

JOHN G. WATSON

Research Professor

Division of Atmospheric Sciences, Desert Research Institute (DRI)

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Education

Ph.D.	Environmental Sciences	1979	Oregon Health and Science University (OHSU, formerly Oregon Graduate Institute)
M.S.	Physics	1974	University of Toledo
B.A.	Physics	1970	State University of New York at Brockport

Experience

Dr. John G. Watson's research includes: 1) evaluating, characterizing, and advancing methods to measure carbonaceous material in suspended particles; 2) developing and applying real-world, multipollutant emission measurement technologies; and 3) designing and conducting aerosol characterization, source apportionment, and adverse effects studies. His recent projects involved real-world emissions testing in the oil sands region of northern Canada, engine exhaust characterization in Hong Kong, commercialization of a multi-wavelength thermal/optical aerosol carbon analyzer, and designing air quality measurement networks in developing countries. Current projects include evaluation of microsensor/smartphone interfaces for detecting intermittent fugitive emission, increasing the efficiency and cost-effectiveness of particulate matter and visibility measurement systems, determining changes in aerosol chemical and optical properties with atmospheric aging, and quantifying atmospheric contributions to stormwater runoff. These projects involve supervision and mentoring of graduate students and post-doctoral fellows.

Dr. Watson was principal investigator or co-investigator for more than 120 major and minor air quality studies. These include: 1) real-world emissions characterization in the Athabasca Oils Sands Region of Canada; 2) the Fresno Supersite; 3) the California Regional PM₁₀/PM_{2.5} Air Quality Study (CRPAQS); 4) the Department of Defense (SERDP) diesel source characterization study; 5) the San Joaquin Valley Air Quality Study and Atmospheric Utilities Signatures, Predictions and Experiments; 6) the Imperial Valley/Mexicali Cross Border PM₁₀ Transport Study; 7) the Mt. Zirkel Visibility Study; 8) the Northern Front Range Air Quality Study; 9) the Mexico City aerosol characterization study, 10) the California Acid Deposition Monitoring Program; and numerous smaller studies. He has participated in PM_{2.5} and PM₁₀ control strategy development in various western states. He developed EPA's Chemical Mass Balance receptor modeling software and prepared EPA monitoring guidelines for PM_{2.5} and PM₁₀. National Ambient Air Quality Standards.

Stemming from his service in the U.S. Peace Corps, Dr. Watson has cultivated relationships with scientists and regulators in rapidly industrializing nations with particular emphasis on China, India, and Mexico. He has hosted three Fulbright Fellows from India, involving them ongoing projects and assisting them in aerosol studies and publications relevant to their regions. In 1998 he established a collaboration with the Institute of Earth Environment of the Chinese Academy of Sciences in Xian, where is currently an Adjunct Professor. An aerosol sampling and analysis capability similar to that at DRI was created and is being used to better target the causes of air pollution in Chinese cities and evaluate the effectiveness of emission controls. Over the past 10 years

Dr. Watson has organized and presented mini-courses and symposia related to aerosol measurement and source apportionment in various parts of China, Hong Kong, Macao, Taiwan, various parts of India, Viet Nam, Egypt, South Africa, Mexico, and Chile. As a journal editor, he has placed special emphasis on assisting foreign scientists to publish technically sound and useful articles.

Dr. Watson has authored or co-authored more than 415 peer-reviewed journal publications, more than 200 chapters published in books and conference transactions, and more than 290 technical reports. He is one of 250 highly-cited authors in the energy and environment section of ISI HighlyCited.com and is listed in the 2021 Stanford University's "Top 2% of Most-Cited Scientists". Dr. Watson co-chaired the National Academy of Engineering panel on "Energy Futures and Urban Air Pollution Challenges for China and the United States" and was a member of the National Academy of Science panel on "New Source Review for Stationary Sources of Air Pollution." He authored the Air & Waste Management Association (A&WMA) 2002 critical review on "Visibility: Science and Regulation", the 2017 critical review on "Air quality measurements—From rubber bands to tapping the rainbow", and has served on the A&WMA Critical Review committee since 1982. Dr. Watson is fluent in the English and Spanish languages.

Professional Experience

1985 -Present	Research Professor, Division of Atmospheric Sciences, DRI, Nevada System of Higher Education, Reno, NV.
2006 -Present	Graduate Faculty, University of Nevada, Reno, Nevada System of Higher Education, Reno, NV.
2005-Present	Adjunct Professor, Institute of Earth Environment, Chinese Academy of Sciences, Xi'an, China
1982 -1985	Associate Research Professor and Director of the Air Resources Laboratory, Energy and Environmental Engineering Center, DRI, University of Nevada System, Reno, NV.
1979 -1982	Senior Environmental Scientist, Environmental Research and Technology, Concord, MA.
1975 -1979	Research Fellow, Oregon Graduate Institute (now OHSU), Beaverton, OR.
1974 -1975	Physical Science Instructor, University of Illinois, Urbana, IL.
1973 -1974	Physics Teaching Assistant, University of Toledo, Toledo, OH.
1970 -1972	Physics Instructor, Teachers' College, Chiclayo, Peru, as a member of the U.S. Peace Corps.

Honors and Awards

Listed in the 2021 Stanford University's "Top 2% of Most-Cited Scientists" (<https://data.mendeley.com/datasets/btchxktyzw/2>).

Atmospheric Environment 2019 Haagen-Smit Prize for Best Paper for "Chow, J.C., Watson, J.G., Pritchett, L.C., Pierson, W.R., Frazier, C.A., Purcell, R.G., (1993). Chow, J.C., Watson, J.G., Pritchett, L.C., Pierson, W.R., Frazier, C.A., Purcell, R.G., (1993). The DRI Thermal/Optical Reflectance carbon analysis system: Description, evaluation and applications in U.S. air quality studies. *Atmospheric Environment*, 27A, 1185-1201."

Arthur C. Stern 2019 Distinguished Paper Award for "Winter and summer PM_{2.5} chemical compositions in 14 Chinese cities", *JAWMA*, vol. 62, p.1214

Desert Research Institute Award for 35 Years of Distinguished Service, 2018.

Haagen-Smit 2018 Clean Air Award for Air Quality Science, California Air Resources Board, Sacramento, CA.

Invited co-author of 2017 A&WMA Critical Review: Air quality measurements—From rubber bands to tapping the rainbow

Arthur C. Stern 2016 Distinguished Paper Award for "The IMPROVE_A temperature protocol for thermal/optical carbon analysis: Maintaining consistency with a long-term database", *JAWMA*, vol. 57, p.1014.

Frontiers of Environmental Science & Engineering (FESE)'s Best Paper of 2011 for Wang, X.L.; Robbins, C.; Hoekman, S.K.; Chow, J.C.; Watson, J.G.; Schuetzle, D. (2011). Dilution sampling and analysis of particulate matter in biomass-derived syngas. *Frontiers of Environmental Science and Engineering in China*, 5(3):320-330.

ISI Highly Cited Author in Ecology/Environment, 2006–present.

Recognition for service and contributions as a member of the EM Editorial Advisory Committee 2003–2006. Air & Waste Management Association, Pittsburgh, PA, June 2006.

Recognition Award as a 2006 Air Quality Expert for contribution to the improvement of air quality science in Taiwan. Presented by the Environmental Protection Administration, Executive Yuan, R.O.C. and the National Central University, R.O.C., June 2006.

2005 University of Nevada Regents' Researcher Award. Board of Regents, Nevada System of Higher Education, Reno, Nevada.

Invited author of 2002 A&WMA Critical Review: Visibility-Science and regulation.

2001 Fellow Member Award. Air & Waste Management Association, Pittsburgh, Pennsylvania.

2000 Frank A. Chambers Award for Outstanding Technical Achievement to the Science and Art of Air Pollution Control. Air & Waste Management Association, Pittsburgh, Pennsylvania.

1998 Distinguished Fellow. Institute of Environmental Engineering, National Sun Yat-Sen University, Kaohsiung, Taiwan.

1996 Environmental Fellow Award. Nankai University, Tianjin, People's Republic of China.

1995 Distinguished Environmental Scientist Award, National Taiwan University and Taiwan Power Company, Taipei, Taiwan.

1993 Who's Who Registry of Global Business Leaders.

1992 Alessandro Dandini Medal of Science. Desert Research Institute, Reno, Nevada.

1990 Ablett Fellow Award. Schonland Research Centre for Nuclear Sciences, University of the Witwatersrand, Johannesburg, South Africa.

1989 Howard Vollum Prize for Distinguished Achievement in Science and Technology. Oregon Graduate Institute, Beaverton, Oregon.

Professional Memberships

Air & Waste Management Association (A&WMA).
American Association for the Advancement of Science (AAAS).
American Association for Aerosol Research (AAAR).

Committees and Offices

Co-editor, *Aerosol Science and Engineering* (Springer), 2016-present.

Associate editor, *Journal of the Air & Waste Management Association*, 2005-2015.

Member and past Chair of the A&WMA Publications Committee, 1982-present.

Member and past Chair of the A&WMA Critical Review Committee, 1982-present.

Member, Excellence in Environmental Education Award Committee, A&WMA Sierra Chapter, 2011 – 2018.

Member of the Scientific Committee for the 2nd International Conference on Air Pollution and Control, Antalya, Turkey (2011)

Technical Program Committee Chair for the A&WMA International Specialty Conference in Xi'an, China (2010).

Member of the Central California Air Quality Studies Technical Advisory Committee, 1995-2008.

Member of the Technical Program Committee for the A&WMA Specialty Conference "Aerosol and Atmospheric Optics: Visual Air Quality and Radiation," 2008.

Adjunct Professor, Nankai University, Tianjin, China, 2007–present

Member and Chair of the National Academy of Engineering's U.S. Committee on Energy Futures and Air Pollution in Urban China and the United States, January 2005–December 2008.

Member of the Technical Programmes Committee, 4th Asian Aerosol Conference (AAC-2005), The Grand Hyatt, Mumbai, India, 13-16 December 2005.

Member of the Executive Technical Program Committee, 2005 AAAR International Specialty Conference: Particulate Matter Supersites Program and Related Studies, Atlanta, GA.

Member of the General Technical Program Committee, 2005 AAAR International Specialty Conference: Particulate Matter Supersites Program and Related Studies, Atlanta, GA.

Member of the Editorial Review Board for the journal, *Aerosol and Air Quality Research*, 2005 to present.

A&WMA Associate Editor, 2004 - 2008.

Member of the National Research Council (NRC) Committee on The Effects of Changes in New Source Review Programs for Stationary Sources of Air Pollutants, 2004 - 2006.

Lecturer, Receptor Model and Data Analysis Training Workshops (various sponsors) in Portland, OR; Las Vegas, NV; San Francisco, Sacramento, Los Angeles, San Diego, and El Centro, CA; Pocatello, ID; Denver, CO; Phoenix and Tucson, AZ; Research Triangle Park, NC; Pittsburgh, PA; Austin, TX; Chicago, IL Vancouver,

B.C., Canada; Santiago, Chile; Taipei, Taiwan; and Johannesburg, Cape Town; Pretoria, South Africa; and Mexico City and Cuernavaca, Mexico.
Member, Expert Panel on Chaff, U.S. Navy, 1999.
Technical Program Chair, 1989 APCA International Specialty Conference on Receptor Models in Air Resources Management, San Francisco, CA.
Technical Program Committee Co-chair, Session, 1994 A&WMA/AGU International Specialty Conference on Aerosol and Atmospheric Optics: Radiation Balance and Visual Air Quality, Snowbird, UT.
Intersociety Committee on Methods of Air Sampling and Analysis (chair, 1995-present).
South Coast Air Quality Management District PM₁₀ Task Force.
California Regional PM₁₀/PM_{2.5} Regional Air Quality Study Technical Committee.

Peer-Reviewed Journal Articles (ISI citations= 26,348, h=78)

- Abbasi, B., Wang, X.L., Chow, J.C., Watson, J.G., Peik, B., Nasiri, V., Riemenschmitter, K.B., Elahifard, M., (2021). Review of respirable coal mine dust characterization for mass concentration, size distribution and chemical composition. *Minerals*, 11, 426. 10.3390/min11040426.
- Alshammari, D., Bloss, W., Chen, Y., Chow, J.C., Gani, S., Harrison, R.M., Hu, D.W., Li, G., McFiggans, G., Milsom, A., Oyarz'un Aravena, A.M., Pfrang, C., Shi, Z.B., Srivastava, D., Styring, P., Su, H., Watson, J.G., Xu, J.S., (2021). General discussion: Multiphase atmospheric chemistry, and source apportionment. *Faraday Discussions*, 226, 314-333. 10.1039/D1FD90015C.
- Altuwayjiri, A.H., Bloss, W.J., Harrison, R.M., Mihaylova, L., Molina, L.T., Oyarz'un Aravena, A.M., Pfrang, C., Schauer, J., Slater, J., Srivastava, D., Styring, P., Wallington, T.J., Wang, P., Watson, J.G., (2021). General discussion: Trends in emissions concentrations. *Faraday Discussions*, 226, 100-111. 10.1039/D1FD90013G.
- Chen, L.-W.A., Chow, J.C., Wang, X.L., Cao, J.J., Mao, J.Q., Watson, J.G., (2021). Brownness of organic aerosol over the United States: Evidence for seasonal biomass burning and photobleaching effects. *Environmental Science & Technology*, online. 10.1021/acs.est.0c08706.
- Cheng, Y., Chow, J.C., Watson, J.G., Zhou, J.M., Liu, S.X., Cao, J.J., (2021). Decreasing concentrations of carbonaceous aerosols in China from 2003 to 2013 *Scientific Reports*, 11 5352. 10.1038/s41598-021-84429-w.
- Chow, J.C., Chen, L.-W.A., Wang, X.L., Green, M.C., Watson, J.G., (2021). Improved estimation of PM_{2.5} brown carbon contributions to filter light attenuation. *Particuology*, 56, 1-9. 10.1016/j.partic.2021.01.001.
- Nava, V., Das, K.C., Amin, V., Gronstal, S., Wang, X.L., Chow, J.C., Watson, J.G., Yang, Y., (2021). Quantification of carboxyl-functionalized multiwall carbon nanotubes in plant tissues with programmed thermal analysis. *Journal of Environmental Quality*, 50, 278–285. 10.1002/jeq2.20180.
- Shen, M.X., Xu, H.M., Liu, S.X., Zhang, Y., Zhang, N.N., Zhou, J.M., Chow, J.C., Watson, J.G., Cao, J.J., (2021). Spatial distribution of PM_{2.5}-bound elements in eighteen cities over China: policy implication and health risk assessment. *Environmental Geochemistry and Health*, 10.1007/s10653-021-00913-2.
- Vega, E., Lopez-Veneroni, D., Ramirez, O., Chow, J.C., Watson, J.G., (2021). Particle-bound PAHs and chemical composition, sources, and health risk of PM_{2.5} in a highly industrialized corridor in Central Mexico. *Aerosol and Air Quality Research*, accepted.
- Wang, X.L., Chen, L.-W.A., Ho, K.F., Chan, C.S., Zhang, Z.Z., Lee, S.C., Chow, J.C., Watson, J.G., (2021). Comparison of vehicle emissions by EMFAC-HK model and tunnel measurement in Hong Kong. *Atmospheric Environment*, 256, 10.1016/j.atmosenv.2021.118452.
- Watson, J.G., Cao, J.J., Wang, X.L., Chow, J.C., (2021). PM_{2.5} pollution in China's Guanzhong Basin and the USA's San Joaquin Valley mega-regions. *Faraday Discussions*, 226, 255-289. 10.1039/D0FD00094A.
- Wei, C., Bandowe, B.A.M., Han, Y.M., Cao, J.J., Watson, J.G., Chow, J.C., Wilcke, W., (2021). Polycyclic aromatic compounds (PAHs, oxygenated PAHs, nitrated PAHs, and azaarenes) in air from four climate zones of China: Occurrence, gas/particle partitioning, and health risks. *Science of the Total Environment*, 786, 147234. 10.1016/j.scitotenv.2021.147234.
- Altshuler, S.L., Zhang, Q., Kleinman, M.T., Garcia-Menendez, F., Moore, C.T., Hough, M.L., Stevenson, E.D., Chow, J.C., Jaffe, D.A., Watson, J.G., (2020). Critical Review Discussion: Wildfire and prescribed burning impacts on air quality in the United States. *Journal of the Air & Waste Management Association*, 70, 961-970.
- Cao, J.J., Wang, Q.Y., Li, L., Zhang, Y., Tian, J., Chen, L.-W.A., Ho, S.H.H., Wang, X.L., Chow, J.C., Watson, J.G., (2020). Evaluation of the oxidation flow reactor for particulate matter emission limit certification.

- Atmospheric Environment, 224, 117086. 10.1016/j.atmosenv.2019.117086.
- Fujitani, Y., Sato, K., Tanabe, K., Takahashi, K., Hoshi, J., Wang, X.L., Chow, J.C., Watson, J.G., (2020). Volatility distribution of organic compounds in sewage incineration emissions. *Environmental Science & Technology*, 54, 14235–14245. 10.1021/acs.est.0c04534.
- Hidy, G.M., Heisler, S.L., Watson, J.G., Wolff, G.T., Blumenthal, D.L., (2020). Winter urban particulate chemistry and Denver's "Brown Cloud": Part II. Air chemistry and meteorology. *Aerosol Science and Engineering*, 4, 80-100. 10.1007/s41810-020-00060-8.
- Hidy, G.M., Heisler, S.L., Watson, J.G., Wolff, G.T., (2020). Winter urban particulate chemistry and Denver's "Brown Cloud": Part I. Light extinction and visibility. *Aerosol Science and Engineering*, 4, 64-79. 10.1007/s41810-020-00055-5.
- June, N.A., Wang, X., Chen, L.-W.A., Chow, J.C., Watson, J.G., Wang, X.L., Henderson, B.H., Zheng, Y.Q., Mao, J.Q., (2020). Spatial and temporal variability of brown carbon in the United States: Implications for direct radiative effects. *Geophysical Research Letters*, 47, 10.1029/2020GL090332.
- Niu, X.Y., Chuang, H.C., Wang, X.L., Ho, S.S.H., Li, L.J., Qu, L.L., Chow, J.C., Watson, J.G., Sun, J., Lee, S.C., Cao, J.J., Ho, K.F., (2020). Cytotoxicity of PM_{2.5} vehicular emissions in the Shing Mun Tunnel, Hong Kong. *Environmental Pollution*, 263, 114386. 10.1016/j.envpol.2020.114386.
- Wang, X.L., Hoekman, S.K., Han, Y., Chow, J.C., Watson, J.G., Wu, X.M., Wu, Y., Schuetzle, D., Schuetzle, R., (2020). Potential emission reductions by converting agricultural residue biomass to synthetic fuels for vehicles and domestic cooking in China Particology, 49, 40-47. 10.1016/j.partic.2019.04.008.
- Wang, X.L., Zhou, H., Arnott, W.P., Meyer, M.E., Taylor, S., Firouzkhohi, H., Moosmuller, H., Chow, J.C., Watson, J.G., (2020). Evaluation of gas and particle sensors for detecting spacecraft-relevant smoke. *Fire Safety Journal*, 113, 1-12. 10.1016/j.firesaf.2020.102977.
- Zhang, Z.Z., Gao, Y., Yuan, Q., Tan, Y., Li, H.W., Cui, L., Huang, Y., Cheng, Y., Xiu, G.L., Lai, S.C., Chow, J.C., Watson, J.G., Lee, S.C., (2020). Effects of indoor activities and outdoor penetration on PM_{2.5} and associated organic/elemental carbon at residential homes in four Chinese cities during winter. *Science of the Total Environment*, 739, 139684. 10.1016/j.scitotenv.2020.139684.
- Altshuler, S.L., Ahad, J.M.E., Chow, J.C., Duane, C., Dube, M., Legge, A.H., Percy, K.E., Stevenson, E.D., Watson, J.G., (2019). Critical review discussion: Advances in science and applications in air pollution monitoring: A case study on oil sands monitoring targeting ecosystem protection. *Journal of the Air & Waste Management Association*, 69, 1133-1141. 10.1080/10962247.2019.1659192.
- Chan, T.W., Huang, L., Banwait, K., Zhang, W., Ernst, D., Wang, X.L., Watson, J.G., Chow, J.C., Green, M., Czimczik, C.I., Santos, G.M., Sharma, S., Jones, K., (2019). Inter-comparison of elemental and organic carbon mass measurements from three North American national long-term monitoring networks at a co-located site. *Atmospheric Measurement Techniques*, 12, 4543-4560. 10.5194/amt-12-4543-2019.
- Chen, X.C., Chow, J.C., Ward, T.J., Cao, J.J., Lee, S.C., Watson, J.G., Lau, N.C., Yim, S.H.L., Ho, K.F., (2019). Estimation of personal exposure to fine particles (PM_{2.5}) of ambient origin for healthy adults in Hong Kong. *Science of the Total Environment*, 654, 514-524. 10.1016/j.scitotenv.2018.11.088.
- Chen, L.-W.A., Zhang, M., Liu, T., Fortier, K., Chow, J.C., Kolberg, R., Cao, J.J., Lin, G., Patel, T.Y., Cruz, P., Buttner, M.P., Watson, J.G., (2019). Evaluation of epifluorescence methods for quantifying bioaerosols in fine and coarse particulate air pollution. *Atmospheric Environment*, 213, 620-628.
- Chow, J.C., Wang, X.L., Green, M.C., Watson, J.G., (2019). Obtaining more information from existing filter samples in PM speciation networks. *EM*, 23, 15-19.
- Chow, J.C., Cao, J.J., Chen, L.-W.A., Wang, X.L., Wang, Q.Y., Tian, J., Ho, S.S.H., Watts, A.C., Carlson, T.N., Kohl, S.D., Watson, J.G., (2019). Changes in PM_{2.5} peat combustion source profiles with atmospheric aging in an oxidation flow reactor. *Atmospheric Measurement Techniques*, 12, 5475-5501. 10.5194/amt-2019-198.
- Chow, J.C., Watson, J.G., Solomon, P.A., Tisch, J., Chen, A., (2019). In memoriam: Thomas Maynard Merrifield (1950-2019). *EM*, 23, 52.
- Liu, T., Chen, L.-W.A., Zhang, M., Watson, J.G., Chow, J.C., Cao, J.J., Chen, H.Y., Wang, W., Zhang, J.Q., Zhan, C.L., Liu, H.X., Zhen, J.R., Chen, N.W., Yao, R.Z., Xiao, W.S., (2019). Bioaerosol concentrations and size distributions during the autumn and winter seasons in an industrial city of central China *Aerosol and Air Quality Research*, 19, 1095-1104.
- Pervez, S., Verma, M., Tiwari, S., Chakrabarty, R.K., Watson, J.G., Chow, J.C., Panicker, A.S., Deb, M.K., Siddiqui, M.N., Pervez, Y.F., (2019). Household solid fuel burning emission characterization and activity levels in India. *Science of the Total Environment*, 664, 493-504. 10.1016/j.scitotenv.2018.11.019.

- Sarkar, S., Rivas-Santiago, C.E., Ibrinke, O.A., Carranza, C., Meng, Q.Y., Osornio Vargas, A.R., Zhang, J.F., Torres, M., Chow, J.C., Watson, J.G., Ohman-Strickland, P., Schwander, S., (2019). Season and size of urban PM differentially affects cytotoxicity and human immune responses to *Mycobacterium tuberculosis* Plos One, 14, 1-20. 10.1371/journal.pone.0219122.
- Wang, X.L., Zhou, H., Arnott, W.P., Meyer, M.E., Taylor, S., Firouzkouhi, H., Moosmuller, H., Chow, J.C., Watson, J.G., (2019). Characterization of smoke for spacecraft safety. *Journal of Aerosol Science*, 136, 36-47. 10.1016/j.jaerosci.2019.06.004.
- Watson, J.G., Altshuler, S.L., Chow, J.C., (2019). Critical review discussion supplement: Oil sands research bibliography. *Journal of the Air & Waste Management Association*, 69, S1-S37.
- Watson, J.G., Cao, J.J., Chen, L.-W.A., Wang, Q.Y., Tian, J., Wang, X.L., Gronstal, S.B., Ho, S.S.H., Watts, A.C., Chow, J.C., (2019). Gaseous, PM_{2.5} mass, and speciated emission factors from laboratory chamber peat combustion. *Atmos. Chem. Phys.*, 19, 14173-14193. 10.5194/acp-19-14173-2019.
- Zhao, Z.Z., Cao, J.J., Chow, J.C., Watson, J.G., Chen, L.-W.A., Wang, X.L., Wang, Q.Y., Tian, J., Shen, Z.X., Zhu, C.S., Liu, S.X., Tao, J., Ye, Z.L., Zhang, T., Zhou, J.M., Tian, R.X., (2019). Multi-wavelength light absorption of black and brown carbon at a high-altitude site on the Southeastern margin of the Tibetan Plateau, China. *Atmospheric Environment*, 212, 54-64. <https://doi.org/10.1016/j.atmosenv.2019.05.035>.
- Altshuler, S.L., Ayala, A., Collet, S., Chow, J.C., Frey, H.C., Shaikh, R., Stevenson, E.D., Walsh, M.P., Watson, J.G., (2018). Trends in on-road transportation, energy, and emissions: Critical review discussion. *Journal of the Air & Waste Management Association*, 68, 1015-1024. 10.1080/10962247.2018.1512734.
- Altshuler, S.L., Ayala, A., Collet, S., Chow, J.C., Frey, H.C., Shaikh, R., Stevenson, E.D., Walsh, M.P., Watson, J.G., (2018). Trends in on-road transportation, energy, and emissions. *Journal of the Air & Waste Management Association*, 68, 1015-1024. 10.1080/10962247.2018.1512734.
- Bano, S., Pervez, S., Chow, J.C., Matawle, J.L., Watson, J.G., Sahu, R.K., Srivastava, A., Tiwari, S., Pervez, Y.F., Deb, M.K., (2018). Coarse particle (PM_{10-2.5}) source profiles for emissions from domestic cooking and industrial process in Central India. *Science of the Total Environment*, 627, 1137-1145. 10.1016/j.scitotenv.2018.01.289.
- Chow, J.C., Riggio, G.M., Wang, X.L., Chen, L.-W.A., Watson, J.G., (2018). Measuring the organic carbon to organic matter multiplier with thermal/optical carbon mass spectrometer analyses. *Aerosol Science and Engineering*, 2, 165-172.
- Chow, J.C., Watson, J.G., Green, M.C., Wang, X.L., Chen, L.-W.A., Trimble, D.L., Cropper, P.M., Kohl, S.D., Gronstal, S.B., (2018). Separation of brown carbon from black carbon for IMPROVE and CSN PM_{2.5} samples. *Journal of the Air & Waste Management Association*, 68, 494-510.
- Cui, L., Wang, X.L., Ho, K.F., Gao, Y., Liu, C., Ho, S.S.H., Li, H.W., Lee, S.C., Wang, X.M., Jiang, B.Q., Huang, Y., Chow, J.C., Watson, J.G., Chen, L.-W.A., (2018). Decrease of VOC emissions from vehicular emissions' in Hong Kong from 2003 to 2015: Results from a tunnel, study. *Atmospheric Environment*, 177, 64-74. 10.1016/j.atmosenv.2018.01.020.
- Gaga, E.O., Ari, A., Akyol, N.H., Üzmez, Ö.Ö., Kara, M., Chow, J.C., Watson, J.G., Özel, E., Döğeroğlu, T., Odabasi, M., (2018). Determination of real-world emission factors of trace metals, EC, OC, BTEX, and semivolatile organic compounds (PAHs, PCBs and PCNs) in a rural tunnel in Bilecik, Turkey. *Science of the Total Environment*, 643, 1285-1296. 10.1016/j.scitotenv.2018.06.227.
- Harner, T., Rauert, C., Muir, D., Schuster, J., Hsu, Y.M., Zhang, L.M., Marson, G., Watson, J.G., Ahad, J., Cho, S., Jariyasopit, N., Kirk, J.L., Korosi, J.B., Landis, M., Martin, J., Zhang, Y.F., Fernie, K.J., Wentworth, G.R., Wnorowski, A., Dabek, E., Charland, J.P., Pauli, B., Wania, F., Galarneau, E., Cheng, I., Makar, P., Whaley, C., Chow, J.C., Wang, X.L., (2018). Air synthesis review on polycyclic aromatic compounds in the Athabasca oil sands region. *Environmental Reviews*, 26, 430-468. 10.1139/er-2018-0039.
- Ho, S.S.H., Wang, L.Q., Chow, J.C., Watson, J.G., Xue, Y., Huang, Y., Qu, L., Li, B., Dai, W.T., Li, L.J., Cao, J.J., (2018). Optimization and evaluation of multi-bed adsorbent tube method in collection of volatile organic compounds. *Atmospheric Research*, 202, 187-195.
- Li, L.J., Ho, S.S.H., Han, Y.M., Chow, J.C., Watson, J.G., Wang, L.Q., Qu, L.L., Cao, J.J., (2018). Quantification of nitrated-polycyclic aromatic hydrocarbons in atmospheric aerosol samples with in-injection port thermal desorption-gas chromatography/negative chemical ionization mass spectrometry method. *Atmospheric Environment*, 192, 84-93. 10.1016/j.atmosenv.2018.08.049.
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