

Publications: Raymond T. Pierrehumbert

Superscript † indicates that the co-author was a student or postdoc working with Pierrehumbert at the time the paper was written. Top 20 featured publications are indicated with **

Books

- *Pierrehumbert RT 2010: *Principles of Planetary Climate*. Cambridge University Press, 652pp.
- Archer DA and Pierrehumbert RT 2010: *The Warming Papers*. Wiley/Blackwell.
- Pierrehumbert RT 2022: *Planetary systems: A very short introduction*. Oxford University Press, 160pp.

Book projects in progress

- Principles of Planetary Climate*, second edition (Cambridge University Press)
- Mathematics and Physics Explorations in Python* (Princeton University Press)

Major peer-reviewed reports

- McNutt MK, Abdalati W, Caldeira K, Doney SC, Falkowski PG, Fetter S, Fleming JR, Hamburg SP, Morgan MG, Penner JE, Pierrehumbert RT, Rasch PJ, Russell LM, Snow JT, Titley DW, Wilcox J. 2015a. Climate intervention carbon dioxide removal and reliable sequestration. National Academies Press [link](#)
- McNutt MK, Abdalati W, Caldeira K, Doney SC, Falkowski PG, Fetter S, Fleming JR, Hamburg SP, Morgan MG, Penner JE, Pierrehumbert RT, Rasch PJ, Russell LM, Snow JT, Titley DW, Wilcox J. 2015b. Climate intervention: Reflecting sunlight to cool earth. National Academies Press [link](#)
- Solomon S, Battisti D, Doney S, Hayhoe K, Held I, Lettenmaier D, Lobell D, Matthews D, Pierrehumbert RT, Raphael M, Richels R, Root T, Steffen K, Tebaldi C and Yohe G 2010. *Climate Stabilization Targets: Emissions, Concentrations and Impacts over Decades to Millennia*. National Academy Press:Washington 190pp. [link](#)
- Alley RB, Marotzke J, Nordhaus W, Overpeck J, Peteet D, Pielke R, Pierrehumbert RT, Rhines P, Stocker T, Talley L and Wallace JM 2002: *Abrupt Climate Change: Inevitable Surprises* National Academy Press,244pp. [link](#)
- Stocker TF,Clarke GKC,Le Treut H,Lindzen RS,Meleshko VP,Mugara RK,Palmer TN,Pierrehumbert RT,Sellers PJ,Trenberth KE, and Willebrand J 2001. Physical Climate Processes and Feedbacks, Ch. 7 in *The Physics of Climate Change: IPCC WG1 Third Assessment Report*, Cambridge University Press. [link](#)

PhD Thesis

- Pierrehumbert RT 1980: *The Structure and Stability of Large Vortices in an Inviscid Flow*. Ph.D. Thesis, Massachusetts Institute of Technology.

Journal articles and peer-reviewed book chapters

2020-2024

- Pierrehumbert R. 2022a. Plant power: Burning biomass instead of coal can help fight climate change, but only if done right. *Bulletin of the Atomic Scientists* 78:125–127
- Tsai SM, Lee EK, Pierrehumbert R. 2022. A mini-chemical scheme with net reactions for 3d gcms i.: Thermochemical kinetics. *arXiv preprint arXiv:2204.04201*
- Tsai SM, Innes H, Lichtenberg T, Taylor J, Malik M, Chubb K, Pierrehumbert R. 2021. Inferring shallow surfaces on sub-neptune exoplanets with jwst. *The Astrophysical Journal Letters* 922:L27
- Zieba S, Zilinskas M, Kreidberg L, Nguyen T, Miguel Y, Cowan N, Pierrehumbert R, Carone L, Dang L, Hammond M, et al. 2022. K2 and spitzer phase curves of the rocky ultra-short-period planet k2-141 b hint at a tenuous rock vapor atmosphere. *arXiv preprint arXiv:2203.00370*
- Lefèvre M, Tan X, Lee EK, Pierrehumbert R. 2022. Cloud-convection feedback in brown dwarf atmospheres. *The Astrophysical Journal* 929:153

- Pierrehumbert RT. 2022b. Fluid mechanics: the quintessential complex system. *Journal of Fluid Mechanics* 938
- Graham[†] R, Lichtenberg T, Boukrouche R, Pierrehumbert RT. 2021. A multispecies pseudoadiabat for simulating condensable-rich exoplanet atmospheres. *The Planetary Science Journal* 2:207
- Tan[†] X, Lefèvre[†] M, Pierrehumbert RT. 2021. Convection modeling of pure-steam atmospheres. *The Astrophysical Journal Letters* 923:L15
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- Innes[†] H, Pierrehumbert RT. 2022. Atmospheric dynamics of temperate sub-neptunes. i. dry dynamics. *The Astrophysical Journal* 927:38
- Allen MR, Peters GP, Shine KP, Azar C, Balcombe P, Boucher O, Cain M, Caias P, Collins W, Forster PM, et al. 2022. Indicate separate contributions of long-lived and short-lived greenhouse gases in emission targets. *npj Climate and Atmospheric Science* 5:1–4
- Boukrouche[†] R, Lichtenberg[†] T, Pierrehumbert RT. 2021. Beyond runaway: initiation of the post-runaway greenhouse state on rocky exoplanets. *The Astrophysical Journal* 919:130
- Lee EK, Parmentier V, Hammond M, Grimm SL, Kitzmann D, Tan[†] X, Tsai[†] SM, Pierrehumbert RT. 2021. Simulating gas giant exoplanet atmospheres with exo-fms: comparing semigrey, picket fence, and correlated-k radiative-transfer schemes. *Monthly Notices of the Royal Astronomical Society* 506:2695–2711
- Lefèvre[†] M, Turbet M, Pierrehumbert R. 2021. 3d convection-resolving model of temperate, tidally locked exoplanets. *The Astrophysical Journal* 913:101
- Baxter C, Désert JM, Tsai[†] SM, Todorov KO, Bean JL, Deming D, Parmentier V, Fortney JJ, Line M, Thorngren D, et al. 2021. Evidence for disequilibrium chemistry from vertical mixing in hot jupiter atmospheres-a comprehensive survey of transiting close-in gas giant exoplanets with warm-spitzer/irac. *Astronomy & Astrophysics* 648:A127
- Lynch[†] J, Cain M, Frame D, Pierrehumbert R. 2021. Agriculture's contribution to climate change and role in mitigation is distinct from predominantly fossil co2-emitting sectors. *Frontiers in sustainable food systems* 4:300
- Lichtenberg[†] T, Bower DJ, Hammond[†] M, Boukrouche[†] R, Sanan P, Tsai[†] SM, Pierrehumbert RT. 2021. Vertically resolved magma ocean–protoatmosphere evolution: H₂, h₂O, CO₂, CH₄, CO, O₂, and N₂ as primary absorbers. *Journal of Geophysical Research: Planets* 126:e2020JE006711
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