**Student presentations**

Each student is to make a 12-minute presentation of a journal paper or a set of short papers (≤10 PowerPoint slides), which will be followed by 3-minute questioning from your fellow students. Write a summary (1-2 pages) that discusses in your own words the background, major findings, significance, and implications of the paper(s). Please include the reference(s). The final exam will feature questions on papers presented.

The presentation should be targeted at your fellow students so please include the necessary background to educate and motivate your audience. Key points to cover: what is the paper about? What are the major phenomena/scientific questions it addresses? What methods does it use and what are the major results? What are the major contributions of the research? What do you feel most excited at, and why? Do not just present the results but also provide the context/story for why these results matter.

It may not be feasible to present the whole paper in a 12-minute talk so you need to be selective, choosing the most important results/figures and building a coherent story for your talk. You may include additional reading and synthesis with other related papers. One can find additional reading in the References section of the main paper or by searching on AMS/AGU journal sites. If you choose a short paper in *Nature*, *Science* or *Geophys Res Lett*, you may need to supplement with one additional paper to fill 10 slides.

Make sure that figures, labels, and text are big/clear enough for the audience to see. Use schematics as necessary.

We’d like to build on and go beyond the class material by

* Highlighting novel contributions & surprises.
* Connecting to the material covered in class (PNA pattern, IPOC, AMM…).
* Stepping out of the authors’ confines by asking: what are the fundamental drivers/mechanisms?

Below is a list of papers for your consideration. You may choose a topic/paper outside this list. In that case, please consult me by e-mailing or showing me the paper(s) you would like to present.

The presentations are tentatively scheduled on June 2 (Fri) 100-350pm in Eckart 227

**Atmospheric convection**

CE Holloway, JD Neelin, 2009: Moisture vertical structure, column water vapor, and tropical deep convection. *J. Atmos. Sci.*, 66, 1665-1683.

**Monsoons**

Wang, B., LinHo, 2002: Rainy Season of the Asian–Pacific Summer Monsoon. *J. Climate*, **15**, 386–398.

Xie, S.-P., H. Xu, N.H. Saji, Y. Wang, and W.T. Liu, 2006: Role of narrow mountains in large-scale organization of Asian monsoon convection. *J. Climate*, 19, 3420-3429.

Boos, W. R. and Z. Kuang, 2010: Dominant control of the South Asian monsoon by orographic insulation versus plateau heating. Nature, **463**, 218-222. (Boos, W. R., 2015:  [A review](http://www.clivar.org/sites/default/files/documents/Exchanges_No_66.pdf) of recent progress on Tibet’s role in the South Asian monsoon.  CLIVAR Exchanges Special Issue on Monsoons, **66**, 23-27.)

Sampe, T. and S.-P. Xie, 2010: Large-scale dynamics of the Meiyu-Baiu rain band: Environmental forcing by the westerly jet. *J. Climate*, 23, 113-134.

Kong, W., and J. Chiang, 2020: Interaction of the Westerlies with the Tibetan Plateau in Determining the Mei-Yu Termination. *J Climate*, 33, 339- 363.

Mapes, B.E., T.T. Warner, M. Xu, and A.J. Negri, 2003: Diurnal patterns of rainfall in northwestern South America. Part I: Observations and context. *MWR,* **131**, 799-812.

Sultan, B. and S. Janicot, 2003: The West African Monsoon Dynamics. Part II: The “Preonset” and “Onset” of the Summer Monsoon. *J. Climate,* **16**, 3407–3427,

Vera, C., and Coauthors, 2006: Toward a Unified View of the American Monsoon Systems. *J. Climate*, **19**, 4977–5000.

Rodwell, M.J. and Hoskins, B.J. (1996), Monsoons and the dynamics of deserts. Q.J.R. Meteorol. Soc., 122: 1385-1404. doi:[10.1002/qj.49712253408](https://doi.org/10.1002/qj.49712253408)

Shaw, T.A., 2014: On the Role of Planetary-Scale Waves in the Abrupt Seasonal Transition of the Northern Hemisphere General Circulation. *J Atmos Sci*, 71, 1724- 1746.

Ting, M., and H. Wang, 2006: The role of the North American topography on the maintenance of the Great Plains summer low-level jet. J. Atmos. Sci., 63, 1056-1068.

WR Boos, S Pascale, 2021: [Mechanical forcing of the North American monsoon by orography](https://scholar.google.com/citations?view_op=view_citation&hl=ja&user=AnKqc8UAAAAJ&cstart=20&pagesize=80&citation_for_view=AnKqc8UAAAAJ:bnK-pcrLprsC). Nature 599 (7886), 611-615

**California/U.S. climate**

Berg, N., A. Hall, S. B. Capps, M. Hughes. (2013) El Niño-Southern Oscillation impacts on winter winds over Southern California. *Climate Dynamics* **40**, 109-121

Cayan, D., R. et al., 1999: ENSO and Hydrologic Extremes in the Western United States. *J. Climate*, 12, 2881-.

Dettinger, Michael D., Daniel R. Cayan, Henry F. Diaz, David M. Meko, 1998: North–South Precipitation Patterns in Western North America on Interannual-to-Decadal Timescales. *J. Climate*, **11**, 3095–3111.

Seager, R., Y. Kushnir, et al., 2005: Modeling of tropical forcing of persistent droughts and pluvials over western North America: 1856-2000. *J. Climate*, **18**(19): 4065-4088.

Williams, A. P., et al. (2019). Observed impacts of anthropogenic climate change on wildfire in California. *Earth's Future*, 7, 892– 910.

Seager, R. et al. 2015: Climatology, Variability, and Trends in the U.S. Vapor Pressure Deficit, an Important Fire-Related Meteorological Quantity. *J. Applied Met. and Clim*., 54, 1121-1141.

Lau, N.-C., and M. J. Nath, 2012: **A Model Study of Heat Waves over North America: Meteorological Aspects and Projections for the 21st Century**. Journal of Climate, **25(14)**, doi:[10.1175/JCLI-D-11-00575.1](http://dx.doi.org/10.1175/JCLI-D-11-00575.1).

Cordeira, J.M., J. Stock, M.D. Dettinger, A.M. Young, J.F. Kalansky, and F.M. Ralph, 2019: A 142-year Climatology of Northern California Landslides and Atmospheric Rivers. *Bull. Amer. Meteor. Soc.*, **100**, 1499-1509, [https://doi.org/10.1175/BAMS-D-18-0158.1](https://journals.ametsoc.org/doi/10.1175/BAMS-D-18-0158.1)

Neiman, P. J., F.M. Ralph, G.A. Wick, J. Lundquist, and M.D. Dettinger, 2008a: Meteorological characteristics and overland precipitation impacts of atmospheric rivers affecting the West Coast of North America based on eight years of SSM/I satellite observations. J. Hydrometeor., **9**, 22-47, [doi:10.1175/2007JHM855.1](http://journals.ametsoc.org/doi/abs/10.1175/2007JHM855.1).

Ralph, F. Martin, Paul J. Neiman, Gary A. Wick, 2004: Satellite and CALJET Aircraft Observations of Atmospheric Rivers over the Eastern North Pacific Ocean during the Winter of 1997/98. *Mon. Wea. Rev.*, **132**, 1721–1745.

**ITCZ**

Xie, S.-P., 2004: The shape of continents, air-sea interaction, and the rising branch of the Hadley circulation. In *The Hadley Circulation: Past, Present and Future*, H. F. Diaz and R. S. Bradley (eds.), Kluwer Academic Publishers, Dordrecht, 121-152. <http://iprc.soest.hawaii.edu/~xie/hadley4camera.pdf>

Frierson, D. M. W., Hwang, Y.-T., Fuckar, N. S., Seager, R., Kang, S. M., Donohoe, A., Maroon, E. A., Liu, X., and D. S. Battisti, 2013: Contribution of ocean overturning circulation to tropical rainfall peak in the Northern Hemisphere. *Nature Geoscience*, 6, 940–944.

Marshall, J., Donohoe, A., Ferreira, D., and McGee, D., 2014: The ocean’s role in setting the mean position of the Inter-Tropical Convergence Zone. *Climate Dynamics*, 42, 1967-1979.

Kang, S. M., Held, I. M., Frierson, D. M. W & Zhao, M. The response of the ITCZ to extratropical thermal forcing: Idealized slab-ocean experiments with a GCM. J. Climate 21, 3521–3532 (2008).

van der Wiel, K., Matthews, A.J., Stevens, D.P. and Joshi, M.M. (2015), A dynamical framework for the origin of the diagonal South Pacific and South Atlantic Convergence Zones. *Q.J.R. Meteorol. Soc*., 141: 1997-2010. doi:[10.1002/qj.2508](https://doi.org/10.1002/qj.2508)

**Equatorial annual cycle**

Mitchell, T.P., and J.M. Wallace, 1992: The Annual Cycle in Equatorial Convection and Sea Surface Temperature. J. Climate, **5**, 1140–1156.

Wang, M., Du, Y., Qiu, B., Cheng, X., Luo, Y., Chen, X., and Feng, M. (2017), Mechanism of seasonal eddy kinetic energy variability in the eastern equatorial Pacific Ocean, *J. Geophys. Res. Oceans*, 122, 3240– 3252, doi:[10.1002/2017JC012711](https://doi.org/10.1002/2017JC012711).

Moum, J.N. et al., 2013: Seasonal sea surface cooling in the equatorial Pacific cold tongue controlled by ocean mixing. *Nature*, 500, 64-67, doi:10.1038/nature12363. Commentary by Xie, S.P., 2013, *Nature*, 500, 33–34, doi:10.1038/nature12456.

Okumura, Y. and S.-P. Xie, 2004: Interaction of the Atlantic equatorial cold tongue and African monsoon. *J. Climate*, 17, 3588-3601.

**ENSO**

Meinen, C. S., and M. J. McPhaden, 2000: Observations of warm water volume changes in the equatorial Pacific and their relationship to El Niño and La Niña. *J. Climate*, **13,** 3551–3559.

Enfield, D. B., and J. S. Allen, 1980: On the structure and dynamics of monthly mean sea level anomalies along the Pacific Coast of North and South America. *J. Phys. Oceanogr.*, **10,** 557–578.

Vecchi, G.A., and DE Harrison, 2000: Tropical Pacific Sea surface temperature anomalies, El Nino, and Equatorial Westerly Wind Events. *J. Climate*, 13 (11), 1814-1830.

Vecchi, G.A., 2006: [The Termination of the 1997–98 El Niño. Part II: Mechanisms of Atmospheric Change.](https://journals.ametsoc.org/doi/abs/10.1175/JCLI3780.1) *J. Climate,* **19**, 2647–2664.

Xie, S.-P., Q. Peng, Y. Kamae, X.T. Zheng, H. Tokinaga, and D. Wang, 2018: Eastern Pacific ITCZ dipole and ENSO diversity. *J. Climate*, 31, 4449-4462.

Adames, Á.F. and J.M. Wallace, 2017: [On the Tropical Atmospheric Signature of El Niño.](https://journals.ametsoc.org/doi/abs/10.1175/JAS-D-16-0309.1) *J. Atmos. Sci.,* **74**, 1923–1939, <https://doi.org/10.1175/JAS-D-16-0309.1> (latest updates of observed ENSO structures)

**ENSO teleconnection**

Trenberth, K. E., Branstator, G. W., Karoly, D., Kumar, A., Lau, N.‐C., and Ropelewski, C., 1998: Progress during TOGA in understanding and modeling global teleconnections associated with tropical sea surface temperatures, *J. Geophys. Res.*, 103 (C7), 14291– 14324.

Lau, N.-C., 1997: Interactions between Global SST Anomalies and the Midlatitude Atmospheric Circulation. *Bull. Amer. Meteor. Soc.*, **78**, 21–33.

Seager, R., N.H. Naik, M.F. Ting, M.A. Cane, N. Harnik, Y. Kushnir, 2010: Adjustment of the atmospheric circulation to tropical Pacific SST anomalies: Variability of transient eddy propagation in the Pacific-North America sector, *Q. J. Royal Met. Soc.,* 136: 277-296. DOI: 10.1002/qj.588.

H Murakami, GA Vecchi, S Underwood, TL Delworth, AT Wittenberg, ..., 2015: [Simulation and prediction of category 4 and 5 hurricanes in the high-resolution GFDL HiFLOR coupled climate model](javascript:void(0)). *J. Climate* 28 (23), 9058-9079

**Ocean adjustment in ENSO**

McCreary, J.P., and D.L. Anderson, 1984: A Simple Model of El Niño and the Southern Oscillation. Mon. Wea. Rev., **112**, 934–946.

Wyrtki, K., 1975: El Niño—The Dynamic Response of the Equatorial Pacific Ocean to Atmospheric Forcing. J. Phys. Oceanogr., **5**, 572–584.

**Pacific Meridional Mode**

Alexander, M.A., D.J. Vimont, P. Chang, and J.D. Scott, 2010: The Impact of Extratropical Atmospheric Variability on ENSO: Testing the Seasonal Footprinting Mechanism Using Coupled Model Experiments. *J. Climate,* **23**, 2885–2901, doi: 10.1175/2010JCLI3205.1.

Vimont, D. J., M. Alexander, and M. Newman, 2014: Optimal growth of central and east Pacific ENSO events. *Geophys. Res. Lett.*, **41**, 4027–4034.

Amaya, DJ, 2019: [The Pacific meridional mode and ENSO: A review](https://scholar.google.com/citations?view_op=view_citation&hl=en&user=e6h9KeIAAAAJ&sortby=pubdate&citation_for_view=e6h9KeIAAAAJ:YsMSGLbcyi4C). *Current Climate Change Reports* 5 (4), 296-307

**Indian Ocean variability**

Han, W., J. P. McCreary Jr., D. L. T. Anderson, and A. J. Mariano, 1999: Dynamics of the Eastern Surface Jets in the Equatorial Indian Ocean. Journal of Physical Oceanography 29:9, 2191-2209

N. H. Saji, B. N. Goswami, P. N. Vinayachandran, T. Yamagata , 1999: A dipole mode in the tropical Indian Ocean. *Nature* 401, 360-363, doi:10.1038/43854

Xie, S.-P., K. Hu, J. Hafner, H. Tokinaga, Y. Du, G. Huang, and T. Sampe, 2009: Indian Ocean capacitor effect on Indo-western Pacific climate during the summer following El Nino. *J. Climate*, 22, 730–747.

Chowdary, J. S., S.-P. Xie, J.-Y. Lee, Y. Kosaka and B. Wang, 2010: Predictability of summer Northwest Pacific climate in eleven coupled model hindcasts: Local and remote forcing. *J. Geophys. Res.-Atmos.*, 115, D22121, doi:10.1029/2010JD014595.

**Tropical Atlantic climate**

Saravanan, R., and P. Chang, Interaction between tropical Atlantic variability and El Nino-Southern Oscillation, *J. Climate*, *13*, 2177-2194, 2000.

Hu, Z.-Z., A. Kumar, B. Huang, Y. Xue, W. Wang, B. Jha, 2011: Persistent Atmospheric and Oceanic Anomalies in the North Atlantic from Summer 2009 to Summer 2010. *J. Climate*, **24**, 5812–5830.

Amaya, D.J., M.J. DeFlorio, A.J. Miller, and S.-P. Xie, 2017: WES feedback and the Atlantic Meridional Mode: observations and CMIP5 comparisons. *Clim. Dyn.*, 49, 1665-1679.

**Atlantic multi-decadal oscillation**

Delworth, T.L., F. Zeng, L. Zhang, R. Zhang, G.A. Vecchi, and X. Yang, 2017: The Central Role of Ocean Dynamics in Connecting the North Atlantic Oscillation to the Extratropical Component of the Atlantic Multidecadal Oscillation. *J. Climate,* **30**, 3789–3805.

Sutton, R. T. and D. L. R. Hodson (2005): Atlantic Ocean Forcing of North American and European Summer Climate. *Science* **309** (5731), 115. [DOI: 10.1126/science.1109496]

Zhang, R., and T. L. Delworth (2006), Impact of Atlantic multidecadal oscillations on India/Sahel rainfall and Atlantic hurricanes, *Geophys. Res. Lett.*, **33**, L17712, doi:10.1029/2006GL026267.

Karnauskas, KB, L Zhang, DJ Amaya, 2021: [The atmospheric response to North Atlantic SST trends, 1870–2019](https://scholar.google.com/citations?view_op=view_citation&hl=en&user=e6h9KeIAAAAJ&sortby=pubdate&citation_for_view=e6h9KeIAAAAJ:UeHWp8X0CEIC). *Geophysical Research Letters* 48 (2), e2020GL090677.

Watanabe, M., and H. Tatebe, 2019: Reconciling roles of sulphate aerosol forcing and internal variability in Atlantic multidecadal climate changes. *Clim Dyn* **53,** 4651–4665. https://doi.org/10.1007/s00382-019-04811-3

**North Atlantic Oscillation/Annular modes**

Thompson, D.W.J., and J.M. Wallace, 2000: Annular Modes in the Extratropical Circulation. Part I: Month-to-Month Variability. *J. Climate*, **13**, 1000–1016.

**Pacific decadal oscillation**

Mantua, N.J., S.R. Hare, Y. Zhang, J.M. Wallace, and R.C. Francis, 1997: A Pacific Interdecadal Climate Oscillation with Impacts on Salmon Production. Bull. Amer. Meteor. Soc., **78**, 1069–1079.

Chen, X. Y., and J. M. Wallace, 2015: ENSO-like variability: 1900–2013. J. Climate, 28, 9623–9641.

**Subtropical low cloud variability**

Klein, S.A., D.L. Hartmann, and J.R. Norris, 1995: On the Relationships among Low-Cloud Structure, Sea Surface Temperature, and Atmospheric Circulation in the Summertime Northeast Pacific. J. Climate, **8**, 1140–1155.

Painemal, D., R. Garreaud, J. Rutllant, P. Zuidema, 2010: Southeast Pacific Stratocumulus: High-Frequency Variability and Mesoscale Structures over San Félix Island. *J. Appl. Meteor. Climatol.*, **49**, 463–477.

# Zuidema et al., 2012: On Trade-wind Cumulus Cold Pools. *J Atmos Sci*, 69, 258-.

W Lin, M Zhang, NG Loeb, 2009: Seasonal variation of the physical properties of marine boundary layer clouds off the California coast. *J. Climate* 22 (10), 2624-2638.

Yang, Y., Y.L. Chen, and F.M. Fujioka, 2005: Numerical simulations of the island induced circulations for the island of Hawaii during HaRP. *Mon. Wea. Rev*., 133, 3693-3713.

Yang, Y., S.-P. Xie, and J. Hafner, 2008: Cloud patterns lee of Hawaii Island: A synthesis of satellite observations and numerical simulation. *J. Geophys. Res.-Atmos*., 35, L04807, doi:10.1029/2008JD009889.

**Recent climate events**

Hoerling, M., and Coauthors, 2013: Anatomy of an Extreme Event. *J. Climate*, **26**, 2811–2832. doi: <http://dx.doi.org/10.1175/JCLI-D-12-00270.1>

Siler, N., Y. Kosaka, S.-P. Xie, and X. Li, 2017: Tropical ocean contributions to California's surprisingly dry El Nino of 2015-16. *J. Climate*, 30, 10067-10079.

Peng, Q., S.-P. Xie, D. Wang, X.-T. Zheng, and H. Zhang, 2019: Coupled ocean-atmosphere dynamics of the 2017 extreme coastal El Nino. *Nature Commun.*, 10, 298, [doi:10.1038/s41467-018-08258-8](https://doi.org/10.1038/s41467-018-08258-8).

Wei, X., K. Li, T. Kilpatrick, M. Wang, and S.-P. Xie, 2021: Large-scale conditions for the record-setting Southern California Marine Heatwave of August 2018. *Geophys. Res. Lett.*, 48, e2020GL091803. [doi: 10.1029/2020GL091803](https://doi.org/10.1029/2020GL091803)

Zhou, Z.-Q., S.-P. Xie, and R. Zhang, 2021: Historic Yangtze flooding of 2020 tied to extreme Indian Ocean conditions. *PNAS*, 118, e2022255118. [doi.org/10.1073/pnas.2022255118](https://doi.org/10.1073/pnas.2022255118),

**Global climate modeling**

Manabe, S., D.G. Hahn, and J.L. Holloway, 1974: The Seasonal Variation of the Tropical Circulation as Simulated by a Global Model of the Atmosphere. J. Atmos. Sci., **31**, 43–83.

**Regional climate change**

Manabe, S. & R., Stouffer, M. Spelman, and K. Bryan (1991). Transient Responses of a Coupled Ocean-Atmosphere Model to Gradual Changes of Atmospheric CO2. Part I: Annual Mean Response. *J. Climate*. 4. 785-818.

Stouffer, R. J., and S. Manabe (2017**). Assessing temperature pattern projections made in 1989**. Nature Climate Change, **7(3),** 163–165.

Deser, C., R. Knutti, S. Solomon, and A. S. Phillips, 2012: Communication of the role of natural variability in future North American climate. *Nat. Clim. Change*, **2**, 775-779.

Peng, Q., S.-P. Xie, et al., 2022: Surface warming-induced global acceleration of upper ocean currents. *Sci. Adv.*, 8, eabj8394.

Wang, H., S.-P. Xie, and Q. Liu, 2016: Comparison of climate response to anthropogenic aerosol versus greenhouse gas forcing: Distinct patterns. *J. Climate*, 29, 5175-5188.

Armour, K.C., C.M. Bitz, and G.H. Roe (2013). Time-varying climate sensitivity from regional feedbacks. *J. Climate,* 26, 4518–4534.

Zhou, C., Zelinka, M. D., and Klein, S. A. (2017), Analyzing the dependence of global cloud feedback on the spatial pattern of sea surface temperature change with a Green's function approach, *J. Adv. Model. Earth Syst.*, 9, 2174– 2189.

Stevenson, S. et al. 2022, [Twenty-first century hydroclimate: A continually changing baseline, with more frequent extremes](https://www.pnas.org/doi/10.1073/pnas.2108124119). Proceedings of the National Academy of Sciences. 119 (12), e2108124119.

Williams, A. P., et al., Large contribution from anthropogenic warming to an emerging North American megadrought. Science **368**, 314–318 (2020).

Abatzoglou, JT, Hatchett, BJ, Fox-Hughes, P, Gershunov, A, Nauslar, NJ, 2021: Global climatology of synoptically-forced downslope winds. *Int J Climatol*. 41: 31– 50. <https://doi.org/10.1002/joc.6607>

Huang, X., Hall, A. D., & Berg, N. (2018). Anthropogenic warming impacts on today's Sierra Nevada snowpack and flood risk. *Geophysical Research Letters*, 45, 6215– 6222.

X Huang, DL Swain,  2022: Climate change is increasing the risk of a California megaflood. *Science* *Advances*, 8, eabq0995. <https://doi.org/10.1029/2018GL077432>

Jacox, M.G., 2022: [Global seasonal forecasts of marine heatwaves](https://scholar.google.com/citations?view_op=view_citation&hl=en&user=e6h9KeIAAAAJ&sortby=pubdate&citation_for_view=e6h9KeIAAAAJ:Wp0gIr-vW9MC). *Nature* 604 (7906), 486-490.