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Professor of Climate Science, Department of Meteorology, University of Reading and National Centre for Earth Observation **www.met.reading.ac.uk/~sgs02rpa**

A professor of climate science specialising in Earth Observation, radiative processes and the global water cycle; over 120 peer-reviewed publications, strong Met Office links and Intergovernmental Panel on Climate Change lead author

Career Outline

2013- : Professor of Climate Science and recent joint head (2017-2019) of the Department of Meteorology, University of Reading

2009-2013: Reader in Climate Science, Department of Meteorology, University of Reading, UK

2003-2009: Research Fellow; NERC Advanced Fellow, ESSC, University of Reading

1999: Visiting scientist, Geophysical Fluid Dynamics Laboratory, Princeton, NJ, USA

1998-2003: Research Scientist, Hadley Centre, Met Office;

1995-1998: PhD, Meteorology Department, University of Reading (CASE award, Hadley Centre)

Professional activities

- Intergovernmental Panel on Climate Change, AR6 lead author (including Chapter 8 on Water Cycle Changes and Summary for Policymakers); contributing author AR4/5/6
- NERC Peer Review College Member (2007-present)
- Fellow of the Higher Education Academy (2016-present)
- Geostationary Earth Radiation Budget (GERB) International Science Team member (1999-present); GERB advisory board member (2013-present); CMSAF review board chair
- NASA Clouds and the Earth's Radiant Energy System (CERES) science team member (2003-present); CERES follow-on NASA Earth Venture Continuity science team (Libera)
- Associate Editor, Journal of Climate (2009-present); Special Issue Editor: Current Climate Change Rep. (2015/16), Surveys in Geophysics, (2010/12); Environ. Res. Lett. (2009/2010)
- Organising committees: NCAS/RMetS national conference (2017-2018); EGU Leonardo Conference (2015-2016); American Meteorological Soc., Atmos. Radiation (2012-2018)

Grants awarded

- INDECIS EU ERA4CS call, Reading Principal Investigator 2017-2021
- MOAP water vapour Met Office Academic Partnership (Reading lead), 2019-2022.
- Rain-from-space, NERC standard grant, Co-I, 2019-2023.
- MARS consortium, Co-I, 2017-2022
- SMURPHS consortium, NERC highlight, Reading Principal Investigator, 2016-2020 (~£1M)
- DEEP-C NERC responsive, Principal Investigator 2013-2017 (~£1M)
- SINATRA NERC FIR directed, Worktask Leader Co-I 2013-2016 (~£1M)
- DACCIWA EU FP7, Co-I, 2013-2018 (~EUR 10M)
- CALM NERC CMIP5 directed, Principal Investigator, 2010-2012 (£103k)
- HYDEF NERC CWC directed program, primary Co-I 2010-2014 (£224k)
- PAGODA NERC CWC directed, WP leader Co-I 2010-2013 (£971k + £14k NCEO PI)
- PREPARE NERC responsive, Principal Investigator, 2010-2013 (£318k)
- HadIR/MW JWCRP Principal Investigator with Met Office, 2009-2012
- Royal Society Incoming Short Visits, Principal Investigator 2008 (£3785)
- NERC Advanced Fellowship, Principal Investigator 2005-2010 (£282k)

Awards

2021 Reuters hot list of top 500 climate scientists
2016 Publons Sentinels of Science reviewers award
2015 Buchan Prize, Royal Meteorological Society
2008 Outstanding reviewer, JGR-Atmospheres
2003 HJE Reid award, NASA Langley Research Center
1993 Cann prize; 1992, First Year prize for Environmental Science, University of East Anglia

Teaching and Outreach

Teaching: Hydrology and Global Environmental Change (MTMG44 convenor). Recent: Science of Climate Change (MT1CC/MT2CC/MTMCC, co-convenor), Climate Change (MTMG16, convenor); Adult Education courses (Weather and Climate; Climate Change: past, present and future; mentor); Summer school lectures (NCAS, NCEO, WAVACS, University of Stockholm)

PhD supervisor: Thea Stevens (2022-), Daniel Watters (2021), Caroline Dunning (2018), Zahra Mousavi (2017), Kerian Ferreira (2017), Ross Maidment (2014), Claire Barber (2012), Nicky Chalmers (2011), Ruth Comer (2008)

PhD examiner: A. Mackie (Edinburgh) 2020; K. Johari Chan 2020; A. Todd 2019 (Exeter); J. Elsey, 2018; J. Gristey, 2018; G. Xu, Univ. East Anglia, 2016; A. Dufour, Grenoble, 2016; E. Turner, Edinburgh, 2014; M. Johnston, Chalmers, 2014; T. Philp, 2014; K. Menang, 2012; P. Hill, 2012; A. Ipe, RMIB, 2011; K. Chan, Imperial College, 2011; T. Andrews, Leeds, 2010; R. Holley, 2009; N. Clerbaux, RMIB, 2008; L. Read, Imperial College, 2004;

Media/Policy: including BBC News, BBC Newsnight, BBC radio 4/5-Live/world service, BBC Breakfast, Channel 4, ITN News at 10; Sky News; Guardian, Telegraph, Wall Street Journal, Financial Times, Global Re-insurance, Carbon Brief contributing editor; Science Media Centre workshop panel, IPCC summary for policymakers approval, Deloitte/HSBC climate finance event

Outreach: STEM climate ambassador**;** recent departmental outreach coordinator; schools/interest group events; Stakeholder events; University of Reading Climate Change MOOC lead of sections

Leadership/Management

Joint Head of Meteorology Department (2017-2019)l; Outreach coordinator (2010-2019); Website Coordinator (2019-)

Management responsibility: 11 Postdoctoral Research Assistants over multiple projects: Ranjini Swaminathan 2017-, Caroline Wainwright 2019-2022, Philip Craig 2018-2022, Shannon Mason 2018-, Albert Osso 2018-2019, James Mollard 2019, Peter Hill 2017-2019, Adrian Champion 2015-2018, Mark Fielding 2014-2017, Charlie Williams 2011-2012, David Lavers 2011-2013, Chunlei Liu-multiple projects 2010-2020, Matthias Zahn 2010-2013, Kevin Pearson 2008-2011, Viju John 2009-2013

Staff Development Reviewing: Dr N Douglas (2022-); Prof R Plant (2021-); Prof D Feltham (2018-); Prof N Bellouin (2018-); Dr A Chevutuli (2020); Dr L Wilcox (2012-2019); Dr A Turner (2014-2018); Dr M Hegglin (2018); Mr S Burt (2017-2018); Ms K Maskell (2015); Dr P Cook (2015-2017); Dr C Daleu (2014-2016); Prof E Black (2014-2015); Dr M Sandells (2013-2014); Dr B Harvey (2012-2013); Dr D Brayshaw (2012); Dr M Valdivieso (2010-); Dr H Wellar (2011); Dr M Woodage (2009-2010); Dr K Pearson (2009-2010) Dr A Bharmal (2009); Dr J Futyan (2009)

Staff Mentoring: Till Kuhlbrodt (2016-2020); Thorwald Stein (2016-2018); David Brayshaw (2012-2017); Maria Valdivieso (2011-2013); Ali Bharmal (2009); Joanna Futyan (2009); FLAIR academic programme mentor

Visiting Positions Host: Dr Albert Osso (2020-); Dr Chunlei Liu (2019-), Prof Dame Julia Slingo (2016-2019), Prof Liz Bentley/RMetS Chief Executive (2016-2019), Mr Stephen Burt (2018-)

Academic/external: Department website/prizes/social media coordinator (2022-); Department joint head (external affairs, 2017-2019); Department outreach coordinator (2014-2019); REF Internal reviewer (2014, 2021); Interview Panels Chair, New lecturer post interview panel; School

Promotions Committee; KE Fellowship committee; RMetS Education committee member 2019; Exams Scrutiny Group chair 2016, 2021; Deputy Fire Warden

Selected Scientific Meetings

See also http://www.met.rdg.ac.uk/~sgs02rpa/talks.html

Selected Seminars:

"Global Water Cycle Changes: Chapter 8 of the IPCC WGI AR6 report" Univ. Oslo/CICERO (2021)
"Exploiting EO data for climate", EUMETSAT (2019);
"Changes in Earth's energy balance and climate" Imperial College (2015);
"Current Changes in Earth's energy and water cycles" Univ. Edinburgh 2012,
"Current changes in the water cycle" Deutscher Wetterdienst (2012), Imperial College London (2011), Univ. Sussex (2010), ETH Zurich (2010);
"Exploiting observations to seek robust responses in global precipitation", Met Office (2010)
Invited Speaker: Royal Society Climate Change, science, responses and research needs (2022); EGU, Global-scale changes in Earth's energy budget and implications for the water cycle (2021); AGU Fall Meeting, Advances in understanding large-scale responses of the water cycle to climate change (2020); Intensification of short-duration rainfall extremes and implications for flash flood risks, Chicheley Hall Workshop (2020); Royal United Services Institute for Defence and Security Studies at Cabinet Offices (2020), RMetS/NCAS National Atmospheric Science Conference keynote, York (2018); NCEO national conference, Bath (2017); Earth's Hydrological Sensitivity to Climate Change, Exeter (2016); EUMETSAT workshop on CMSAF products (2016); ECMWF workshop on Earth's Energy Budget (2016); Royal Society Hiatus Workshop (2014); Decision analysis for policy support in climate change adaptation and mitigation, CliMathNet workshop, Exeter (2014); Royal Society, Next Steps in Climate Change (2013); Gordon Conference: Radiation and Climate (2013); EGU session "Climate, Hydrology and Water Infrastructure" (2012); Earth's Hydrological Cycle, ISSI (2012), WAVACS water vapour workshop (2011), Royal Meteorological Society Conference (2009), AGU Chapman Conference on water vapour (2008), EGU conference, Surface Radiation Budget (2008); Met Office workshop: Improving Predictions of the Large-scale Hydrological Cycle (2008)

Convenor: American Meteorological Society Atmospheric Radiation Conference (2014); Royal Meteorol. Soc. Clouds & Earth's Energy Budget (2011); ISSI workshop: Earth's Energy Flows (2011); AGU Fall, Dynamic/Thermodynamic Controls on Hydrological Cycle (2008).

Publications

(>120 publications; > 13,000 citations; h-index 45, WoS Jun 2022)
See also http://www.met.rdg.ac.uk/~sgs02rpa/publications.html

Allan R.P., K.M. Willett, V.O. John & T. Trent (2022), Global changes in water vapor 1979-2020, J. Geophys. Res., 127, e2022JD036728, doi:10.1029/2022JD036728

Wainwright C.M., **R.P. Allan** & E. Black (2022), Consistent trends in dry spell length in recent observations and future projections, Geophys. Res. Lett. 49, e2021GL097231 doi:10.1029/2021GL097231

Mahmoud S.H., T.-Y. Gan, **R.P. Allan**, J. Li & C. Funk (2022) Worsening drought of Nile basin under shift in atmospheric circulation, stronger ENSO and Indian Ocean dipole. Sci Rep, 12, 8049. doi:10.1038/s41598-022-12008-8

Peña-Angulo D., S.M. Vicente-Serrano, F. Domínguez-Castro, J. Lorenzo-Lacruz, C. Murphy, J. Hannaford, **R.P. Allan,** Y. Tramblay, F. Reig-Gracia & A. El Kenawy (2022) The complex and spatially diverse patterns of hydrological droughts across Europe. Water Resources Research, 58, e2022WR031976, doi:10.1029/2022WR031976

Liu C., Y. Yang, X. Liao, N. Cao, J. Liu, N. Ou, **R.P. Allan**, L. Jin, N. Chen & R. Zheng (2022) Discrepancies in Simulated Ocean Net Surface Heat Fluxes over the North Atlantic. Adv. Atmos. Sci., in press, doi:10.1007/s00376-022-1360-7

Allan, R. P. (2021) How and why Earth's climate is changing. In: Weather - A force of nature: Spectacular images from weather photographer of the year. Natural History Museum, London, England, pp. 6-7, pp. 192. ISBN 9780565095253

IPCC, 2021: Summary for Policymakers. [**Allan, R. P**. drafting author] In: Masson-Delmotte, V., Zhai, P., Pirani, A., Connors, S. L., Péan, C., Berger, S., Caud, N., Chen, Y., Goldfarb, L., Gomis, M. I., Huang, M., Leitzell, K., Lonnoy, E., Matthews, J. B. R., Maycock, T. K., Waterfield, T., Yelekçi, O., Yu, R. and Zhou, B. (eds.) Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth

Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press. (In Press)

Arias, P. A., Bellouin, N. , Coppola, E., Jones, R. G., Krinner, G., Marotzke, J., Naik, V., Palmer, M. D., Plattner, G.-K., Rogelj, J., Rojas, M., Sillmann, J., Storelvmo, T., Thorne, P. W., Trewin, B., Rao, K. A., Adhikary, B., **Allan, R. P.** , Armour, K., Bala, G., Barimalala, R., Berger, S., Canadell, J. G., Cassou, C., Cherchi, A., Collins, W. , Collins, W. D., Connors, S. L., Corti, S., Cruz, F., Dentener, F. J., Dereczynski, C., Luca, A. D., Niang, A. D., Doblas-Reyes, F. J., Dosio, A., Douville, H., Engelbrecht, F., Eyring, V., Fischer, E., Forster, P., Fox-Kemper, B., Fuglestvedt, J. S., Fyfe, J. C., Gillett, N. P., Goldfarb, L., Gorodetskaya, I., Gutierrez, J. M., Hamdi, R., Hawkins, E. , Hewitt, H. T., Hope, P., Islam, A. S., Jones, C., Kaufman, D. S., Kopp, R. E., Kosaka, Y., Kossin, J., Krakovska, S., Lee, J.-Y., Li, J., Mauritsen, T., Maycock, T. K., Meinshausen, M., Min, S.-K., Monteiro, P. M. S., Ngo-Duc, T., Otto, F., Pinto, I., Pirani, A., Raghavan, K., Ranasinghe, R., Ruane, A. C., Ruiz, L., Sallée, J.-B., Samset, B. H., Sathyendranath, S., Seneviratne, S. I., Sörensson, A. A., Szopa, S., Takayabu, I., Tréguier, A.-M., van den Hurk, B., Vautard, R., von Schuckmann, K., Zaehle, S., Zhang, X. and Zickfeld., K. (2021) Technical summary. In: Climate Change 2021: The Physical Science Basis. Cambridge University Press. (In Press)

Douville, H., Raghavan, K., Renwick, J., **Allan, R. P.** , Arias, P. A., Barlow, M., Cerezo-Mota, R., Cherchi, A., Gan, T. Y., Gergis, J., Jiang, D., Khan, A., Mba, W. P., Rosenfeld, D., Tierney, J. and Zolina, O. (2021) Water cycle changes. In: Masson-Delmotte, V., Zhai, P., Pirani, A., Connors, S. L., Péan, C., Berger, S., Caud, N., Chen, Y., Goldfarb, L., Gomis, M. I., Huang, M., Leitzell, K., Lonno, E., Matthews, J. B. R., Maycock, T. K., Waterfield, T., Yelekçi, O., Yu, R. and Zhou, B. (eds.) Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to 45 the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press. (In Press)

Seneviratne et al. (2021) [**R.P. Allan** contributing author] Weather and Climate Extreme Events in a Changing Climate. In: Climate Change 2021: The Physical Science Basis, In Press.

Gulev et al. (2021) [**R.P. Allan** contributing author] Changing State of the Climate System. In: Climate Change 2021: The Physical Science Basis, In Press.

John, V. O., Shi, L., Chung, E.-S., **Allan, R. P.** , Buehler, S. A. and Soden, B. J. (2021) Upper tropospheric humidity [in "State of the Climate in 2020"]. In: State of the climate in 2020. American Meteorological Society, S55-S56. doi: https://doi.org/10.1175/BAMS-D-21-0098.1

Swaminathan, R., Parker, R. J., Jones, C. G., **Allan, R. P.** , Quaife, T. , Kelley, D. I., de Mora, L. and Walton, J. (2022) The physical climate at global warming thresholds as seen in the UK earth system model. Journal of Climate, 35 (1). pp. 29-48. ISSN 0894-8755 doi: https://doi.org/10.1175/JCLI-D-21-0234.1

Yeh, S.-W. , Song, S.-Y. , **Allan, R. P.** , An, S.-I. and Shin, J. (2021) Contrasting response of hydrological cycle over land and ocean to a changing CO2 pathway. npj Climate and Atmospheric Science, 4 (1). 53. ISSN 2397-3722 doi: https://doi.org/10.1038/s41612-021-00206-6

van der Schrier, G. , **Allan, R. P.** , Osso, A., Sousa, P. M. , Van de Vyver, H. , Van Schaeybroeck, B. , Coscarelli, R. , Pasqua, A. A., Petrucci, O. , Curley, M., Mietus, M. , Filipiak, J., Štěpánek, P. , Zahradníček, P., Brázdil, R., Řezníčková, L., van den Besselaar, E. J. M., Trigo, R. and Aguilar, E. (2021) The 1921 European drought: impacts, reconstruction and drivers. Climate of the Past, 17 (5). pp. 2201-2221. ISSN 1814-9332 doi: https://doi.org/10.5194/cp-17-2201-2021

Wainwright, C. M. , Black, E. and **Allan, R. P.** (2021) Future changes in wet and dry season characteristics in CMIP5 and CMIP6 simulations. Journal of Hydrometeorology, 22 (9). pp. 2339-2357. ISSN 1525-7541 doi: https://doi.org/10.1175/JHM-D-21-0017.1

Osso, A. , **Allan, R. P.** , Hawkins, E. , Shaffrey, L. and Maraun, D. (2021) Emerging new climate extremes over Europe. Climate Dynamics. ISSN 0930-7575 doi: https://doi.org/10.1007/s00382-021-05917-3

Craig, P. M. and **Allan, R. P.** (2021) The role of teleconnection patterns in the variability and trends of growing season indices across Europe. International Journal of Climatology. ISSN 0899-8418 doi: https://doi.org/10.1002/joc.7290

Watters, D., Battaglia, A. and **Allan, R. P.** (2021) The diurnal cycle of precipitation according to multiple decades of global satellite observations, three CMIP6 models, and the ECMWF reanalysis. Journal of Climate, 34 (12). pp. 5063-5080. ISSN 1520-0442 doi: https://doi.org/10.1175/JCLI-D-20-0966.1

Fowler, H. J. , Ali, H., **Allan, R. P.** , Ban, N., Barbero, R. , Berg, P., Blenkinsop, S., Cabi, N. S., Chan, S., Dale, M. , Dunn, R. J. H. , Ekström, M., Evans, J. P. , Fosser, G., Golding, B., Guerreiro, S. B., Hegerl, G. C., Kahraman, A. , Kendon, E. J. , Lenderink, G. , Lewis, E., Li, X., O'Gorman, P. A. , Orr, H. G. , Peat, K. L., Prein, A. F. , Pritchard, D., Schär, C., Sharma, A. , Stott, P. A., Villalobos-Herrera, R., Villarini, G. , Wasko, C. , Wehner, M. F. , Westra, S. and Whitford, A. (2021) Towards advancing scientific knowledge of climate change impacts on short-duration rainfall extremes. Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences, 379 (2195). ISSN 1364-503X doi: https://doi.org/10.1098/rsta.2019.0542

Fowler, H. J., Lenderink, G., Prein, A. F., Westra, S., **Allan, R.P.** , Ban, N., Barbero, R., Berg, P., Blenkinsop, S., Do, H. X., Guerreiro, S. B., Haerter, J. O., Kendon, E., Lewis, E., Schaer, C., Sharma, A., Villarini, G., Wasko, C. and Zhang, X. (2021) Anthropogenic intensification of short-duration rainfall extremes. Nature Reviews Earth & Environment, 2. pp. 107-122. ISSN 2662-138X doi: https://doi.org/10.1038/s43017-020-00128-6

Black, E., Pinnington, E., Wainwright, C. , Lahive, F., Quaife, T. , **Allan, R. P.** , Cook, P., Daymond, A., Hadley, P., McGuire, P. C., Verhoef, A. and Vidale, P. L. (2021) Cocoa plant productivity in West Africa under climate change: a modelling and experimental study. Environmental Research Letters, 16 (1). 014009. ISSN 1748-9326 doi: https://doi.org/10.1088/1748-9326/abc3f3

Liu, C. , **Allan, R. P.** , Mayer, M., Hyder, P., Desbruyères, D., Cheng, L., Xu, J., Xu, F. and Zhang, Y. (2020) Variability in the global energy budget and transports 1985–2017. Climate Dynamics, 55. pp. 3381-3396. ISSN 0930-7575 doi: https://doi.org/10.1007/s00382-020-05451-8

John, V. O., Shi, L., Chung, E.-S., **Allan, R. P.,** Buehler, S. A. and Soden, B. J. (2020) Upper tropospheric humidity. In: Blunden, J. and Arndt, D. S. (eds.) State of the Climate in 2019. Bulletin of the American Meteorological Society, 101 (8). American Meteorological Society, S45-S46. doi: https://doi.org/10.1175/2020BAMSStateoftheClimate.1

Allison, L. C. , Palmer, M. D. , **Allan, R.P.** , Hermanson, L. , Liu, C. and Smith, D. M. (2020) Observations of planetary heating since the 1980s from multiple independent datasets. Environmental Research Communications, 2 (10). p. 101001. ISSN 2515-7620 doi: https://doi.org/10.1088/2515-7620/abbb39

Menary MB, J Robson, **RP Allan**, BB Booth, C Cassou, G Gastineau, J Gregory, D Hodson, C Jones, J Mignot, MA Ringer, R Sutton, L Wilcox, R Zhang (2020), Aerosol-forced AMOC changes in CMIP6 historical simulations Geophys. Res. Lett., in press. doi: 10.1029/2020GL088166.

Liu C, X Liao, J Qiu, Y Yang, X Feng, **RP Allan**, N Cao, J Long & J Xu (2020), Observed variability of intertropical convergence zone over 1998-2018 Environ. Res. Lett., doi:10.1088/1748-9326/aba033

Allan RP, M Barlow, MP Byrne, A Cherchi, H Douville, HJ Fowler, TY Gan, AG Pendergrass, D Rosenfeld, ALS Swann, LJ Wilcox and O Zolina (2020) Advances in understanding large-scale responses of the water cycle to climate change, Annals of the New York Academy of Sciences, 1472, 49-75, doi: 10.1111/nyas.14337

Loeb N, H. Wang, **RP Allan**, T Andrews, K Armour, JNS Cole, J-L Dufresne, P Forster, A Gettelman, H Guo, T Mauritsen, Y Ming, D Paynter, C Proistosescu, MF Stuecker, U Willén, & K Wyser (2020)New Generation of Climate Models Track Recent Unprecedented Changes in Earth's Radiation Budget Observed by CERES, Geophys. Res. Lett., 47, doi: 10.1029/2019GL086705

Schwarz M, D Folini, S Yang, **RP Allan**, M Wild (2020) Changes in atmospheric shortwave absorption as important driver of dimming and brightening, *Nature Geoscience*, 13, 110-115, doi: 10.1038/s41561-019-0528-y.

Allan RP, S Blenkinsop, HJ Fowler, AJ Champion (2020) Atmospheric precursors for intense summer rainfall over the UK, Int. J. Climatology, 40, 3849-3867. doi: 10.1002/joc.6431

Allan D & **RP Allan** (2019) Seasonal changes in the North Atlantic cold anomaly: the influence of cold surface waters from coastal Greenland and warming trends associated with variations in subarctic sea ice cover, J Geophys. Res. Oceans, 124, 9040-9052, doi: 10.1029/2019JC015379

Zhan C, **RP Allan**, S Liang, D Wang & Z Song (2019), Evaluation of Five Satellite Top-of-Atmosphere Albedo Products over Land, Remote Sens. 2019, 2, 11, 2919, doi:10.3390/rs11242919

Wainwright C, JH Marsham, RJ Keane, DP Rowell, DL Finney, E Black, **RP Allan** (2019), "Eastern African Paradox" rainfall decline due to shorter not less intense Long Rains, npj Climate & Atmospheric Science, 2, 34, doi:10.1038/s41612-019-0091-7

Wainwright C, L Hirons, N. Klingaman, **RP Allan**, E Black, A Turner (2019) The impact of air-sea coupling and ocean biases on the seasonal cycle of southern West African precipitation Clim. Dyn., doi: 10.1007/s00382-019-04973-0

John, VO, L Shi, E-S Chung, **RP Allan**, SA Buehler and B. Soden (2019) Upper Tropospheric Humidity [in "State of the Climate in 2018"], Bull. Amer. Meteor. Soc., 100, doi:10.1175/2019BAMSStateoftheClimate.1

Schmidt A, M Mills, S Ghan, JM Gregory, **RP Allan**, T Andrews, CG Bardeen, A Conley, PM Forster, A Gettelman, RW Portmann, S Solomon and OB Toon (2018), Volcanic radiative forcing from 1979 to 2015, J. Geophys. Res., 123, 12491-12508, doi: 10.1029/2018JD028776

Dunning C, E Black & **RP Allan** (2018), Later wet seasons with more intense rainfall over Africa under future climate change, J. Climate, 31, 9719-9738, doi: 10.1175/JCLI-D-18-0102.1

Hill PJ, C Chiu, **RP Allan**, J-D Chern (2018), Characterizing the radiative effect of rain using a global ensemble of cloud resolving simulations, Journal of Advances Modeling Earth Systems (JAMES), 10, 2453-2470, doi: 10.1029/2018MS001415

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Hyder P, J Edwards, **RP Allan**, H Hewitt, T Bracegirdle, J Gregory, R Wood, A Meijers, J Mulcahy, P Field, K Furtado, A Bodas-Salcedo, K Williams, D Copsey, S Josey, C Liu, C Roberts, C Sanchez, J Ridley, L Thorpe, S Hardiman, M Mayer, D Berry and S Belcher (2018) Critical Southern Ocean climate model biases traced to atmospheric model cloud errors, *Nature Communications*, 9, 3625, doi: 10.1038/s41467-018-05634-2.

Allan RP, C Liu (2018) Evaluating Large-Scale Variability and Change in Tropical Rainfall and Its Extremes in Tropical Extremes: Natural Variability and Trends (Ed. V. Vuruputur, J. Sukhatme, R. Murtugudde, R. Roca) ISBN 978-0-12-809248-4.

Blenkinsop S, Fowler HJ, Barbero R, Chan SC, Guerreiro SB, Kendon E, Lenderink G, Lewis E, Li X-F, Westra S, Alexander, **Allan RP**, Berg P, Dunn RJH, Ekström M, Evans JP, Holland G, Jones R, Kjellström E, Klein-Tank A, Lettenmaier D, Mishra V, Prein AF, Sheffield J, and Tye MR (2018) The INTENSE project: using observations and models to understand the past, present and future of sub-daily rainfall extremes, Adv. Sci. Res., 15, 117-126, doi:10.5194/asr-15-117-2018

Hill, P., **R.P. Allan**, J. C.Chiu, A. Bodas-Salcedo, P. Knippertz (2018), Quantifying the contribution of different cloud types to the radiation budget in southern West Africa, J. Climate, 31, 5273-5291, doi:10.1002/2016JD025246.

Liu, C and **R.P. Allan** (2018) Unrealistic increases in wind speed explain reduced eastern Pacific heat flux in reanalyses., J. Climate, 31, 2981-2993, doi:10.1175/JCLI-D-17-0642.1

Dunning, C., **R.P. Allan** & E. Black (2017), Identification of deficiencies in seasonal rainfall simulated by CMIP5 climate models Environ. Res. Lett., **12,** 114001, doi:10.1088/1748-9326/aa869e

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