references

## R Markdown

This is an R Markdown document. Markdown is a simple formatting syntax for authoring HTML, PDF, and MS Word documents. For more details on using R Markdown see <http://rmarkdown.rstudio.com>.

When you click the **Knit** button a document will be generated that includes both content as well as the output of any embedded R code chunks within the document. You can embed an R code chunk like this:

summary(cars)

## speed dist   
## Min. : 4.0 Min. : 2.00   
## 1st Qu.:12.0 1st Qu.: 26.00   
## Median :15.0 Median : 36.00   
## Mean :15.4 Mean : 42.98   
## 3rd Qu.:19.0 3rd Qu.: 56.00   
## Max. :25.0 Max. :120.00

## Including Plots

You can also embed plots, for example:



Note that the echo = FALSE parameter was added to the code chunk to prevent printing of the R code that generated the plot.

Harley (2008)

(Harley 2008; Hayford, Gilman, and Carrington 2015; B. S. T. Helmuth 1998; B. Helmuth et al. 2006; Hesketh, Schwindt, and Harley 2021; Hobday et al. 2016; Ianson et al. 2016; Ignacio et al. 2021; Laura J. Jurgens, Ashlock, and Gaylord n.d.; L. J. Jurgens and Gaylord 2018; Kreyling, Jentsch, and Beierkuhnlein 2011; LaScala-Gruenewald and Denny 2020; Leonard 2000; Levine et al. 1999; Li et al. 2021; Liversage et al. 2020; Maxwell et al. 2019; McAfee and Bishop 2019; Miller, Harley, and Denny 2009; Morelissen and Harley 2007; Morley et al. 2019; “Frontiers Within-Canopy Experimental Leaf Warming Induces Photosynthetic Decline Instead of Acclimation in Two Northern Hardwood Species Forests and Global Change” n.d.; Pansch et al. 2018; Pardal-Souza et al. 2017; Perkins and Alexander 2013; Perkins-Kirkpatrick and Lewis 2020; Reimer, n.d.; Riemer et al. 2018; Román et al. 2020; Scanes et al. 2020; Scrosati 2017; Seabra et al. 2011; Seifert, Weithoff, and Vos 2015; Siegle, Taylor, and O’Connor 2018; Smithson and Verkuilen 2006; Sorte, Fuller, and Bracken 2010; Straub et al. 2019; Tituskin, Waddell, and Mabry n.d.; Tomanek and Helmuth 2002; Umanzor et al. 2017; Uyà et al. 2020; Vasseur et al. 2014; Wang et al. 2020; Wernberg et al. 2013; Yang et al. 2020)

Amstutz, A., L. B. Firth, J. I. Spicer, and M. E. Hanley. 2021. “Facing up to Climate Change: Community Composition Varies with Aspect and Surface Temperature in the Rocky Intertidal.” *Marine Environmental Research* 172 (December): 105482. <https://doi.org/10.1016/j.marenvres.2021.105482>.

Arias-Ortiz, A., O. Serrano, P. Masqué, P. S. Lavery, U. Mueller, G. A. Kendrick, M. Rozaimi, et al. 2018. “A Marine Heatwave Drives Massive Losses from the World’s Largest Seagrass Carbon Stocks.” *Nature Climate Change* 8 (4): 338–44. <https://doi.org/10.1038/s41558-018-0096-y>.

Babcock, R. C., D. P. Thomson, M. D. E. Haywood, M. A. Vanderklift, R. Pillans, W. A. Rochester, M. Miller, et al. 2020. “Recurrent Coral Bleaching in North-Western Australia and Associated Declines in Coral Cover.” *Marine and Freshwater Research* 72 (5): 620–32. <https://doi.org/10.1071/MF19378>.

Barbosa, Romina Vanessa, Cédric Bacher, Fred Jean, and Yoann Thomas. 2021. “Linking Individual and Population Patterns of Rocky-Shore Mussels.” *PeerJ* 9 (December): e12550. <https://doi.org/10.7717/peerj.12550>.

Barnes, Margaret. n.d. “The Use of Intertidal Barnacle Shells.” In *Oceanography and Marine Biology: An Annual Review*, 38:157–87. Taylor & Francis.

Brown, James H., James F. Gillooly, Andrew P. Allen, Van M. Savage, and Geoffrey B. West. 2004. “Toward a Metabolic Theory of Ecology.” *Ecology* 85 (7): 1771–89. <https://doi.org/10.1890/03-9000>.

Bulleri, Fabio, John F. Bruno, Brian R. Silliman, and John J. Stachowicz. 2016. “Facilitation and the Niche: Implications for Coexistence, Range Shifts and Ecosystem Functioning.” *Functional Ecology* 30 (1): 70–78. <https://doi.org/10.1111/1365-2435.12528>.

Buschbaum, Christian, Sabine Dittmann, Jae-Sang Hong, In-Seo Hwang, Matthias Strasser, Martin Thiel, Nelson Valdivia, San-Pil Yoon, and Karsten Reise. 2009. “Mytilid Mussels: Global Habitat Engineers in Coastal Sediments.” *Helgoland Marine Research* 63 (1): 47–58. <https://doi.org/10.1007/s10152-008-0139-2>.

“Frontiers Within-Canopy Experimental Leaf Warming Induces Photosynthetic Decline Instead of Acclimation in Two Northern Hardwood Species Forests and Global Change.” n.d. Accessed January 19, 2022. <https://www.frontiersin.org/articles/10.3389/ffgc.2018.00011/full>.

Harley, Cdg. 2008. “Tidal Dynamics, Topographic Orientation, and Temperature-Mediated Mass Mortalities on Rocky Shores.” *Marine Ecology Progress Series* 371 (November): 37–46. <https://doi.org/10.3354/meps07711>.

Hayford, Ha, Se Gilman, and E Carrington. 2015. “Foraging Behavior Minimizes Heat Exposure in a Complex Thermal Landscape.” *Marine Ecology Progress Series* 518 (January): 165–75. <https://doi.org/10.3354/meps11053>.

Helmuth, Brian S. T. 1998. “Intertidal Mussel Microclimates: Predicting the Body Temperature of a Sessile Invertebrate.” *Ecological Monographs* 68 (1): 51–74. <https://doi.org/10.2307/2657143>.

Helmuth, Brian, Bernardo R. Broitman, Carol A. Blanchette, Sarah Gilman, Patricia Halpin, Christopher D. G. Harley, Michael J. O’Donnell, Gretchen E. Hofmann, Bruce Menge, and Denise Strickland. 2006. “MOSAIC PATTERNS OF THERMAL STRESS IN THE ROCKY INTERTIDAL ZONE: IMPLICATIONS FOR CLIMATE CHANGE.” *Ecological Monographs* 76 (4): 461–79. [https://doi.org/10.1890/0012-9615(2006)076[0461:MPOTSI]2.0.CO;2](https://doi.org/10.1890/0012-9615(2006)076%5b0461:MPOTSI%5d2.0.CO;2).

Hesketh, Amelia V., Evangelina Schwindt, and Christopher D. G. Harley. 2021. “Ecological and Environmental Context Shape the Differential Effects of a Facilitator in Its Native and Invaded Ranges.” *Ecology* 102 (10): e03478. <https://doi.org/10.1002/ecy.3478>.

Hobday, Alistair J., Lisa V. Alexander, Sarah E. Perkins, Dan A. Smale, Sandra C. Straub, Eric C. J. Oliver, Jessica A. Benthuysen, et al. 2016. “A Hierarchical Approach to Defining Marine Heatwaves.” *Progress in Oceanography* 141 (February): 227–38. <https://doi.org/10.1016/j.pocean.2015.12.014>.

Ianson, Debby, Susan E. Allen, Benjamin L. Moore-Maley, Sophia C. Johannessen, and Macdonald, and Robie W. 2016. “Vulnerability of a Semienclosed Estuarine Sea to Ocean Acidification in Contrast with Hypoxia.” *Geophysical Research Letters* 43 (11): 5793–5801. <https://doi.org/10.1002/2016GL068996>.

Ignacio, Peralta-Maraver, this link will open in a new window Link to external site, Enrico L. Rezende, and this link will open in a new window Link to external site. 2021. “Heat Tolerance in Ectotherms Scales Predictably with Body Size.” *Nature Climate Change* 11 (1): 58–63. https://doi.org/<http://dx.doi.org/10.1038/s41558-020-00938-y>.

Jurgens, L. J., and B. Gaylord. 2018. “Physical Effects of Habitat-Forming Species Override Latitudinal Trends in Temperature.” *Ecology Letters* 21 (2): 190–96. <https://doi.org/10.1111/ele.12881>.

Jurgens, Laura J., Lauren W. Ashlock, and Brian Gaylord. n.d. “Facilitation Alters Climate Change Risk on Rocky Shores.” *Ecology* n/a (n/a): e03596. Accessed January 21, 2022. <https://doi.org/10.1002/ecy.3596>.

Kreyling, J., A. Jentsch, and C. Beierkuhnlein. 2011. “Stochastic Trajectories of Succession Initiated by Extreme Climatic Events.” *Ecology Letters* 14 (8): 758–64. <https://doi.org/10.1111/j.1461-0248.2011.01637.x>.

LaScala-Gruenewald, Diana E., and Mark W. Denny. 2020. “Long-Term Mechanistic Hindcasts Predict the Structure of Experimentally-Warmed Intertidal Communities.” *Oikos* 129 (11): 1645–56. <https://doi.org/10.1111/oik.07468>.

Leonard, George H. 2000. “Latitudinal Variation in Species Interactions: A Test in the New England Rocky Intertidal Zone.” *Ecology* 81 (4): 1015–30. <https://doi.org/10.2307/177175>.

Levine, Jonathan M., John F. Bruno, George H. Leonard, and Mark D. Bertness. 1999. “Climate-Driven Interactions Among Rocky Intertidal Organisms Caught Between a Rock and a Hot Place.” *Oecologia* 120 (3): 446–50. <https://doi.org/10.1007/s004420050877>.

Li, Xiao-xu, Yue Tan, Yong-xu Sun, Jie Wang, and Yun-wei Dong. 2021. “Microhabitat Temperature Variation Combines with Physiological Variation to Enhance Thermal Resilience of the Intertidal Mussel Mytilisepta Virgata.” *Functional Ecology* 35 (11): 2497–507. <https://doi.org/10.1111/1365-2435.13885>.

Liversage, Kiran, Jonne Kotta, Clarissa M. L. Fraser, Will F. Figueira, and Ross A. Coleman. 2020. “The Overlooked Role of Taphonomy in Ecology: Post-Mortem Processes Can Outweigh Recruitment Effects on Community Functions.” *Oikos* 129 (3): 420–32. <https://doi.org/10.1111/oik.06780>.

Maxwell, Sean L., Nathalie Butt, Martine Maron, Clive A. McAlpine, Sarah Chapman, Ailish Ullmann, Dan B. Segan, and James E. M. Watson. 2019. “Conservation Implications of Ecological Responses to Extreme Weather and Climate Events.” *Diversity and Distributions* 25 (4): 613–25. <https://www.jstor.org/stable/26607746>.

McAfee, Dominic, and Melanie J. Bishop. 2019. “The Mechanisms by Which Oysters Facilitate Invertebrates Vary Across Environmental Gradients.” *Oecologia* 189 (4): 1095–1106. <https://doi.org/10.1007/s00442-019-04359-3>.

Miller, Luke P., Christopher D. G. Harley, and Mark W. Denny. 2009. “The Role of Temperature and Desiccation Stress in Limiting the Local-Scale Distribution of the Owl Limpet, Lottia Gigantea.” *Functional Ecology* 23 (4): 756–67. <https://doi.org/10.1111/j.1365-2435.2009.01567.x>.

Morelissen, Bionda, and Christopher D. G. Harley. 2007. “The Effects of Temperature on Producers, Consumers, and Plant–Herbivore Interactions in an Intertidal Community.” *Journal of Experimental Marine Biology and Ecology* 348 (1-2): 162–73. <https://doi.org/10.1016/j.jembe.2007.04.006>.

Morley, S. A., L. S. Peck, J. M. Sunday, S. Heiser, and A. E. Bates. 2019. “Physiological Acclimation and Persistence of Ectothermic Species Under Extreme Heat Events.” *Global Ecology and Biogeography* 28 (7): 1018–37. <https://doi.org/10.1111/geb.12911>.

Pansch, Christian, Marco Scotti, Francisco R. Barboza, Balsam Al-Janabi, Janina Brakel, Elizabeta Briski, Björn Bucholz, et al. 2018. “Heat Waves and Their Significance for a Temperate Benthic Community: A Near-Natural Experimental Approach.” *Global Change Biology* 24 (9): 4357–67. <https://doi.org/10.1111/gcb.14282>.

Pardal-Souza, André Luiz, Gustavo Muniz Dias, Stuart Rees Jenkins, Áurea Maria Ciotti, and Ronaldo Adriano Christofoletti. 2017. “Shading Impacts by Coastal Infrastructure on Biological Communities from Subtropical Rocky Shores.” *Journal of Applied Ecology* 54 (3): 826–35. <https://doi.org/10.1111/1365-2664.12811>.

Perkins, S. E., and L. V. Alexander. 2013. “On the Measurement of Heat Waves.” *Journal of Climate* 26 (13): 4500–4517. <https://doi.org/10.1175/JCLI-D-12-00383.1>.

Perkins-Kirkpatrick, S. E., and S. C. Lewis. 2020. “Increasing Trends in Regional Heatwaves.” *Nature Communications* 11 (1): 3357. <https://doi.org/10.1038/s41467-020-16970-7>.

Reimer, A A. n.d. “Succession of Invertebrates in Vacant Tests of Tetracfita Stalactifera Panamensis,” 13.

Riemer, Kristina, Kristina J. Anderson-Teixeira, Felisa A. Smith, David J. Harris, and S. K. Morgan Ernest. 2018. “Body Size Shifts Influence Effects of Increasing Temperatures on Ectotherm Metabolism.” *Global Ecology and Biogeography* 27 (8): 958–67. <https://doi.org/10.1111/geb.12757>.

Román, Marta, Salvador Román, Elsa Vázquez, Jesús Troncoso, and Celia Olabarria. 2020. “Heatwaves During Low Tide Are Critical for the Physiological Performance of Intertidal Macroalgae Under Global Warming Scenarios.” *Scientific Reports* 10 (1): 21408. <https://doi.org/10.1038/s41598-020-78526-5>.

Scanes, Elliot, Laura M. Parker, Wayne A. O’Connor, Michael C. Dove, and Pauline M. Ross. 2020. “Heatwaves Alter Survival of the Sydney Rock Oyster, Saccostrea Glomerata.” *Marine Pollution Bulletin* 158 (September): 111389. <https://doi.org/10.1016/j.marpolbul.2020.111389>.

Scrosati, Ricardo A. 2017. “Community-Level Facilitation by Macroalgal Foundation Species Peaks at an Intermediate Level of Environmental Stress.” *Algae* 32 (1): 41–46. https://doi.org/<http://dx.doi.org/10.4490/algae.2017.32.2.20>.

Seabra, Rui, David S. Wethey, António M. Santos, and Fernando P. Lima. 2011. “Side Matters: Microhabitat Influence on Intertidal Heat Stress over a Large Geographical Scale.” *Journal of Experimental Marine Biology and Ecology*, Global change in marine ecosystems, 400 (1): 200–208. <https://doi.org/10.1016/j.jembe.2011.02.010>.

Seifert, Linda I., Guntram Weithoff, and Matthijs Vos. 2015. “Extreme Heat Changes Post‐heat Wave Community Reassembly.” *Ecology and Evolution* 5 (11): 2140–48. <https://doi.org/10.1002/ece3.1490>.

Siegle, Matthew R., Eric B. Taylor, and Mary I. O’Connor. 2018. “Prior Heat Accumulation Reduces Survival During Subsequent Experimental Heat Waves.” *Journal of Experimental Marine Biology and Ecology* 501 (April): 109–17. <https://doi.org/10.1016/j.jembe.2018.01.012>.

Smithson, Michael, and Jay Verkuilen. 2006. “A Better Lemon Squeezer? Maximum-Likelihood Regression with Beta-Distributed Dependent Variables.” *Psychological Methods* 11 (1): 54–71. <https://doi.org/10.1037/1082-989X.11.1.54>.

Sorte, Cascade J. B., Adam Fuller, and Matthew E. S. Bracken. 2010. “Impacts of a Simulated Heat Wave on Composition of a Marine Community.” *Oikos* 119 (12): 1909–18. <https://doi.org/10.1111/j.1600-0706.2010.18663.x>.

Straub, Sandra C., Thomas Wernberg, Mads S. Thomsen, Pippa J. Moore, Michael T. Burrows, Ben P. Harvey, and Dan A. Smale. 2019. “Resistance, Extinction, and Everything in Between – The Diverse Responses of Seaweeds to Marine Heatwaves.” *Frontiers in Marine Science* 6. <https://www.frontiersin.org/article/10.3389/fmars.2019.00763>.

Tituskin, Julia R., Shane M. Waddell, and Karen E. Mabry. n.d. “Species-Specific Responses to Warming Alter Community Composition.” *Ecological Entomology* n/a (n/a). Accessed February 1, 2022. <https://doi.org/10.1111/een.13112>.

Tomanek, Lars, and Brian Helmuth. 2002. “Physiological Ecology of Rocky Intertidal Organisms: A Synergy of Concepts1.” *Integrative and Comparative Biology* 42 (4): 771–75. <https://doi.org/10.1093/icb/42.4.771>.

Umanzor, S, L Ladah, Le Calderon-Aguilera, and Ja Zertuche-González. 2017. “Intertidal Macroalgae Influence Macroinvertebrate Distribution Across Stress Scenarios.” *Marine Ecology Progress Series* 584 (December): 67–77. <https://doi.org/10.3354/meps12355>.

Uyà, Marc, Fabio Bulleri, Jeffrey T. Wright, and Paul E. Gribben. 2020. “Facilitation of an Invader by a Native Habitat-Former Increases Along Interacting Gradients of Environmental Stress.” *Ecology* 101 (4): e02961. <https://doi.org/10.1002/ecy.2961>.

Vasseur, David A., John P. DeLong, Benjamin Gilbert, Hamish S. Greig, Christopher D. G. Harley, Kevin S. McCann, Van Savage, Tyler D. Tunney, and Mary I. O’Connor. 2014. “Increased Temperature Variation Poses a Greater Risk to Species Than Climate Warming.” *Proceedings of the Royal Society B: Biological Sciences* 281 (1779): 20132612. <https://doi.org/10.1098/rspb.2013.2612>.

Wang, Hui-Yu, Ling Ming Tsang, Fernando P. Lima, Rui Seabra, Monthon Ganmanee, Gray A. Williams, and Benny K. K. Chan. 2020. “Spatial Variation in Thermal Stress Experienced by Barnacles on Rocky Shores: The Interplay Between Geographic Variation, Tidal Cycles and Microhabitat Temperatures.” *Frontiers in Marine Science* 7. <https://www.frontiersin.org/article/10.3389/fmars.2020.00553>.

Wernberg, Thomas, Dan A. Smale, Fernando Tuya, Mads S. Thomsen, Timothy J. Langlois, Thibaut de Bettignies, Scott Bennett, and Cecile S. Rousseaux. 2013. “An Extreme Climatic Event Alters Marine Ecosystem Structure in a Global Biodiversity Hotspot.” *Nature Climate Change* 3 (1): 78–82. <https://doi.org/10.1038/nclimate1627>.

Yang, Yu-Jie, Zhi-Gao Zeng, Ke-Fan Xing, Shu-Ran Li, Chun-Sheng Yang, and Wei-Guo Du. 2020. “Behavioural Thermoregulation by the Endangered Crocodile Lizard (Shinisaurus Crocodilurus) in Captivity.” *Journal of Thermal Biology* 93 (October): 102731. <https://doi.org/10.1016/j.jtherbio.2020.102731>.