[67], Linda Forster[19], Iulian Furtuna[68], Alan Gadian[15],

Atmos. Chem. Phys., 21, 1507–1563, 2021
https://doi.org/10.5194/acp-21-1507-2021

Atmospheric Chemistry and Physics Open Access EGU

An overview of the ORACLES (ObseRvations of Aerosols above CLouds and their intEractionS) project: aerosol–cloud–radiation interactions in the southeast Atlantic basin

Jens Redemann[1], Robert Wood[2], Paquita Zuidema[3], Sarah J. Doherty[2], Bernadette Luna[4], Samuel E. LeBlanc[5,4], Michael S. Diamond[2], Yohei Shinozuka[7], Ian Y. Chang[1], Rei Ueyama[4], Leonhard Pfister[4], Ju-Mee Ryoo[4,36], Amie N. Dobracki[3], Arlindo M. da Silva[6], Karla M. Longo[6,7], Meloë S. Kacenelenbogen[4], Connor J. Flynn[1], Kristina Pistone[5,4], Nichola M. Knox[8], Stuart J. Piketh[9], James M. Haywood[10], Paola Formenti[11], Marc Mallet[12], Philip Stier[13], Andrew S. Ackerman[14], Susanne E. Bauer[14], Ann M. Fridlind[14], Gregory R. Carmichael[15]

1. Intro
2. General setting and novel measurements
3. Science facets
4. Scientific practice
5. Data availability
6. Conclusions

1. Intro
2. Project background
3. Description of deployments
4. Preliminary science findings and implications
5. Discussion
6. Conclusions and future work

Campaign Summary Examples

ACTIVATE

Atmos. Chem. Phys., 11, 627–654, 2011
www.atmos-chem-phys.net/11/627/2011/
doi:10.5194/acp-11-627-2011

Atmospheric Chemistry and Physics

The VAMOS Ocean-Cloud-Atmosphere-Land Study Regional Experiment (VOCALS-REx): goals, platforms, and field operations

R. Wood[1], C. R. Mechoso[2], C. S. Bretherton[1], R. A. Weller[3], B. Huebert[4], F. Straneo[3], B. A. Albrecht[5], H. Coe[6], G. Allen[6], G. Vaughan[6], P. Daum[7], C. Fairall[8], D. Chand[1,*], L. Gallardo Klenner[9], R. Garreaud[9], C. Grados[10], D. S. Covert[1], T. S. Bates[11], R. Krejci[12], L. M. Russell[13], S. de Szoeke[14], A. Brewer[8], S. E. Yuter[15], S. R. Springston[7], A. Chaigneau[17], T. Toniazzo[16], P. Minnis[18], R. Palikonda[23], S. J. Abel[19], W. O. J. Brown[20], S. Williams[20], J. Fochesatto[21], J. Brioude[22,8], and K. N. Bower[6]

1. Intro
2. VOCALS-REx study region and dates
3. Platforms and instrumentation
4. Sampling strategies
5. Satellite datasets produced specifically for VOCALS-Rex
6. Coordinated modeling for VOCALS-Rex
7. VOCALS data management
8. Conclusions

OCEAN–CLOUD–ATMOSPHERE–LAND INTERACTIONS IN THE SOUTHEASTERN PACIFIC

The VOCALS Program

BY C. R. MECHOSO, R. WOOD, R. WELLER, C. S. BRETHERTON, A. D. CLARKE, H. COE, C. FAIRALL, J. T. FARRAR, G. FEINGOLD, R. GARREAUD, C. GRADOS, J. MCWILLIAMS, S. P. DE SZOEKE, S. E. YUTER, AND P. ZUIDEMA

1. Research activities
2. The coastal circulation
3. The ocean heat budget
4. Aerosol–cloud–precipitation interactions
5. Modeling
6. Community capacity building
7. Summary of findings and remaining questions

Campaign Summary Examples

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AGU PUBLICATIONS

JGR

Journal of Geophysical Research: Atmospheres

RESEARCH ARTICLE

10.1002/2015JD024297

Special Section:
Studies of Emissions and Atmospheric Composition, Clouds and Climate Coupling by Regional Surveys, 2013 (SEAC4RS)

Planning, implementation, and scientific goals of the Studies of Emissions and Atmospheric Composition, Clouds and Climate Coupling by Regional Surveys (SEAC^{4}RS) field mission

Owen B. Toon[1], Hal Maring[2], Jack Dibb[3], Richard Ferrare[4], Daniel J. Jacob[5], Eric J. Jensen[6], Z. Johnny Luo[7], Gerald G. Mace[8], Laura L. Pan[9], Lenny Pfister[6], Karen H. Rosenlof[10], Jens Redemann[6], Jeffrey S. Reid[11], Hanwant B. Singh[6], Anne M. Thompson[12], Robert Yokelson[13], Patrick Minnis[4], Gao Chen[4], Kenneth W. Jucks[2], and Alex Pszenny[2]

1. Intro
2. Scientific Motivation and Key Questions
3. Meteorological Context
4. Implementation
5. Summary of SEAC4RS Implementation and Some Initial Results

BAMS Article

Aerosol and Cloud Experiments in the Eastern North Atlantic (ACE-ENA)

Jian Wang, Rob Wood, Michael P. Jensen, J. Christine Chiu, Yangang Liu, Katia Lamer, Neel Desai, Scott E. Giangrande, Daniel A. Knopf, Pavlos Kollias, Alexander Laskin, Xiaohong Liu, Chunsong Lu, David Mechem, Fan Mei, Mariusz Starzec, Jason Tomlinson, Yang Wang, Seong Soo Yum, Guangjie Zheng, Allison C. Aiken, Eduardo B. Azevedo, Yann Blanchard, Swarup China, Xiquan Dong, Francesca Gallo, Sinan Gao, Virendra P. Ghate, Susanne Glienke, Lexie Goldberger, Joseph C. Hardin, Chongai Kuang, Edward P. Luke, Alyssa A. Matthews, Mark A. Miller, Ryan Moffet, Mikhail Pekour, Beat Schmid, Arthur J. Sedlacek, Raymond A. Shaw, John E. Shilling, Amy Sullivan, Kaitlyn Suski, Daniel P. Veghte, Rodney Weber, Matt Wyant, Jaemin Yeom, Maria Zawadowicz, and Zhibo Zhang

1. Intro
2. Measurements and observation strategy
3. Meteorological conditions
4. Observations and early findings
5. Summary and Outlook

Met Overview Examples

ACTIVATE

Atmos. Chem. Phys., 21, 16689–16707, 2021
https://doi.org/10.5194/acp-21-16689-2021

Atmospheric Chemistry and Physics
Open Access
EGU

A meteorological overview of the ORACLES (ObseRvations of Aerosols above CLouds and their intEractionS) campaign over the southeastern Atlantic during 2016–2018: Part 1 – Climatology

Ju-Mee Ryoo[1,2], Leonhard Pfister[1], Rei Ueyama[1], Paquita Zuidema[3], Robert Wood[4], Ian Chang[5], and Jens Redemann[5]

1. Intro
2. Data
3. Seasonal mean and variability of the synoptic-scale circulation
4. Summary and discussion

https://doi.org/10.5194/acp-2022-256
Preprint. Discussion started: 1 June 2022

Atmospheric Chemistry and Physics
Discussions
Open Access
EGU

A meteorological overview of the ORACLES (ObseRvations of Aerosols above CLouds and their intEractionS) campaign over the southeast Atlantic during 2016-2018: Part 2 – daily and synoptic characteristics

Ju-Mee Ryoo[1,2], Leonhard Pfister[1], Rei Ueyama[1], Paquita Zuidema[3], Robert Wood[4], Ian Chang[5],
Jens Redemann[5]

1. Intro
2. Data and methodology
3. Variability of synoptic-scale circulation during the deployments
4. Relationships between low cloud cover and meteorological variables
5. Summary and discussion

Met Overview Examples

ELEMENTA
Science of the Anthropocene

Peterson, DA, et al. 2019. Meteorology influencing springtime air quality, pollution transport, and visibility in Korea. *Elem Sci Anth*, 7: 57. DOI: https://doi.org/10.1525/elementa.395

RESEARCH ARTICLE

Meteorology influencing springtime air quality, pollution transport, and visibility in Korea

David A. Peterson*, Edward J. Hyer*, Sang-Ok Han†, James H. Crawford‡, Rokjin J. Park§, Robert Holz‖, Ralph E. Kuehn‖, Edwin Eloranta‖, Christoph Knote¶, Carolyn E. Jordan** and Barry L. Lefer††

1. Intro
2. Study region and measurement strategy
3. General meteorology and observed pollution
4. The role of cold fronts in surface air quality
5. Dynamic meteorology and complex aerosol vertical profiles
6. Dynamic meteorology, low-level transport, and haze development
7. Stagnation under a persistent anticyclone
8. Blocking pattern
9. Contrasting meteorology and observational limitations
10. Representativeness of KORUS-AQ meteorology
11. Summary and Conclusions

Modeling Overview Examples

ACTIVATE

Atmos. Chem. Phys., 15, 153–172, 2015
www.atmos-chem-phys.net/15/153/2015/
doi:10.5194/acp-15-153-2015

Atmospheric Chemistry and Physics
Open Access

Global and regional modeling of clouds and aerosols in the marine boundary layer during VOCALS: the VOCA intercomparison

M. C. Wyant[1], C. S. Bretherton[1], R. Wood[1], G. R. Carmichael[2], A. Clarke[3], J. Fast[4], R. George[1], W. I. Gustafson Jr.[4], C. Hannay[5], A. Lauer[6,*], Y. Lin[7,**], J.-J. Morcrette[8], J. Mulcahy[9], P. E. Saide[2], S. N. Spak[2], and Q. Yang[4]

1. Intro
2. Case setup
3. Results
4. Discussion
5. Conclusions

Composition Overview Examples

Atmos. Chem. Phys., 11, 5237–5262, 2011
www.atmos-chem-phys.net/11/5237/2011/
doi:10.5194/acp-11-5237-2011

Atmospheric Chemistry and Physics

South East Pacific atmospheric composition and variability sampled along 20° S during VOCALS-REx

G. Allen[1], H. Coe[1], A. Clarke[2], C. Bretherton[3], R. Wood[3], S. J. Abel[4], P. Barrett[4], P. Brown[4], R. George[3], S. Freitag[2], C. McNaughton[2], S. Howell[2], L. Shank[2], V. Kapustin[2], V. Brekhovskikh[2], L. Kleinman[5], Y.-N. Lee[5], S. Springston[5], T. Toniazzo[6], R. Krejci[7], J. Fochesatto[8], G. Shaw[8], P. Krecl[9], B. Brooks[9], G. McMeeking[1], K. N. Bower[1], P. I. Williams[1], J. Crosier[1], I. Crawford[1], P. Connolly[1], J. D. Allan[1], D. Covert[3], A. R. Bandy[10], L. M. Russell[11], J. Trembath[12], M. Bart[9], J. B. McQuaid[9], J. Wang[5], and D. Chand[3,*]

1. Intro
2. Data sources
3. Data sampling
4. Results
5. Conclusions

BAMS-Style Overview

Goals: what do we want to tell the community about the project

Working groups to develop ideas (new figures/tables/analysis) for overview paper broken up into objectives

0920-1000: Pick a group linked to an objective you have worked most on

1015-1100: Pick another group

1115: Reports from groups

Or is better use of time something else like coming together as a group and spending more time collectively on each objective?

Ideas to steer discussion:

- Can we design a figure(s) to showcase our statistics well (e.g., basic or joint histograms of variables; scatterplots)
- Is there a case flight that best showcases a specific objective and what could be shown?
  - How about a winter and summer example?
- Is there a type of figure we can uniquely make that other ACI-campaigns cannot due to our extensive statistics?
- What types of events or phenomena can be summarized in a table?
  - E.g., list of CAOs per winter season?
- Table to list all past ACI campaigns to place ACTIVATE into context?
- What is(are) the most important gap(s) and/or paper(s) left to work on unrelated to an overview paper?

Original Science Objectives

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Science objectives and questions related to acquisition and use of a large in situ and remote sensing dataset of aerosols and MBL clouds (spanning the continuum from stratiform to cumulus)
Objective 1. Quantify N_a-CCN-N_d relationships and reduce uncertainty in model cloud droplet activation parameterizations. A. How do these relationships depend on aerosol characteristics (e.g., amount, size, composition, type) and dynamic and thermodynamic properties? B. How consistent are these relationships across the complete range of spatial scales provided by in situ measurements and airborne and satellite remote sensing retrievals? C. What are the magnitudes of biases in the N_a-CCN-N_d relationships from satellite aerosol proxies? How do these translate to uncertainties in N_d parameterizations in current global aerosol-climate models? Deliverables: Improved model representations of N_a-CCN-N_d relationships; unique dataset using a sustained long-term strategy for model intercomparison and process-based studies

Objective 2. Improve process-level understanding and model representation of factors governing cloud micro/macro-physical properties and how they couple with cloud effects on aerosol. A. What are the relationships between N_d, cloud micro/macro-physical properties, and meteorology? B. To what extent do uncertainties in N_a/cloud/meteorology relationships within the targeted cloud regimes in global aerosol-climate models come from biases in aerosols, clouds, and meteorological factors? How can the identified model biases and uncertainties be reduced using the measurements? C. How can climate models better represent conditions with known challenges, such as post-frontal clouds and cold air outbreaks? D. What is the signature of cloud effects on the CCN budget (e.g., wet scavenging, aqueous processing). Deliverables: Improved model parameterizations for relationships between cloud microphysical and macrophysical properties; unique dataset using a sustained long-term strategy for model intercomparison and process-based studies
Objective 3: Assess advanced remote sensing capabilities for retrieving aerosol and cloud properties related to aerosol-cloud interactions. A. How well and under what conditions can active and passive remote sensing retrievals provide improved measurements for N_d and proxies for CCN concentration? B. How well can a combination of remote sensors improve measurements of LWP? Deliverables: Evaluation and intercomparison of CCN and N_d retrievals and measurements; evaluation of LWP as a function of scale

Overview paper discussion for Objective 3

November 14, 2023

Goals

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- Develop ideas (figures/tables/analysis) for overview paper

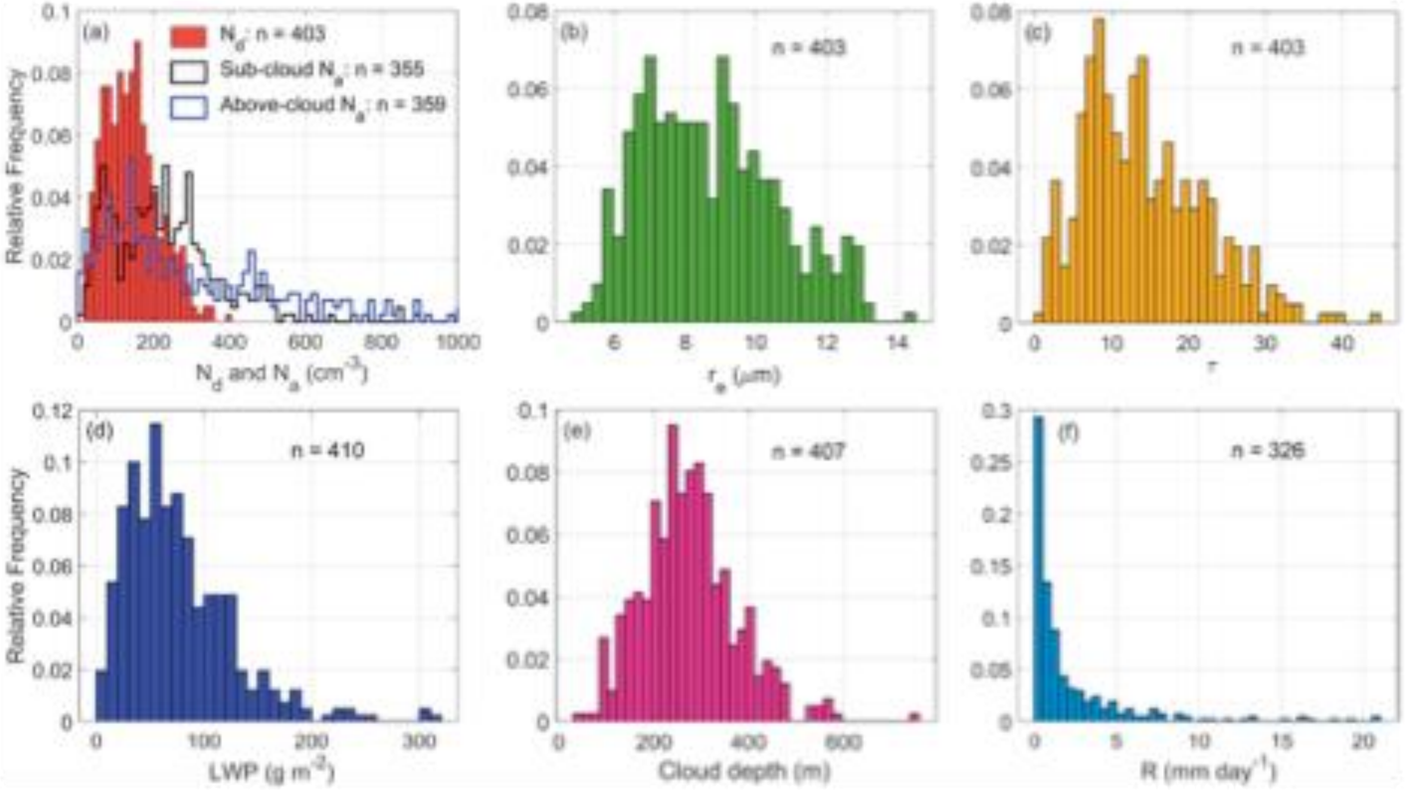
Science objectives and questions related to acquisition and use of a large in situ and remote sensing dataset of aerosols and MBL clouds (spanning the continuum from stratiform to cumulus)	Scientific Measurement Requirements
Objective 3: Assess advanced remote sensing capabilities for retrieving aerosol and cloud properties related to aerosol-cloud interactions. A. How well and under what conditions can active and passive remote sensing retrievals provide improved measurements for N_d and proxies for CCN concentration? B. How well can a combination of remote sensors improve measurements of LWP? Deliverables: Evaluation and intercomparison of CCN and N_d retrievals and measurements; evaluation of LWP as a function of scale	1. Vertically resolved in situ and remote sensing profiles of aerosol optical properties 2. Cloud-top backscatter/extinction/ depolarization and cloud optical depth; MBL height; cloud-top height, LWP, effective radius and variance, N_d, SST 3. Satellite retrievals of cloud properties (cloud fraction, cloud-top height, LWP) and SST

ACTIVATE literature

- Chemyakin et al. (2023): LUT for cloud optical properties
- Ferrare et al. (2023): Detection of sea salt from HSRL-2 aerosol depolarization; Compare with CALIPSO
- Nied et al. (2023): Cloud mask for RSP and HSRL-2 dataset.
- Sanchez et al. (2023): Multi-campaign data paper.
- Schlosser et al. (2022): Derive N_a profiles from RSP+HSRL-2
- van Diedenhoven et al. (2022): Derive water fraction, soluble fraction, and size distribution of N_a from RSP; Compare with in situ data

- Dmitrovic et al. (under review): HSRL-2 wind retrievals; Compare with dropsondes.
- Xu et al. (under review): HSRL-2 MLH; Compare with dropsondes.
- Siu et al. (under review): RSP and HSRL-2 AOD evaluation.

- Find good projects to leverage statistics



from Sorooshian et al. (2019)