

Julien Emile-Geay

Professor

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EDUCATION

- 2001–2006 **Graduate School of Arts and Sciences, Columbia University, New York**
2006: Ph.D. in Climate Dynamics.
Dissertation: ENSO dynamics and the Earth's climate : from decades to Ice Ages.
advisors: Prof. Mark Cane, Dr. Richard Seager, Prof. Peter DeMenocal.
2003: M.Phil. in Climate Dynamics.
- 2000–2001 **Université Paris VI, France / Ecole Normale Supérieure**
M.S. in Ocean and Atmosphere Dynamics, with distinction.
- 1998–2000 **Ecole Normale Supérieure, Paris, France**
B.S. in Earth Sciences, with honors

PROFESSIONAL APPOINTMENTS

- 2022–now **Professor of Earth Sciences**, University of Southern California
2016–2022 **Associate Professor of Earth Sciences**, University of Southern California
2008–2016 **Assistant Professor of Earth Sciences**, University of Southern California
2006–2008 **Postdoctoral Fellow**, Georgia Institute of Technology
2001–2006 **Graduate Research & Teaching assistant**, Columbia University

RESEARCH INTERESTS

ocean-atmosphere dynamics; low-frequency climate variability
forward and inverse modeling of climate proxies
low order climate models, paleoclimate modeling
climate informatics, model/data fusion.

PROFESSIONAL AFFILIATIONS

American Geophysical Union
Center for Applied Mathematical Sciences (USC)

RESEARCH SUPERVISION

Postdoctoral Scholars

- Deborah Khider** (PhD USC, Earth Sciences), principal supervisor, 2016 – 2018. Now a Research Lead at USC's Information Sciences Institute. Awards: EarthCube Distinguished Lecturer.
- Michael Erb** (PhD Rutgers, Climate Dynamics), principal supervisor, 2016 – 2017.
Now assistant research professor at Northern Arizona University.
- Jonathan Lawhead** (PhD Columbia, Philosophy), jointly supervised with Ralph Wedgwood, 2014 – 2016.
Now faculty at University of Nevada in Reno. Awards: USC Sustainability postdoctoral fellowship.
- Maud Comboul** (PhD USC, Civil Engineering), principal supervisor, 2012 – 2015.
Machine Learning Engineer in Bend, OR.
Awards: Climate Informatics Travel Grant 2013.
- Nasim Mirnateghi** (PhD UCSB, Electrical Engineering), principal supervisor, 2011– 2012
- Dominique Guillot** (PhD U. Laval (Quebec), Pure Mathematics), principal supervisor, 2010– 2012

now associate professor at the University of Delaware (Mathematical Sciences)

Ph. D. students

Jordan Landers, 2022 – present.

Alexander James, 2020 – present.

Feng Zhu, 2016 – 2021.

Thesis: *Seeing the Future through the Lens of the Past: Fusing Paleoclimate Observations and Models*

current position: Assistant Professor, Nanjing University of Information Science and Technology.

Jun Hu, 2014 – 2019.

Thesis: *Flowstone Ideograms: Deciphering the Climate Messages of Asian Speleothems*

current position: Associate Professor, Xiamen University

Sylvia Dee, principal supervisor, 2010 – 2015.

Thesis: *A multi-model framework for high-resolution paleoclimatology: tracking signals from climate to proxy systems via water isotope systematics*

current position: Assistant Professor, Rice University

External travel awards obtained while at USC:

PAGES Workshop: Holocene Climate as Context for Future Climate Change. Oct 2014

ThinkSwiss Fellowship for NCCR Climate Summer School, Grindelwald, Switzerland, Sep 2013

Jianghao Wang, principal supervisor, 2010 – 2015.

Thesis: *Taking the temperature of the Common Era: statistics, patterns and dynamical insights.*

current position: *Data Scientist at the Mathworks, Inc.*

External travel awards obtained while at USC:

PAGES Travel fellowship for the 4th OSM and 2nd YSM, 2013

NCAR Travel fellowship for the 12th International Meeting of Statistical Climatology, 2013

PAGES Travel fellowship for Advances in Climate Field Reconstruction Workshop, 2014

CAS Travel fellowship for the 3rd Asia 2k Workshop, 2014

NSF Travel fellowship for the 4th International Workshop on Climate Informatics, 2014

Thesis committees

Max Berkelhammer (2010), Pat Horan (2009), Deborah Khider (2009-2011),

Mengfang Zhu (2009-2012), Michael Cheetham (2009-2012), Haoran Meng (2017).

Kate Vavra-Musser (Spatial Sciences, 2020 –2022)

Undergraduate students

Senior Theses

Shreya Agrawal, 2022-2023 *Model-data fusion for neopaleoclimatology*

Zeynep Karaibrahim, 2022 *Abrupt Change Detection in the Presence of Noise*

Tiffany Tsai, 2011 *Development of a tropical coral database for paleoclimate reconstruction*

now a MS student at the Miami University of Ohio (Mathematics)

Jill Hardy (Spring 2011 senior thesis), *Beyond the Hockey Stick: new approaches to paleoclimate reconstruction*; now a Research Meteorologist with the National Weather Service

Directed research: **Shengyu Wang**, (2018–2019); **Adam Vaccaro**, (2013–2015); **Yuxin Zhou** (2013–2014);

Aubree Yeiser (Fall 2012); **Paige Green** (summer 2009)

REFEREED PUBLICATIONS

Legend: Undergraduate student^u, Graduate student^g, Postdoc[†], Senior colleague, Corresponding Author[□]

In preparation

58 **Emile-Geay, J.** & Viens, F.: The Echo Hypothesis: statement, testing, and climate implications.
Phil. Trans. Royal Soc. A, in prep.

- 57 Zhu, F.[®], **J. Emile-Geay**, Hakim, G.J., Guillot, D., Tardif, R., Perkins, A.: CFR: a Python package for the reconstruction of climate fields, *Geosci. Model. Dev.*, in prep.
- 56 **Emile-Geay, J.**, Hakim, G. J., Zhu, F.[®], Amrhein, D., & F. Viens, Using offline data assimilation to diagnose spatiotemporal paleoclimate variability, *Geophys. Res. Lett.*, in prep.
- 55 Zhu, F.[®], **J. Emile-Geay** K. J. Anchukaitis, G. J. Hakim, S. Stevenson, A pseudoproxy emulation of the PAGES 2k database using a hierarchy of proxy system models, *Scientific Data*, in prep.
- 54 Yang, W., E. Wallace, G. Vecchi, T. Delworth, J. Donnelly, **J. Emile-Geay**, G. Hakim, L. Horowitz, R. Sullivan, R. Tardif, P. van Hengstum, T. Winkler, Atlantic Hurricane Fluctuations over the Last Millennium Linked to Endogenous Climate Variability, *Nature Climate Change*, in prep.
- 53 Hu, J.[®], **J. Emile-Geay**[□], B. Goswami, N. McKay, Y. Ait Brahim, J. Partin, A. James[®], S. Stevenson, (in prep) Asian speleothems only weakly constrain the 4.2 ka event, *Science Advances*

Published and in press

- 52 Khider, D., **J. Emile-Geay**, F., Zhu[®], A.K. James[®], J.P. Landers[®] (2022), Pyleoclim: Paleoclimate Timeseries Analysis and Visualization with Python, *Paleoceanography and Paleoclimatology*, 37, e2022PA004509, doi:10.1029/2022PA004509
- 51 Manety, S., D. Khider, C. Heiser, N. McKay, **J. Emile-Geay**, and C. Routson (2022), Paleorec: A sequential recommender system for the annotation of paleoclimate datasets, *Environmental Data Science*, 1, e4, doi:10.1017/eds.2022.3.
- 50 Zhu, F.[®], **J. Emile-Geay** K. J. Anchukaitis, G. J. Hakim, A.T. Wittenberg, M. Morales and J. M. King, A re-appraisal of the ENSO response to volcanism with paleoclimate data assimilation, *Nature Comm.*, 13(1), 747, doi:10.1038/s41467-022-28210-1.
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- 49 Feng, X., Q. Ding, L. Wu, C. Jones, I. Baxter, R. Tardif, S. Stevenson, **J. Emile-Geay**, J. Mitchell, L. M. V. Carvalho, H. Wang, and E. J. Steig (2021), A multidecadal-scale tropically driven global teleconnection over the past millennium and its recent strengthening, *J. Climate*, 34(7), 2549–2565, doi:10.1175/JCLI-D-20-0216.1.
- 48 Power, S., M. Lengaigne, A. Capotondi, M. Khodri, J. Vialard, B. Jebri, E. Guilyardi, S. McGregor, J.-S. Kug, M. Newman, M. J. McPhaden, G. Meehl, D. Smith, J. Cole, **J. Emile-Geay**, D. Vimont, A. T. Wittenberg, M. Collins, G.-I. Kim, W. Cai, Y. Okumura, C. Chung, K. M. Cobb, F. Delage, Y. Y. Planton, A. Levine, F. Zhu, J. Sprintall, E. D. Lorenzo, X. Zhang, J.-J. Luo, X. Lin, M. Balmaseda, G. Wang, and B. J. Henley (2021), Decadal climate variability in the tropical pacific: Characteristics, causes, predictability, and prospects, *Science*, 374(6563), eaay9165, doi:10.1126/science.aay9165.
- 47 King, J. M., K. J. Anchukaitis, J. E. Tierney, G. J. Hakim, **J. Emile-Geay**, F. Zhu[®], and R. Wilson (2021): A data assimilation approach to last millennium temperature field reconstruction using a limited high-sensitivity proxy network. *J. Climate*, doi:10.1175/JCLI-D-20-0661.1
- 46 McKay, N. P.[□], **J. Emile-Geay** and D. Khider (2021), GeoChronR – an R package to model, analyze and visualize age-uncertain paleoscientific data, *Geochronology*, doi:10.5194/gchron-2020-25.
- 45 Vaccaro, A.[♣], **J. Emile-Geay**[□], D. Guillot, R. Verna[♣], C. Morice, J. Kennedy, & B. Rajaratnam, Climate field completion via Markov random fields – Application to HadCRUT4.6 (2021), *J. Climate*, doi:10.1175/JCLI-D-19-0814.1

- 44 Dee, S. G.[®], K. M. Cobb, J. Emile-Geay, T. R. Ault, R. L. Edwards, H. Cheng, and C. D. Charles (2020) Response to Comment on "No consistent ENSO response to volcanic forcing over the last millennium", *Science*, 369(6509), eabc1733, doi:10.1126/science.abc1733.
- 43 Brierley, C. M., Zhao, A., Harrison, S. P., Braconnot, P., Williams, C. J. R., Thornalley, D. J. R., Shi, X., Peterschmitt, J.-Y., Ohgaito, R., Kaufman, D. S., Kageyama, M., Hargreaves, J. C., Erb, M. P., J. Emile-Geay, D'Agostino, R., Chandan, D., Carré, M., Bartlein, P. J., Zheng, W., Zhang, Z., Zhang, Q., Yang, H., Volodin, E. M., Tomas, R. A., Routson, C., Peltier, W. R., Otto-Bliesner, B., Morozova, P. A., McKay, N. P., Lohmann, G., Legrande, A. N., Guo, C., Cao, J., Brady, E., Annan, J. D., and Abe-Ouchi, A.: Large-scale features and evaluation of the PMIP4-CMIP6 midHolocene simulations, *Clim. Past*, 16, 1847-1872, doi:10.5194/cp-16-1847-2020, 2020.
- 42 Erb, M. P.^{‡□}, J. Emile-Geay, G. J. Hakim, N. Steiger, and E. J. Steig, Atmospheric dynamics drive most interannual U.S. droughts over the last millennium, *Science Advances*, 6(32), eaay7268, doi:10.1126/sciadv.aay7268.
- 41 Kaufman, D., N. McKay, C. Routson, M. Erb, B. Davis, O. Heiri, S. Jaccard, J. Tierney, C. Dätwyler, Y. Axford, T. Brussel, O. Cartapanis, B. Chase, A. Dawson, A. de Vernal, S. Engels, L. Jonkers, J. Marsicek, P. Moffa-Sanchez, C. Morrill, A. Orsi, K. Rehfeld, K. Saunders, P. S. Sommer, E. Thomas, M. Tonello, M. Toth, R. Vachula, A. Andreev, S. Bertrand, B. Biskaborn, M. Bringue, S. Brooks, M. Caniupan, M. Chevalier, L. Cwynar, J. Emile-Geay, J. Fegyveresi, A. Feurdean, W. Finsinger, M.-C. Fortin, L. Foster, M. Fox, K. Gajewski, M. Grosjean, S. Hausmann, M. Heinrichs, N. Holmes, B. Ilyashuk, E. Ilyashuk, S. Juggins, D. Khider, K. Koinig, P. Langdon, I. Larocque-Tobler, J. Li, A. Lotter, T. Luoto, A. Mackay, E. Magyari, S. Malevich, B. Mark, J. Massaferrero, V. Montade, L. Nazarova, E. Novenko, P. Paril, E. Pearson, M. Peros, R. Pienitz, M. Plociennik, D. Porinchu, A. Potito, A. Rees, S. Reinemann, S. Roberts, N. Rolland, S. Salonen, A. Self, H. Seppä, S. Shala, J.-M. St-Jacques, B. Stenni, L. Syrykh, P. Tarrats, K. Taylor, V. van den Bos, G. Velle, E. Wahl, I. Walker, J. Wilmshurst, E. Zhang, and S. Zhilich (2020), A global database of Holocene paleotemperature records, *Scientific Data*, 7(1), 115, doi:10.1038/s41597-020-0445-3.
- 40 Dee, S. G.[®], K. M. Cobb, J. Emile-Geay, T. R. Ault, R. L. Edwards, H. Cheng, and C. D. Charles (2020), No consistent ENSO response to volcanic forcing over the last millennium, *Science*, 367(6485), 1477, doi:10.1126/science.aax2000.
- 39 Zhu, F.[®], J. Emile-Geay[□], Hakim, G.J., King, J. and Anchukaitis, K. (2020), Resolving the differences in the simulated and reconstructed climate response to volcanism over the last millennium, *Geophys. Res. Lett.*, e2019GL086908, 2020.
- 38 Emile-Geay, J.[□], Cobb, K. M., Cole, J. E. and Eliot, M. (2020), Past ENSO variability: reconstructions, models, and implications, in *"El Niño Southern Oscillation in a Changing Climate"*, AGU monograph, (eds: M. McPhaden, A. Santoso, and W. Cai), doi: 10.1002/9781119548164.ch5.
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- 2019
- 37 Hu, J.^{®□}, J. Emile-Geay, Tabor, C., Nussbaumer, J. and Partin, J. (2019), Deciphering Chinese speleothem $\delta^{18}\text{O}$ with an isotope-enabled climate model, *Paleoceanography and Paleoclimatology*, 34(12), 2098–2112, doi: 10.1029/2019PA003741. [press highlight](#)
- 36 Khider, D.^{‡□}, J. Emile-Geay, N. P. McKay, Y. Gil, D. Garijo, V. Ratnakar, M. Alonso-Garcia, S. Bertrand, O. Bothe, P. Brewer, A. Bunn, M. Chevalier, L. Comas-Bru, A. Csank, E. Dassie, K. DeLong, T. Felis, P. Francus, A. Frappier, W. Gray, S. Goring, L. Jonkers, M. Kahle, D. Kaufman, N. M. Kehrwald, B. Martrat, H. McGregor, J. Richey, A. Schmittner, N. Scroton, E. Sutherland, K. Thirumalai, K. Allen, F. Arnaud, Y. Axford, T. T. Barrows, L. Bazin, S. P. Birch, E. Bradley, J. Bregy, E. Capron, O. Cartapanis, H.-W. Chiang, K. M. Cobb, M. Debret, R. Dommain, J. Du, K. Dyez, S. Emerick, M. P. Erb, G. Falster, W. Finsinger, D. Fortier, N. Gauthier, S. George, E. Grimm, J. Hertzberg, F. Hibbert, A. Hillman, W. Hobbs, M. Huber, A. Hughes, S. Jaccard, J. Ruan, M. Kienast, B. Konecky, G. L. Roux, V. Lyubchich, V. Novello, L. Olaka, J. Partin, C. Pearce, S. Phipps, C. Pignol, N. Piotrowska, M.-S. Poli, A. Prokopenko, F. Schwanck, C. Stepanek, G. E. A. Swann, R. Telford, E. Thomas, Z. Thomas, S. Truebe, L. von Gunten, A. Waite, N. Weitzel, B. Wilhelm, J. Williams, J. Williams, M. Winstrup, N. Zhao, and Y. Zhou (2019), PaCTS v1.0: A Crowdsourced Reporting Standard for Paleoclimate Data, *Paleoceanography and Paleoclimatology*, doi:10.1029/2019PA003632.

- 35 Neukom, R.[□], L. A. Barboza, M. P. Erb[‡], F. Shi, **J. Emile-Geay**, M. N. Evans, J. Franke, D. Kaufman, L. Lücke, K. Rehfeld, A. Schurer, V. Valler, F. Zhu[®], S. Brönnimann, G. J. Hakim, B. J. Henley, F. C. Ljungqvist, N. McKay, L. von Gunten (2019), Consistent multi-decadal variability in global temperature reconstructions and simulations over the Common Era, *Nature Geoscience*, 12(8), 643-649, doi:10.1038/s41561-019-0400-0.
- 34 Barboza, L.[□], **J. Emile-Geay**, Li, B. and He, W. (2019), Efficient reconstructions of Common Era climate via integrated nested Laplace approximations, *J. Agr. Biol. & Env. Stat.*, doi:10.1007/s13253-019-00372-4
- 33 Tardif, R., G. J. Hakim, W. A. Perkins, K. A. Horlick, M. P. Erb, **J. Emile-Geay**, D. M. Anderson, E. J. Steig, and D. Noone (2019), Last millennium reanalysis with an expanded proxy database and seasonal proxy modeling, *Clim. Past*, 15(4), 1251–1273, doi:10.5194/cp-15-1251-2019.
- 32 Zhu, F.[®], **J. Emile-Geay**[□], T. R. Ault, N. P. McKay, G. Hakim, D. Khider, E. J. Steig, S. G. Dee, and J. W. Kirchner (2019), Climate models can correctly simulate the continuum of global-average temperature variability, *Proc. Nat. Acad. Sci.*, 116(18), 8728, doi:10.1073/pnas.1809959116
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- 31 Hu, J.^{®□}, **J. Emile-Geay**, J. Nussbaumer, and D. Noone (2018), Impact of convective activity on precipitation $\delta^{18}\text{O}$ in isotope-enabled general circulation models, *J. Geophys. Research (Atmospheres)*, 123, 13,595–13,610. doi: 10.1029/2018JD029187.
- 30 Fischer, H., K. J. Meissner, A. C. Mix, N. J. Abram, J. Austermann, V. Brovkin, E. Capron, D. Colombaroli, A.-L. Daniau, K. A. Dyez, T. Felis, S. A. Finkelstein, S. L. Jaccard, E. L. McClymont, A. Rovere, J. Sutter, E. W. Wolff, S. Affolter, P. Bakker, J. A. Ballesteros-Canovas, C. Barbante, T. Caley, A. E. Carlson, O. Churakova (Sidorova), G. Cortese, B. F. Cumming, B. A. S. Davis, A. de Vernal, **J. Emile-Geay**, S. C. Fritz, P. Gierz, J. Gottschalk, M. D. Holloway, F. Joos, M. Kucera, M.-F. Loutre, D. J. Lunt, K. Marcisz, J. R. Marlon, P. Martinez, V. Masson-Delmotte, C. Nehrbass-Ahles, B. L. Otto-Bliesner, C. C. Raible, B. Risebrobakken, M. F. Sanchez-Goni, J. S. Arrigo, M. Sarnthein, J. Sjolte, T. F. Stocker, P. A. Velasquez Alvarez, W. Tinner, P. J. Valdes, H. Vogel, H. Wanner, Q. Yan, Z. Yu, M. Ziegler, and L. Zhou (2018), Palaeoclimate constraints on the impact of 2°C anthropogenic warming and beyond, *Nature Geoscience*, doi:10.1038/s41561-018-0146-0.
- 29 Singh, H. K. A.[□], G. J. Hakim, R. Tardif, **J. Emile-Geay**, and D. C. Noone (2018), Atlantic multidecadal variability from the last millennium reanalysis, *Climate of the Past*, 1–25, doi:10.5194/cp-2017-49.
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- 28 Dee, S. G.[®], L. Parsons, G. Loope, T. R. Ault, J. T. Overpeck, and **J. Emile-Geay**, Improved spectral comparisons of paleoclimate models and observations via proxy system modeling: implications for multi-decadal variability, *Earth Planet. Sci. Lett.*, 476 (Supplement C), 34–46, doi:10.1016/j.epsl.2017.07.036
- 27 PAGES 2k Consortium (**Emile-Geay, J.**[□], McKay, N., Kaufman, D., von Gunten, L., Wang, J.[®], Anchukaitis, K., Abram, N., Addison, J., Curran, M., Evans, M., Henley, B., Hao, Z., Martrat, B., McGregor, H., Neukom, R., Pederson, G., Stenni, B., Thirumalai, K., Werner, J., Xu, C., Divine, D., Dixon, B., Gergis, J., Mundo, I., Nakatsuka, T., Phipps, S., Routson, C., Steig, E., Tierney, J., Tyler, J., Allen, K., Bertler, N., Björklund, Chase, B., Chen, M., Cook, E., de Jong, R., DeLong, K., Dixon, D., Ekaykin, A., Ersek, V., Filipsson, H., Francus, P., Freund, M., Frezzotti, M., Gaire, N., Gajewski, K., Ge, Q., Goosse, H., Gornostaeva, A., Grosjean, M., Horiuchi, K., Hormes, A., Husum, K., Isaksson, E., Kandasamy, S., Kawamura, K., Kilbourne, K., Koc, N., Leduc, G., Linderholm, H., Lorrey, A., Mikhalenko, V., Mortyn, G., Motoyama, H., Moy, A., Mulvaney, R., Munz, P., Nash, D., Oerter, H., Opel, T., Orsi, A., Ovchinnikov, D., Porter, T., Roop, H., Saenger, C., Sano, M., Sauchyn, D., Saunders, K., Seidenkrantz, M., Severi, M., Shao, X., Sicre, M., Sigl, M., Sinclair, K., St. George, S., St. Jacques, J., Thamban, M., Thapa, U., Thomas, E., Turney, C., Uemura, R., Viau, A., Vladimirova, D., Wahl, E., White, J., Yu, Z., Zinke, J.), 2017: A global multiproxy database for temperature reconstructions of the Common Era, *Scientific Data*, 4, 170,088 EP, doi:10.1038/sdata.2017.88.
- 26 Gil, Y., D. Garijo, V. Ratnakar, D. Khider, **J. Emile-Geay**, and N. McKay (2017), A controlled crowdsourcing approach for practical ontology extensions and metadata annotations, in *The Semantic Web – ISWC 2017*, edited by C. d'Amato,

M. Fernandez, V. Tamma, F. Lecue, P. Cudre-Mauroux, J. Sequeda, C. Lange, and J. Heflin, pp. 231–246, Springer International Publishing, Cham, doi:10.1007/978-3-319-68204-4 24.

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- 2016
- 24 Dee, S.G.^{⊗□}, Steiger, N.J., **J. Emile-Geay**, and Hakim, G.J. (2016): On the utility of proxy system modeling in estimating climate states over the Common Era, *Journal of Advances in Modeling Earth Systems*, 8, doi:10.1002/2016MS000677.
- 23 Hakim, G.J.[□] **J. Emile-Geay**, Steig, E.J., Noone, D.C., Anderson, D.M., Tardif, R., Steiger, N.J. and Perkins, W.A. (2016): The Last Millennium Climate Reanalysis Project: Framework and First Results, *J. Geophys. Res. (Atmos.)*, 121, 6745–6764, doi:10.1002/2016JD024751.
- 22 Chen, S., Hoffmann, S., Lund, D.C., Cobb, K.M., **J. Emile-Geay**, and Adkins, J.F. (2016): A High-resolution Speleothem Record of Western Equatorial Pacific Rainfall: Implications for Holocene ENSO Evolution *Earth Planet. Sci. Lett.*, 442, 61–71, doi:10.1016/j.epsl.2016.02.050.
- 21 McKay, N.P.[□] and **J. Emile-Geay**, (2016): Technical Note: The Linked Paleo Data framework a common tongue for paleoclimatology, *Clim. Past*, 12, 1093–1100, 10.5194/cp-12-1093-2016
- 20 **Emile-Geay, J.**[□], Tingley, M.P. (2016): Inferring climate variability from nonlinear proxies. Application to paleo-ENSO studies, *Clim. Past*, 12, 31-50, doi:10.5194/cp-12-31-2016.
- 19 **Emile-Geay, J.**[□], K.M. Cobb, M. Carré, P. Braconnot, J. Leloup, Y. Zhou[⊙], S. P. Harrison, T. Corrège, M. Collins, R. Driscoll[⊗], M. Elliot, H. McGregor, B. Schneider, A. Tudhope, (2016) Links between tropical Pacific seasonal, interannual, and orbital variability during the Holocene, *Nature Geoscience*, doi:10.1038/ngeo2608.
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- 16 Comboul, M.^{‡□}, **J. Emile-Geay**, Hakim, G.J., Evans, M. N. (2015) Paleoclimate Sampling as a Sensor Placement Problem, *J. Climate*, 28, 7717–7740, doi:10.1175/JCLI-D-14-00802.1
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- 14 Guillot, D.^{‡□}, Rajaratnam, B., **J. Emile-Geay**, (2015) Statistical paleoclimate reconstructions using Markov random fields, *Ann. Applied. Statist.*, 9 (1), 324–352. doi:10.1214/14-AOAS794
- 13 Dee, S.G.^{⊗□}, Noone, D., Buening, N.[‡], **J. Emile-Geay**, and Zhou, Y.[⊙] (2015): SPEEDY-IER: A Fast Atmospheric GCM with Water Isotope Physics, *J. Geophys. Res. Atmos.*, 120, 73–91, doi:10.1002/2014JD022194
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- 2014
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to annually-banded coral archives, *Clim. Past*, 10:2, 825–841, doi:10.5194/cp-10-825-2014

- 11 Wang, J.[⊠], **J. Emile-Geay**, Guillot, D.[‡], Smerdon, J., Rajaratnam, B. (2014): Evaluating climate field reconstruction techniques using improved emulations of real-world conditions, *Clim. Past.*, 10, 1–19, doi:10.5194/cp-10-1-2014

2013

- 10 Partin, J.W.[‡], T.M. Quinn, C-C Shen, **J. Emile-Geay**, F.W. Taylor, C.R. Maupin[⊠], K. Lin, C.S. Jackson, J.L. Banner, D.J. Sinclair, and C.-A. Huh (2013): Multidecadal rainfall variability in the South Pacific Convergence Zone as revealed by stalagmite geochemistry, *Geology*, doi:10.1130/G34718.1

- 9 Ault, T.[‡], Deser, C., Newman, M. and **J. Emile-Geay** (2013): Characterizing decadal to centennial variability in the equatorial Pacific during the last millennium, *Geophys. Res. Lett.*, doi:10.1002/grl.50647

- 8 **Emile-Geay, J.**[⊠], Eshleman, J. (2013): Towards a Semantic Web for Paleoclimatology *Geophys. Geochem. Geosys.*, 14(2):457–469, doi:10.1002/ggge.20067.

- 7 **J. Emile-Geay**[⊠], Cobb, K.M., Mann, M.E., and Wittenberg, A. T. (2013): Estimating Tropical Pacific SST variability over the Past Millennium. Part 1: Methodology and Validation. *J. Clim.*, 26, 2302–2328, doi:10.1175/JCLI-D-11-00510.1

- 6 **J. Emile-Geay**[⊠], Cobb, K.M., Mann, M.E, and Wittenberg, A. T. (2013): Estimating Tropical Pacific SST variability over the Past Millennium. Part 2: Reconstruction and Uncertainties. *J. Clim.*, 26, 2329–2352, doi:10.1175/JCLI-D-11-00511.1 (ISI Highly Cited paper)

2011

- 5 Khider[⊠], D., L. D. Stott, **J. Emile-Geay**, R. Thunell and D. Hammond (2011): Assessing El Niño Southern Oscillation Variability During the Past Millennium, *Paleoceanography*, doi:10.1029/2011PA002139

- 4 Thompson, D. M.[⊠], Ault, T. R., Evans, M. N., Cole, J. E., and **J. Emile-Geay** (2011): Comparison of observed and simulated tropical climate trends using a forward model of coral $\delta^{18}\text{O}$, *Geophys. Res. Lett.*, 38, L14706, doi:10.1029/2011GL048224

2010

- 3 Dutay, J.C.[⊠], **J. Emile-Geay**, D. Iudicone, P. Jean-Baptiste, G. Madec and C. Carouge (2010): Helium Isotopic Constraints on simulated ocean circulations. Implications for Abyssal Theories, *Environmental Fluid Mechanics*, 10(1), 257–273, 10.1007/s10652-009-9159-y

2009

- 2 **Emile-Geay, J.**[⊠] and G. Madec (2009): Geothermal Heating, Diapycnal Mixing and the Abyssal Circulation *Ocean Science*, 5, 203–217, doi:10.5194/os-5-203-2009

- 1 **Emile-Geay, J.**[⊠] and M. A. Cane (2009): Pacific Decadal Variability in the view of linear equatorial wave theory *Journal of Physical Oceanography*, 39:203–218, doi: 10.1175/2008JPO3794.1

..... Publications prior to USC start date

- 0 **Emile-Geay, J.**[⊠], R. Seager, M. A. Cane, E.C. Cook, G.H. Haug (2008): Volcanoes and ENSO over the past millennium, *Journal of Climate*. 21(13), 3134–3148, doi:10.1175/2007JCLI1884.1

- 1 **Emile-Geay, J.**[⊠], Cane, M. A., Seager, R. S., Kaplan, A. and P. Almasi (2007): El Niño as a mediator of the solar influence on climate, *Paleoceanography*, 22, 3, doi:10.1029/2006PA001304

- 2 Herweijer, C.[⊠], R. Seager, E.R. Cook and **J. Emile-Geay** (2007): North American droughts of the

last Millennium from a gridded network of tree-ring data , *Journal of Climate*, 20, 1353-1376

- 3 **Emile-Geay, J.**[□], M. A. Cane, N. Naik, R. Seager, A. C. Clement and A. van Geen (2003): Warren revisited: Atmospheric freshwater fluxes and "Why is no deep water formed in the North Pacific ?", *Journal of Geophysical Research-Oceans*, 108(C6):3178. doi:10.1029/2001JC001058

OTHER PUBLICATIONS

Articles

- O8 McKay, N. P., and **J. Emile-Geay**(2018), Linked paleo data: A resource for open, reproducible, and efficient paleoclimatology, *Past Global Change Magazine*, 26(2), 71–71, doi:10.22498/pages.26.2.71.
- O7 **Emile-Geay, J.**, D. Khider[‡], N. McKay, Y. Gil, D. Garijo, and V. Ratnakar (2018), LinkedEarth: supporting paleoclimate data standards and crowd curation, *Past Global Change Magazine*, 26(2), 62–63, doi:10.22498/pages.26.2.62.
- O6 **Emile-Geay, J.**, Erb, M. P.[‡], Hakim, G., Steig, E. J. and Noone, D.C. (2017): Climate dynamics with the Last Millennium Reanalysis, *Past Global Changes Magazine*, vol. 25(3), 162, doi:10.22498/pages.25.3.162.
- O5 **Emile-Geay, J.**, and McKay, Nicholas P. (2016): Paleoclimate data standards, *Past Global Changes Magazine*, vol. 24(1), 47 doi:10.22498/pages.24.1.47.
- O4 Kaufman, D.S. & PAGES 2k Consortium (2014): A Community-Driven Framework for Climate Reconstructions, *Eos, Transactions, American Geophysical Union*, Volume 95, Number 40, 7 October 2014. 361–368, doi: 10.1002/2014EO40
- O3 Thompson, D.M.[®]. T.R.Ault[‡], M.N. Evans, J.E.Cole, J. Emile-Geay and A. LeGrande (2013): Coral-CGCM comparison highlights role of salinity in long-term trends. P. Braconnot, C. Brierley, S.P. Harrison, L. von Gunten (eds). El Niño-Southern Oscillation: observations and modeling, *PAGES news* 21(2)
- O2 **Emile-Geay, J.**[□] (2012): , What is the outlook for ENSO? *PAGES news*, 20(1)
- O1 Clement, A.C., J. Emile-Geay, R. Seager, M. A. Cane and M.N. Evans (2006): America for the last millennium, *PAGES Newsletter*

Public Code Repositories

- C7 McKay, N. P. & **J. Emile-Geay**(2022). The Abrupt Change Toolkit in R (Version v0.1.3)
<https://github.com/LinkedEarth/actR>
- C6 **J. Emile-Geay**, Khider, D., & James, A. (2019). PaleoBooks: Doing Science with Pyleoclim (Version v1.1).
<https://doi.org/10.5281/zenodo.5771123>
- C5 Khider, D., **J. Emile-Geay**, & Zhu, F. (2022). Example scientific workflows using Pyleoclim (Version v0.2).
<https://doi.org/10.5281/zenodo.6633665>
- C4 Khider, D., **J. Emile-Geay**, James, A. K., Landers, J. P. & Zhu, F.[®] (2022). PyleoTutorials: A gentle introduction to the Pyleoclim package. (Version v0.0.1)
<https://doi.org/10.5281/zenodo.6999577>
- C3 Khider, D., **J. Emile-Geay**, Introduction to Python for the paleosciences (2022),
http://linked.earth/ec_workshops_py/
- C2 Khider, D., **J. Emile-Geay**, Zhu, F., & James, A.[®] (2022). PaleoHack: building coding capacity in the paleogeosciences (Version v3.0). <https://doi.org/10.5281/zenodo.6365841>
- C1 Khider, D., **J. Emile-Geay**, Zhu, F., James, A., Landers, J., Kwan, M., & Athreya, P.[®] (2022). Pyleoclim: A Python package for the analysis and visualization of paleoclimate data (Version v0.9.0)
<https://doi.org/10.5281/zenodo.1205661>.

Monographs

2014 **J. Emile-Geay**, *Data Analysis in the Earth & Environmental Sciences*, 247pp, Second edition,
<http://dx.doi.org/10.6084/m9.figshare.1014336>.

2008 **J. Emile-Geay**, *El Niño and the Earth's climate: from decades to ice ages*, Verlag Dr Müller, 163pp.

Edited volumes

2015 *Proceedings of the Fifth International Workshop on Climate Informatics: CI 2015*. J. G. Dy, **J. Emile-Geay**,
V. Lakshmanan, Y. Liu (Eds.). September 2015. ISBN: 978-0-9973548-0-5

CITATION STATISTICS (AS OF NOV 2022)

72 citations per article (4018 total), based on 56 indexed papers. *h*-index: 33

INVITED LECTURES AND CONFERENCE PRESENTATIONS OF THE PAST 5 YEARS

Woods Hole Oceanographic Institution, Climate Seminar – September 2020

The Case Against the Meghalayan.

International conference on the Impacts of large volcanic eruptions on climate and societies

University of Geneva, Switzerland – August 2020

Resolving the differences in the simulated and reconstructed temperature response
to volcanism over the Last Millennium

Scripps Institution of Oceanography, CASPO Seminar – May 2020

Climate scaling: what it tells us about the climate system, and its models.

Princeton University, Climate Seminar – May 2019

Climate scaling: what it tells us about the climate system, and its models.

California Institute of Technology, ESE Seminar – Feb 2019

Climate scaling: what it tells us about the climate system, and its models.

International Workshop on Climate Informatics, Boulder, CO – Sep 2018

Paleoclimate informatics: enabling knowledge discovery about past climates

AGU Fall meeting, New Orleans, LA – Dec 2017

Geothermal influences on the abyssal ocean

Past2Future Workshop, Reading, UK – July 2017

Paleoclimate uncertainty: representing the known unknowns

PAGES Open Science Meeting, Zaragoza, Spain – May 2017

OTHER CONFERENCE PRESENTATIONS

as first or co-author.

2022 3 presentations (2 oral, 1 poster)

2021 1 presentation (oral)

2020 5 presentations (4 oral, 1 poster)

2019 7 presentations (5 oral, 2 posters)

2018 4 presentations (3 oral, 1 poster)

2017 7 presentations (5 oral, 2 poster)

HONORS AND AWARDS

2012 Editors' Citation for Excellence in Refereeing for *Journal of Geophysical Research-Atmospheres*

2008 Leverhulme Trust postdoctoral travel award for the Leverhulme Climate Symposium (Cambridge, UK)

2004–2005 Boris Bakhmeteff Fellowship in Fluid Mechanics

FUNDING HISTORY

Pending Grants

Collaborative Research: GCR: Knowledge-guided machine learning for nimble climate science and applications
NSF, Growing Convergence Research (co-PI)
USC Amount: \$1,246,463, submitted Feb 2022

Active Grants

EarthCube Capabilities: PaleoCube: Enabling Cloud-Based Paleoclimatology
NSF, EarthCube ICER 2126510 (co-PI)
USC Amount: \$877,305, 09/01/2021 – 08/31/2024.

Collaborative Research: A Big Data Approach to Fundamental Paleoclimate Questions
NSF, Paleo Perspectives on Climate Change AGS 2002518 (PI)
USC Amount: \$398,099, 09/01/2020 – 08/31/2023.

Collaborative Research: PReSto: A Paleoclimate Reconstruction Storehouse to Broaden Access and Accelerate Scientific Inference
NSF, Geoinformatics EAR 1948822 (PI)
USC Amount: \$347,629, 07/01/2020 – 06/30/2023.

Completed Grants

Belmont Forum Collaborative Research: Abrupt Change in Climate and Ecosystems: Where are the Tipping Points?
Belmont Forum via NSF, ICER 1929554 (PI)
Amount: USC portion = \$99,982, 07/1/2019 – 06/30/2022.

Collaborative Research: The global climate response to volcanic eruptions in the Last Millennium Reanalysis
NOAA Climate Program Office, NA18OAR4310426 (PI)
Amount: \$299,973 (USC portion = \$194,489), 09/1/2018 – 08/30/2020.

Collaborative Research: LinkedEarth: Crowdsourcing Data Curation & Standards Development in Paleoclimatology
NSF EarthCube program ICER 1541029 (PI).
Amount: \$797,793 (USC portion = \$684,978), 09/01/2015 – 08/31/2019.

Collaborative Research: Last Millennium Climate Reanalysis Project
NOAA Climate Program Office, NOAA-OAR-CPO-2014-2003692 (PI)
Amount: \$1,488,473 (USC portion = \$254,255), 08/1/2014 – 07/31/2017.

Collaborative Research: GeoChronR - open-source tools for the analysis, visualization and integration of time-uncertain geoscientific data,
NSF, Geoinformatics EAR 1347213 (PI)
Amount: \$566K (USC portion = \$196,655), 07/1/2014 – 06/30/2018.

Collaborative Research: Efficient high dimensional Bayesian methods for climate field reconstruction
NSF, Collaborations in Mathematical Geophysics, DMS 1025464 (PI).
Amount: \$419,188 (USC portion = \$214,002), 10/01/2010 – 09/30/2015.

Collaborative Research: Maximizing the potential of tropical climate proxies through integrated climate-proxy forward modeling.
NOAA, Climate Change Data and Detection, NA10OAR4310115 (PI)
Amount: \$410,791 (USC portion = \$278,858), 08/31/2010 – 08/30/2014.

Collaborative Research: Multiproxy Reconstructions as a Missing-Data Problem: New Techniques and Their Application to Regional Climates of the Past Millennium
NSF, Paleo Perspectives on Climate Change, AGS 1003818 (PI).
Amount: \$579,000 (USC portion = \$291,582), 05/06/2010 – 05/31/2015.

MEETING COORDINATION

- 2022 **Co-organizer and instructor** of 1 virtual PaleoHackathon (attendance: 40), and one Town Hall at the International Conference on Paleoceanography, Bergen, Norway (attendance: 50)
- 2021 **Co-organizer and instructor** of 2 virtual PaleoHackathons, reaching 89 people on 4 continents.
- 2021 – **Member** of the World Climate Research Program’s US CLIVAR TropiCal Basin Interactions working group.
- 2021 **Convener** of a session in the *Paleoclimate Model Intercomparison Project 30-year anniversary conference*
- 2017 **Convener** of the international workshop: *Climate Dynamics with the Last Millennium Reanalysis* Boulder, CO, Oct 2–4.
- 2016 **Convener** of the international workshop on *Paleoclimate Data Standards* Boulder, CO, June 22–23.
- 2015 **Program Committee co-chair** Climate Informatics workshop Boulder, CO, Sept 24–25.
- 2015 **Organizer** of an international workshop on Proxy System Modeling Catalina Island, CA, May 4–6. 30 participants.
- 2010–2014 **Co-convener** of the yearly Fall AGU sessions “Climate of the Common Era”, (with J. Smerdon, K. Anchukaitis, E. Cook)
- 2007 **Co-convener** of the Fall AGU session PP07 (with Yemane Asmerom)

SERVICE AS ACADEMIC REVIEWER

- 2018 - now Associate Editor for the Nature Publishing Group’s *Scientific Data*
- 2020 Editor for *Climate of the Past* special issue on PMIP4-CMIP6.
- 2002 - now **Article Reviews** for *Geophysical Research Letters*, *Climate Dynamics*, *Journal of Climate*, *Journal of Geophysical Research-Oceans*, *Climate of the Past*, *Environmental Research Letters*, *Journal of Geophysical Research-Atmospheres*, *Earth System Dynamics*, *PNAS*, *Nature Geoscience*, *Nature Education*, *Nature Communications*, *Nature Scientific Reports*, *Nature*, *Journal of Physical Oceanography*, *Journal of Marine Research*, *Paleo*³, *Scientific Reports*, *Geochimica and Cosmochimica Acta*, *Global & Planetary Change*, *Environmental Research Letters*, *Dendrochronologia*, *Quaternary Science Reviews*, *International Journal on Geomathematics*, *Earth & Planetary Science Letters*, *Geology*, *EOS*
- 2006 - now **Proposal Reviews** for the *National Science Foundation* (3-4 per year), the *National Oceanographic and Atmospheric Administration* (1), the *European Research Council* (1), & the *UK Natural Environment Research Council* (1).

ACADEMIC SERVICE TO THE USC COMMUNITY

'21-'22	Guest lectures for GEOL599 (The Science of Prediction), EALC130g, SOCI210, ASCJ-420
'21-'22	Earth Science Colloquium Series coordinator
2021	Earth Science faculty merit review committee, Chair
'20 –	Center for Sustainability Solutions, academic board member.
'20-'21	Led search committee for a faculty position in Global Change Research, culminating in the hire of a highly qualified diversity candidate.
2020	Participant in the Sustainability Across the Curriculum initiative (worked with Dan Lainer-Vos, sociology).
'18-'19	Member of the academic Senate Sustainability Committee.
2018	Reviewer for the Graduate School fellowship grant program.
2017	Reviewer for USC research grant program. Member, Earth Science faculty review committee.
2016	panelist for the Electoral Commons on Climate Change
2015	Panel moderator at the USC Know Tomorrow event (10/02).
2015	USC Dornsife Lunch & Lecture: Pope Francis - Environmental Activist? , also recounted here
2015	Guest lectures for Problem without Passports : Ecological Security and Global Politics
2014	Member, Earth Science faculty review committee
2011	Organized Dornsife Commons Event “Carbon Nation” with director Q&A
2011	Wrote the learning objectives of the Earth Science department’s undergraduate programs
2009 – 2011	Member, Climate Dynamics Search Committee
2010–	Member, Earth Science Curriculum Committee
2009 –	Member, Computing Committee (chair since 2020)

CLASSES TAUGHT AT USC

GEOL599	"The Cutting Edge of Geoscience Research", Fall 2021 + Spring 2022. Graduate Journal Club (2 units)
GEOL 515	"Introduction to Atmospheric Science", Fall 2010, Fall 2014, 2018, 2020 Graduate class (enrollment:7,6). Course grade: 4.50, 4.67; Instructor grade: 4.33, 4.67
GEOL 425L	"Data Analysis in the Earth and Environmental Sciences", Fall 2011, Spring 2014, Fall 2015, 2017, 2019, 2021. Undergraduate class (enrollment:9,21,6,17). Course grade: 4.00, 4.00, 4.75, 4.67; Instructor grade: 4.13, 4.08, 4.50, 4.67
GEOL 351	"Climate Systems", Fall 2015, 25%; Fall 2017, 33%, Spring 2022, 100% Undergraduate class (enrollment:10). Course grade: 4.50; Instructor grade: 4.50
GEOL 157L	"The Logic of Climate Change", Spring 2018 Undergraduate General Education class, 4 units (enrollment:15).
GEOL 150L	"Climate Change", Spring 2010 – 2017, 2021 Undergraduate General Education class, 4 units (enrollment:106, 110, 64, 174, 179, 180, 127). Course grade: 4.36, 4.26, 4.09, 4.13, 3.59, 4.00, 4.05, 4.09; Instructor grade: 4.60, 4.35, 4.27, 4.37, 3.75, 4.00, 4.34, 4.20
GEOL 599	"The Climate of the Common Era", Spring 2012. graduate seminar (enrollment:4)
GEOL145L	"Lies, Damn lies, and Statistics", Spring 2019, 2020. Undergraduate General Education class, 4 units (enrollment: 22, 16).
CORE103	"The process of change in Science", Fall 2018, 2020. Undergraduate Thematic Option, 4 units. Enrollment: 37.

OUTREACH

Wrote article for [The Conversation](#) about committed warming (June 2022)
Featured expert in this USC-produced [video](#).
Panelist for the USC [Climate Forward](#) event, April 2019
Featured in [ATTN video](#) on Extreme Heat Events (>340,000 views), July 2018
Motivational speech at the [Beyond Meat](#) headquarters, El Segundo, CA. (Feb 2018).
Panelist for [STEAM Sound Bytes](#) (Jan 2018).
Panelist on “Scientifically Speaking” event sponsored by [Sense About Science](#) (March 2017).
Radio interviews for BBC Radio 5, TalkRadio 630 KHOW, [Annenberg Media](#).
TV interviews for the BBC, Associated Press, [ABC 7](#), Al Jazeera English, ScienceNow, History Channel, Sky News, [SpectrumNews1](#).
Featured in [ScienceDaily](#), [The Guardian](#), the [New York Times](#), the [Financial Times](#), and local press.