

Ju-Mee Ryoo

Atmospheric Science Branch, NASA Ames Research Center,
Moffett Field, CA 94035
Science and Technology Corporation
ju-mee.ryoo@nasa.gov · <https://jmryoo.github.io>

Research Interest

- Extreme precipitation and air pollutant transport processes shaped by large-, synoptic-scale atmospheric dynamics and their variability associated with climate change.
- Urban outflow of CO₂ and CH₄ flux estimation and the meteorological impact on it.
- Investigation of Ozone sources and transport processes and their surface impacts using models and multi-platform datasets (in-situ, satellite, radar, and reanalysis)

Education

Ph.D. (2009)	Earth and Planetary Sciences, Johns Hopkins University, Baltimore, MD, USA
M.A. (2007)	Earth and Planetary Sciences, Johns Hopkins University, Baltimore, MD, USA
M.S. (2003)	Atmospheric Sciences, Yonsei University, Seoul, South Korea
B.S. (2001)	Mathematics, Yonsei University, Seoul, South Korea
B.S. (2001)	Atmospheric Sciences, Yonsei University, Seoul, South Korea

Work Experience

- NASA Ames Research Center, Science and Technology Corporation; Research Scientist (summer 2017–present)
- NASA Ames Research Center, Bay Area Environmental research institute; Research Scientist (fall 2016– summer 2017)
- San Jose State University; Teaching associate adjunct faculty (fall 2018–spring 2020)
- NASA Ames Research Center; NASA Postdoctoral Fellow (fall 2014–fall 2016)
- University of California, Berkeley; Postdoctoral Scholar (2012–fall 2014)
- Jet Propulsion Laboratory; California Institute of Technology Postdoctoral Scholar (fall 2009–2011)

Awards and Honors

- NASA Ames Contractor Council, Certificate of Excellence award as an ObseRvation of Aerosols above CLouds and their intEractionS (ORACLES) participant (2017, 2019)
- Best poster award at the Chapman conference in convection session (2008)
- Johns Hopkins University, Gillman Fellowship (2004–2005)
- BK 21(Brain Korea 21 Century) Scholarship (2002)
- Honor student Scholarship from the Alumni Association (1999–2000)

Peer-Reviewed Journal Publications

(* indicates papers in preparation)

Ryoo, J.-M., Pfister, L., Ueyama, R., Zuidema, P., Wood, R., Chang, I., and Redemann, J., **2021**: A meteorological overview of the ORACLES (ObseRvations of Aerosols above Clouds and their intEractionS) campaign over the southeastern Atlantic during 2016–2018: Part 2 - synoptic-scale characteristics during deployments (in preparation).*

Ryoo, J.-M., Fung, I., et al. **2021**: Top-down Estimates of Urban CO₂ Sources: A Salt Lake City Case Study (in preparation).*

Ryoo, J.-M., Pfister, L., Ueyama, R., Zuidema, P., Wood, R., Chang, I., and Redemann, J., **2021**: A meteorological overview of the ORACLES (ObseRvations of Aerosols above Clouds and their intEractionS) campaign over the southeast Atlantic during 2016–2018, Part 1 – climatology, Atmos. Chem. Phys, accepted.

- Pistone, K., Zuidema, R. Wood, M. Diamond, Arlindo M. da Silva, Gonzalo Ferrada, P. E. Saide, R. Ueyama, **J-M Ryoo**, L. Pfister, J. Podolske, D. Noone, R. Bennett, E. Stith, G. Carmichael, J. Redemann, C. Flynn, S. LeBlanc, M. Segal-Rozenhaimer, and Y. Shinozuka, **2021**: Exploring the elevated water vapor signal associated with the free tropospheric biomass burning plume over the southeast Atlantic Ocean, *Atmos. Chem. Phys.*, **21**, 9643–9668, 2021, <https://doi.org/10.5194/acp-21-9643-2021>.
- Redemann, J., Wood, R., Zuidema, P., Doherty, S. J., Luna, B., LeBlanc, S. E., Diamond, M. S., Shinozuka, Y., Chang, I. Y., Ueyama, R., Pfister, L., **Ryoo, J.-M.**, Dobracki, A. N., da Silva, A. M., Longo, K. M., Kacenelenbogen, M. S., Flynn, C. J., Pistone, K., Knox, N. M., Piketh, S. J., Haywood, J. M., Formenti, P., Mallet, M., Stier, P., Ackerman, A. S., Bauer, S. E., Fridlind, A. M., Carmichael, G. R., Saide, P. E., Ferrada, G. A., Howell, S. G., Freitag, S., Cairns, B., Holben, B. N., Knobelspiesse, K. D., Tanelli, S., L'Ecuyer, T. S., Dzambo, A. M., Sy, O. O., McFarquhar, G. M., Poellot, M. R., Gupta, S., O'Brien, J. R., Nenes, A., Kacarab, M., Wong, J. P. S., Small-Griswold, J. D., Thornhill, K. L., Noone, D., Podolske, J. R., Schmidt, K. S., Pilewskie, P., Chen, H., Cochrane, S. P., Sedlacek, A. J., Lang, T. J., Stith, E., Segal-Rozenhaimer, M., Ferrare, R. A., Burton, S. P., Hostetler, C. A., Diner, D. J., Seidel, F. C., Platnick, S. E., Myers, J. S., Meyer, K. G., Spangenberg, D. A., Maring, H., and Gao, L., **2021**: An overview of the ORACLES (ObSErvations of Aerosols above CLouds and their intERactions) project: aerosol–cloud–radiation interactions in the southeast Atlantic basin, *Atmos. Chem. Phys.*, **21**, 1507–1563, <https://doi.org/10.5194/acp-21-1507-2021>, 2021.
- Ryoo, J.-M.**, S. Chiao, J. R. Spackman, L. T. Iraci, F. M. Ralph, A. Martin, R. M. Dole, J. E. Marrero, E. L. Yates, T. Paul Bui, J. M. Dean-Day, and C. S. Chang, **2020**: Terrain Trapped Airflows and Precipitation Variability during an Atmospheric River, 355–375, *J. Hydromet*, **21**, 355–375, <https://doi.org/10.1175/JHM-D-19-0040.1>.
- Shinozuka, Y., P.E. Saide, G. A. Ferrada, S. P. Burton, R. Rerrare, S. J. Doherty, H. Gordon, K. Longo, M. Mallet, Y. Feng, Q. Wang, Y. Cheng, A. Dobracki, S. Freitag, S. G. Howell, S. LeBlanc, C. Flynn, M. Segal-Rosenhaimer, K. Pistone, J. R. Podolske, E. J. Stith, J. R. Bennett, G. R. Carmichael, A. da Silva, R. Govindaraju, R. Leung, Y. Zhang, L. Pfister, **J.-M. Ryoo**, J. Redemann, R. Wood, and P. Zuidema, **2020**: Modeling the smoky troposphere of the southeast Atlantic: a comparison to ORACLES airborne observations from September of 2016, *Atmospheric Chemistry and Physics*, <https://doi.org/10.5194/acp-2019-678>.
- Langford, A.O., R. J. Alvarez II, J. Brioude, D. Caputi, S. A. Conley, S. Evan, I. C. Faloona, L. T. Iraci, G. Kirgis, J.E. Marrero, **J.-M. Ryoo**, C. J. Senff, and E.L. Yates, **2020**: Ozone production in the Soberanes smoke haze: impact on air quality in the San Joaquin Valley during the California Baseline Ozone Transport Study, *J. Geophys. Res.*, <https://doi.org/10.1029/2019JD031777>.
- Yates, E.L., L.T.Iraci, L.W.Tarnay, J.D.Burley, C. Parworth, **J.-M. Ryoo**, **2020**: The effect of an upwind non-attainment area on ozone in California's Sierra Nevada Mountains, *Atmos Environ*, **230**, <https://doi.org/10.1016/j.atmosenv.2020.117426>,
- Leifer, I., C. Melton, R. Chatfield, X. Cui, M. L. Fischer, M. Fladeland, W. Gore, D. L. Hlavka, L. T. Iraci, J. Marrero, J.-M. Ryoo, T. Tanaka, E. Yates, J. E. Yorks, **2020**: Air pollution inputs to the Mojave Desert by fusing surface mobile and airborne in situ and airborne and satellite remote sensing: A case study of interbasin transport with numerical model validation, *Atmos. Environ.*, **224**, 117184, <https://doi.org/10.1016/j.atmosenv.2019.117184>.
- Ryoo, J.-M.**, L. T. Iraci, T. Tanaka, J. E. Marrero, E. L. Yates, I. Fung, Anna M. Michalak, Jovan Tadić, and W. Gore, T. Paul Bui, J. M. Dean-Day, C. S. Chang **2019**: Quantification of CO₂ and CH₄ emissions over Sacramento, California based on divergence theorem using aircraft measurement. *Atmos. Meas. Tech.*, **12**, 2949–2966, <https://doi.org/10.5194/amt-12-2949-2019>.
- Faloona, I. C., S. Chiao, A. Eiserloh, R. J. Alvarez II, G. Kirgis, A. Langford, C. Senff, D. Caputi, A. Hu, L. T. Iraci, E. L. Yates, J. E. Marrero, **J.-M. Ryoo**, S. Conley, S. Tanrikulu, J. Xu, and T. Kuwayama, **2019**: The California Baseline Ozone Transport Study (CABOTS), *BAMS*, <https://doi.org/10.1175/BAMS-D-18-0302.1>
- Liu, C., S. Chiao, **J.-M. Ryoo**, **2019**: Asian long-range transport in relation to atmospheric rivers in northern California, *Atmosphere*, **10**, 313; doi:10.3390/atmos10060313.
- Ryoo, J.-M.**, M. S. Johnson, E. L. Yates, L. T. Iraci, R. B. Pierce, T. Tanaka, W. Gore, **2017**: Investigating sources of ozone over California using AJAX airborne measurements and models: assessing the long-range transport, *Atmos. Environ*, **155**, 53–67, <http://dx.doi.org/10.1016/j.atmosenv.2017.02.008>.
- Tadić, J., A. Michalak, L. Iraci, V. Ilić, S., Biraud, D. Feldman, B. Thaopaul, M. S. Johnson, M. Loewenstein, S. Jeong, M. Fischer, E. Yates, **J.-M. Ryoo**, **2017**: Elliptic cylinder airborne sampling and geostatistical mass balance approach for quantifying local greenhouse gas emissions, *Environ. Sci. Tech.*, **51** (17), 10012–10021, DOI: 10.1021/acs.est.7b03100
- Yates, E. L., M. S. Johnson, L. T. Iraci, **J.-M. Ryoo**, B. J. Johnson, M. A. Ives, T. LeBlanc, M. S. Gustin, T. Tanaka, W. Gore, **2017**: Western US tropospheric ozone: An assessment of vertical, seasonal and spatial variations over California and Nevada, *J. of Geophys. Res.: Atmos.*, **122**, <https://doi.org/10.1002/2016JD026266>.

- Ryoo, J.-M.**, D. E. Waliser, D. W. Waugh, S. Wong, E. J. Fetzer, I. Fung, **2015**: Classification of atmospheric river events on the U.S. west coast using a trajectory model., *J. Geophys. Res. Atmos.*, 120, doi:10.1002/2014JD022023.
- Ryoo, J.-M.**, Y. Kaspi, D. W. Waugh, G. N. Kiladis, D. E. Waliser, E. J. Fetzer, J. Kim, **2013**: Impact of Rossby Wave Breaking on U.S. West Coast Winter Precipitation during ENSO Events. *J. Climate*, **26**, 6360–6382, <http://dx.doi.org/10.1175/JCLI-D-12-00297.1>
- Ryoo, J.-M.**, T. Igusa, and D. W. Waugh, **2009**: PDFs of Tropical Tropospheric Humidity: Measurements and Theory, *J. Climate*, **22**, 3357-3373.
- Ryoo, J.-M.**, D. W. Waugh, and A. Gettelman, **2008**: Variability of subtropical upper tropospheric humidity, *Atmos. Chem. Phys.*, **8**, 1041-1067.
- H.-Y. Chun, and **J.-M. Ryoo**, **2005**: A Case Study of Dynamical Linkage Between the Troposphere and Stratosphere Associated with Stratospheric Major Sudden Warmings in 1979 and 1984, *Journal of Korean Meteorological Society*, **41**, 3, 415-430.
- Ryoo, J.-M.** and H.-Y. Chun, **2005**: Stratospheric Major Sudden Warmings Revealed in NCEP Reanalysis Data for 41 years (1958-1999), *J. Korean. Meteorol. Soc.*, **41**, 2, 173-190.

Grant and Funding Opportunity

- “Solving the Mystery of the Disappearing Low Ozone Values: Attributing Ozone Trends over the Eastern Pacific Ocean and Western North America”, NASA ROSES 2020 ACCDAM (Atmospheric Composition Campaign Data Analysis and Modeling). **Selected**: Role (Co-I), 2021-2024.
- Atmospheric river process understanding using GPM satellite observations and models (working title), NASA ROSES 2021, PMM (Precipitation Measurement Mission science). **Pending**: Role (PI)
- Planetary boundary layer height (PBLH) estimation using machine learning method (working title), NASA ROSES 2021, DSI (Decadal Survey Incubation). **Pending**: Role (Co-I).

Programing Languages, IT Experience, and Field Work

- IDL, Python, UNIX/Linux, (with R and Matlab as minor), Web, and other MS Suites.
- Serving as Ames Flight Planning and Forecasting (FFP) operational data management engineer during NASA DCOTSS (Dynamics and Chemistry of the Summer Stratosphere) field campaign (2021–present)
- Serving as Flight Planning and Forecasting (FFP) team member for NASA DCOTSS field mission held in July – August, 2021, Salina, KS
- Serving as Ames operational forecasting data management engineer during NASA EVS-2 ORACLES (ObseRvations of Aerosols above Clouds and their intEractionS) field campaigns (2017 – 2018)

Mentoring Students Experience

- **2020** “Atmospheric Rivers over the Southeast Atlantic”: Graduate student, SJSU (summer intern)
- **2019** “Rain-on-Snow events during Atmospheric Rivers in northern California: the role of aerosols and hydrometeorology”: Graduate student, SJSU (summer intern); will serve as a committee as his MS thesis defense
- **2018** “Long-range Aerosol Transport via Rossby Wave Breaking during Atmospheric River Events on the Western U.S.”: Graduate student, SJSU (summer intern); served as a committee as her MS thesis defense
- **2017** “The Linkage of Atmospheric Rivers and Air Quality over Northern California”: Undergraduate student, SJSU (summer-intern)
- **2016** “First Results from the AJAX Flights for the California Baseline Ozone Transport Study (CABOTS)”: Undergraduate students, University of California, Davis (summer-intern; *Co-mentoring with NASA Ames Scientists*)
- **2006-2007** Volunteering as a graduate student tutor for West Baltimore Elementary School Science project (Kids Grow), Baltimore, MD

Professional Journal reviews

- Journal of Climate, Journal of Geophysical Research, Atmospheric Chemistry and Physics, Monthly Weather Review, Environmental Pollution, Climate Dynamics, Remote Sensing, Journal of Applied Meteorology and Climatology, Atmospheric Environment, International Journal of Climatology, Atmospheric Science Letter, Atmosphere, Climate, Water, Sustainability, and Tellus.