

Curriculum vitae



Prof. dr. Marten Scheffer (13 September 1958)

Center for Water and Climate
Wageningen University, The Netherlands

Academic Education:

- PhD. in Ecology. University of Utrecht (1990). Dissertation ‘Simple models as useful tools for ecologists’.
- MSc. in Ecology. University of Utrecht (1985) with the ‘cum laude’ honour award.

Academic Positions:

- Distinguished professor at Wageningen University (2018-now)
- Head of the Aquatic Ecology and Water Quality Management department (a group of about 25 scientists, technicians, and graduate students; for information see our website: <http://www.aew.wur.nl/uk/>) at the Wageningen University, The Netherlands (1998-2018)
- Senior researcher at the Institute for Inland Water Management and Waste Water Treatment (a national institute for applied research). The Netherlands (1987-1997).
- Researcher at the Institute for Forestry and Landscape Planning De Dorschkamp, Wageningen, The Netherlands (1985-1987)

Citation impact and publication profile:

The impact of Scheffer’s scientific work is reflected in his recognition by Thompson Reuters 2022 ISI analysis as belonging to the highly cited world top, described by this authority as: “world’s leading scientific minds”. Scheffer has an H-index of 103, and published about 313 peer-reviewed papers and two monographs. His papers appeared in the top journals of the field. For instance, he has published 11 papers in Nature, 14 in Science and 32 in PNAS.

Research lines

Scheffer is interested in unravelling the mechanisms that determine the stability and resilience of complex systems. Although much of his work has focused on the ecosystems of lakes, he also worked with a range of scientists from other disciplines to address issues of stability and shifts in natural and social systems. Examples include the feedback between atmospheric carbon and the earth temperature, the collapse of ancient societies, inertia and shifts in public opinion, evolutionary emergence of patterns of species similarity, the effect of climatic extremes on forest dynamics and the balance of facilitation and competition in plant communities.

Among the early contributions of Scheffer is his research showing that lakes can have alternative stable states. His classic article on the issue (TREE 1993) has now 1928 cites and his best-selling book ‘Ecology of Shallow lakes’ has become a cornerstone of the field (1940 cites). Scheffer

subsequently demonstrated that many ecosystems have tipping points where catastrophic shifts may happen.

Research on plankton inspired Scheffer's long line of work on complex dynamics, leading among other things to a 2008 co-publication in *Nature* demonstrating chaos in a real food web. He currently uses simple lab-systems with plankton to test theories of stability in complex systems, resulting in a well-cited publication (*Nature* 2012) where cyanobacterial dynamics are demonstrated to display theoretically predicted early warning signals for critical transitions.

In climate science Scheffer proposed a method that allows the estimation of the magnitude of a crucial positive feedback in global warming, i.e. higher temperatures promote the release of greenhouse gases from terrestrial ecosystems and oceanic denitrification and stratification, limiting algal growth and thus reducing the oceanic CO₂ sink (*Geophys Res Lett* 2006), and showed that abrupt climate shifts in the past were preceded by early warning signals associated to tipping points (*PNAS* 2008, 618 cites). He contributed to a study of the risk that self-reinforcing feedbacks could push the Earth System toward a planetary threshold (*PNAS* 2018, 1348 cites). Recently he analysed how the climatic envelope where humans live ('human niche') is projected to change due to climate change (*PNAS*, 2020, 232 citations).

An influential line of work was initiated when Scheffer organized a workshop and wrote a review about generic early warning signals for critical transitions in ecosystems, as well as financial markets and the climate (*Nature* 2009, 2480 cites). He now works on linking that theory to empirical data, which resulted in a publication showing how rainforest fragility can be deduced from remote sensing data (*Science* 2011, 749 cites) and the aforementioned paper on cyanobacterial early warning signals (*Nature* 2012, 276 cites). Together with psychologists Scheffer also applied this theory to predict the onset and termination of depression (*PNAS*, 2014, 378 cites) and with animal scientists and medical doctors on the chronic diseases (*PNAS* 2018, 140 cites).

In addressing the classical question of 'Why are there so many species?' Scheffer showed that evolution tends to produce self-organized groups of look-a-likes that are basically more of the same as they share a niche (*PNAS* 2006, 384 cites). With respect to the stunning consequences of this result *Nature* (2006) wrote that it "revitalized the fundamental question of how we should look at the ecological identity of species". In 2017 this line of work resulted in the *PNAS* paper on "Inequality in Nature and Society" (*PNAS*, 56 cites).

Scheffer also co-published a series of articles with social scientists on resilience and transitions in societies, for instance the loss of resilience of ancient societies (*PNAS*, 2021). Princeton University press published in 2009 his book on 'Critical Transitions in Nature and Society' (1081 cites), bringing this work to the attention of a broader audience.

Leadership

Scheffer is a member of the science board of the Resilience

Alliance (<http://www.resalliance.org/1.php>), a group of ecologists, economists, and specialists in organisational dynamics, politics, and sociology aiming at developing a innovative research on resilient society-nature interactions. In addition Scheffer has served on various Science Boards such as the ones of the Beijer Institute of Ecological Economics (<http://www.beijer.kva.se/>) and the IGBP program GLOBEC (<http://www.pml.ac.uk/globec/>). Scheffer is also active in setting up new institutes for interdisciplinary research such as IPL (<http://www.paralimes.org/>), and the South American Institute for Resilience and Sustainability Science (SARAS <http://www.saras-institute.org/en/index.html>). In addition he founded the Synergy Program for Analyzing Resilience

and Critical Transitions (SparcS <http://www.sparcs-center.org/>). The workshops and networks organized through SparcS span a very broad range of transdisciplinary topics including medicine, ecology, social sciences, climate studies and arts. Scheffer's [vision](#) on stimulating interdisciplinary top-science have been highlighted in Nature magazine (451: 872-873).

International visibility, activities, awards, scholarships

Scheffer's scientific leadership profile is perhaps best summarized by a citation from the Jury Report of the 2009 Spinoza Award: "The ecologist from Wageningen is a charismatic leader who builds up institutes and attracts students both in the Netherlands and internationally. He is a free thinker with a rare breadth of thought as well as an independent and creative innovator. His students and colleagues praise the simplicity with which he explains complex issues and his qualities as a lecturer are highly praised from many sides. Marten Scheffer is an influential but above all surprising and inspiring scientist who repeatedly crosses and pushes back the boundaries between various scientific disciplines." His work was highlighted in an exceptional three page [portrait](#) of in Science Magazine (345: 1552-1554).

In addition to the Dutch national science price (the Spinoza award) Scheffer received an earlier ERC advanced grant in 2010. The Ecological Society of America awarded the Sustainability Science Award to Scheffer's work on catastrophic shifts in 2004, and made him an honorary member in 2011. Scheffer also received a prestigious grant from the Dutch government for work on climate tipping points as part of a 26 million consortium (Gravitation grant, NESSC 2015-2023). He was elected into the National Academy of sciences in 2012.

Selected publications

- 1) Hughes, T. P.,... M. Scheffer. (2017). "Coral reefs in the Anthropocene." *Nature* 546:82-90.
- 2) Arani, B. M. S., ... M. Scheffer. (2021). "Exit time as a measure of ecological resilience". *Science* 372:eaay4895.
- 3) Scheffer, M., et al. (2009). "Early-warning signals for critical transitions." *Nature* 461(7260): 53-59.
- 4) Scheffer, M., et al. (2012). "Anticipating critical transitions." *Science* 338(6105): 344-348.
- 5) Scheffer, M. et al. *Creating a safe operating space for iconic ecosystems* (2015). *Science* 347, 1317-1319.
- 6) Veraart, ... M. Scheffer (2012). "Recovery rates reflect distance to a tipping point in a living system." *Nature* 481(7381): 357-359.
- 7) Hirota, ... M. Scheffer (2011). "Global resilience of tropical forest and savanna to critical transitions." *Science* 334(6053): 232-235.
- 8) Rockström J, .. Scheffer M,.. et al (2009). "A safe operating space for humanity." *Nature* 461:472-475.
- 9) Steffen, W.. Scheffer ...et al. (2018) "Trajectories of the Earth System in the Anthropocene". *Proceedings of the National Academy of Sciences of the United States of America* 115:8252-8259.
- 10) Estes, J. A. .. Scheffer .. et al. (2011) *Trophic downgrading of planet earth*. *Science* 333, 301-306

Monographs

- Scheffer M. (1998) *Ecology of Shallow Lakes* Chapman and Hall.
- Scheffer M. (2009) *Critical Transitions in Nature and Society* Princeton University Press

Selected invited presentations

Scheffer received invitations to give presentations from across the globe about every week, but has become highly selective in order to safe-guard quality time for my research and students. Here are a few examples of presentations Scheffer did give to get a flavour.

- "Anticipating Critical Transitions" At the 2013 annual AAAS meeting in Boston
- "Complexity and abrupt transitions" Conference on Complex Systems, 2015, Arizona
- "Tipping points for policy makers" presentations in 2013 and 2015 for the scientific advisory boards of the Dutch government.
- "Critical Transitions in Nature and Society" 2012 Grantham special lecture at Imperial College, London
- "Early warning signals" Lorentz Centre conference on Socio-Economic Complexity.
- "Concerted Science" a series of reflections on science and art given during 2012 in theatres in the Netherlands ranging from Paradiso to the royal Academy of Sciences
- "Catastrophic Shifts in Theory and Nature" at 2006 Annual Meeting Ecological Society of America Memphis USA August 6-11, 2006
- "Thresholds for catastrophic shifts in Nature and Society" Public lecture at Royal Swedish Academy. Stockholm Sweden; September 4 2007
- "Critical Transitions" at 2008 Conference on Resilience, adaptation and transformation Stockholm Sweden April 14-17 2008

Research Expedition

South American Lake Gradient Analysis (SALGA) Scheffer designed and led this expedition (2006) at which 100 lakes were sampled in a climatic gradient from the north of Brazil to Tierra del Fuego to collect information needed for prognosis of climate change effects. He obtained funding from the Dutch national science foundation NWO and from the National Geographic Society for the basics, and then invited a range of groups in South America to join the effort and share the data.

Advisory boards

- Resilience Alliance (<http://www.resalliance.org/1.php>), a group of ecologists, economists, and specialists in organisational dynamics, politics, and sociology aiming at developing an innovative research on resilient society-nature interactions.
- Beijer Institute of Ecological Economics (<http://www.beijer.kva.se/>)
- IGBP program GLOBEC (<http://www.pml.ac.uk/globec/>).
- Resilience 2008 First World Conference on Resilience, adaptation and transformation. Stockholm Sweden April 14-17 2008
- The 6th European Conference on Ecological Modeling ECEM'07: Challenges for ecological modeling in a changing world. Trieste, Italy, November 27-30, 2007
- Shallow Lakes 2008. Montevideo, Uruguay November 23-28 2008

Awards

Scheffer received the Spinoza Award in 2009. This is the highest award in Science in the Netherlands, nicknamed 'The Dutch Nobel Prize'. Also Scheffer received the Sustainability Science Award by the Ecological Society of America, for the most significant contribution in this field over the past 5 years, and was elected as a member into the Royal Dutch Academy of Sciences. In 2017 Scheffer received the Spanish BBVA Foundation Frontiers of Knowledge Award for his work on the ecology of shallow lakes. In addition there is a series of awards and prizes of more modest character.

Founding Institutes for excellence in interdisciplinary research

- IPL a European initiative to cross borders between disciplines (<http://www.paralimes.org/>). Scheffer is in the board of founding fathers together with 5 Nobel laureates.
- South American Institute for Resilience and Sustainability Science (SARAS <http://www.saras-institute.org/en/index.html>). This Institute initiated and led by Scheffer is being constructed in Uruguay and will host working groups, courses and sabbaticals.
- In addition he founded the Synergy Program for Analyzing Resilience and Critical Transitions (SparcS <http://www.sparcs-center.org/>). The workshops and networks organized through SparcS span a very broad range of transdisciplinary topics including medicine, ecology, social sciences, climate studies and arts.

Full publication list

- Calderón-Contreras, R., P. Balvanera, M. Trimble, A. Langle-Flores, E. Jobbágy, M. Maass Moreno, J. Marcone, N. Mazzeo, M. M. Muñoz Anaya, I. A. Ortiz-Rodríguez, M. Perevochtchikova, S. Avila-Foucat, M. Bonilla-Moheno, L. Beth Clark, M. Equihua, B. Ayala-Orozco, I. Bueno, L. Hensler, J. C. Leyva Aguilera, M. Martínez Ramos, J. Merçon, M. A. Mesa-Jurado, H. Österblom, R. Pacheco-Vega, B. Pérez Alcántara, O. Pérez-Maqueo, L. Porter-Bolland, S. Quijas, L. E. Quiroz Rosas, E. Rios Patron, J. C. Rocha-Gordo, I. A. Rojo Negrete, L. P. Romero-Duque, J. A. Rosell, M. Scheffer, L. B. Vázquez, M. Villada Canela, and M. Velázquez. 2022. A regional PECS node built from place-based social-ecological sustainability research in Latin America and the Caribbean. *Ecosystems and People* 18:1-14.
- Carpenter, S. R., B. M. S. Arani, E. H. Van Nes, M. Scheffer, and M. L. Pace. 2022. Resilience of phytoplankton dynamics to trophic cascades and nutrient enrichment. *Limnology and Oceanography* 67:S258 - S265.
- Chapin, F. S., E. U. Weber, E. M. Bennett, R. Biggs, J. van den Bergh, W. N. Adger, A.-S. Crépin, S. Polasky, C. Folke, and M. Scheffer. 2022. Earth stewardship: Shaping a sustainable future through interacting policy and norm shifts. *Ambio*:1-14.
- Kemp, L., C. Xu, J. Depledge, K. L. Ebi, G. Gibbins, T. A. Kohler, J. Rockstrom, M. Scheffer, H. J. Schellnhuber, W. Steffen, and T. M. Lenton. 2022. Climate Endgame: Exploring catastrophic climate change scenarios. *Proceedings of the National Academy of Sciences of the United States of America* 119.
- Kemp, L., C. Xu, J. Depledge, K. L. Ebi, G. Gibbins, T. A. Kohler, J. Rockstrom, M. Scheffer, H. J. Schellnhuber, W. Steffen, and T. M. Lenton. 2022. Reply to Kelman: The foundations for studying catastrophic climate risks. *Proceedings of the National Academy of Sciences of the United States of America* 119.

- Kemp, L., C. Xu, J. Depledge, K. L. Ebi, G. Gibbins, T. A. Kohler, J. Rockström, M. Scheffer, H. J. Schellnhuber, W. Steffen, and T. M. Lenton. 2022. Reply to Bhowmik et al.: Democratic climate action and studying extreme climate risks are not in tension. *Proceedings of the National Academy of Sciences of the United States of America* 119.
- Kemp, L., C. Xu, J. Depledge, K. L. Ebi, G. Gibbins, T. A. Kohler, J. Rockström, M. Scheffer, H. J. Schellnhuber, W. Steffen, and T. M. Lenton. 2022. Reply to Burgess et al: Catastrophic climate risks are neglected, plausible, and safe to study. *Proceedings of the National Academy of Sciences of the United States of America* 119.
- Lacerot, G., S. Kosten, R. Mendonça, E. Jeppesen, J. L. Attayde, N. Mazzeo, F. Teixeira-de-Mello, G. Cabana, M. Arim, J. H. Cantarino Gomes, S. Tserenpil, and M. Scheffer. 2022. Large fish forage lower in the food web and food webs are more truncated in warmer climates. *Hydrobiologia* 849:3877-3888.
- Lenton, T. M., C. A. Boulton, and M. Scheffer. 2022. Resilience of countries to COVID-19 correlated with trust. *Scientific reports* 12.
- Levin, S. A., J. M. Anderies, N. Adger, S. Barrett, E. M. Bennett, J. C. Cardenas, S. R. Carpenter, A. S. Crépin, P. Ehrlich, J. Fischer, C. Folke, N. Kautsky, C. Kling, K. Nyborg, S. Polasky, M. Scheffer, K. Segerson, J. Shogren, J. van den Bergh, B. Walker, E. U. Weber, and J. Wilen. 2022. Governance in the Face of Extreme Events: Lessons from Evolutionary Processes for Structuring Interventions, and the Need to Go Beyond. *Ecosystems* 25:697-711.
- Meerhoff, M., J. Audet, T. A. Davidson, L. De Meester, S. Hilt, S. Kosten, Z. Liu, N. Mazzeo, H. Paerl, M. Scheffer, and E. Jeppesen. 2022. Feedback between climate change and eutrophication: revisiting the allied attack concept and how to strike back. *Inland Waters* 12:187-204.
- Pinto, S., E. Benincà, E. H. van Nes, M. Scheffer, and J. A. Bogaards. 2022. Species abundance correlations carry limited information about microbial network interactions. *PLoS computational biology* 18.
- Promislow, D., R. M. Anderson, M. Scheffer, B. Crespi, J. DeGregori, K. Harris, B. N. Horowitz, M. E. Levine, M. A. Riolo, D. S. Schneider, S. L. Spencer, D. R. Valenzano, and M. E. Hochberg. 2022. Resilience integrates concepts in aging research. *iScience* 25.
- Scheffer, M., D. Borsboom, S. Nieuwenhuis, and F. Westley. 2022. Belief traps: Tackling the inertia of harmful beliefs. *Proceedings of the National Academy of Sciences of the United States of America* 119.
- Scheffer, M., I. van de Leemput, E. Weinans, and J. Bollen. 2022. Reply to Sun: Making sense of language change. *Proceedings of the National Academy of Sciences of the United States of America* 119.
- Spisak, B. R., B. State, I. van de Leemput, M. Scheffer, and Y. Liu. 2022. Large-scale decrease in the social salience of climate change during the COVID-19 pandemic. *PLoS one* 17.
- Arani, B. M. S., S. R. Carpenter, L. Lahti, E. H. van Nes, and M. Scheffer. 2021. Exit time as a measure of ecological resilience. *Science* 372:eaay4895.
- Bollen, J., M. ten Thij, F. Breithaupt, A. T. J. Barron, L. A. Rutter, L. Lorenzo-Luaces, and M. Scheffer. 2021. Historical language records reveal a surge of cognitive distortions in recent decades. *Proceedings of the National Academy of Sciences of the United States of America* 118.
- Bury, T. M., R. I. Sujith, I. Pavithran, M. Scheffer, T. M. Lenton, M. Anand, and C. T. Bauch. 2021. Deep learning for early warning signals of tipping points. *Proceedings of the National Academy of Sciences of the United States of America* 118.
- Folke, C., S. Polasky, J. Rockström, V. Galaz, F. Westley, M. Lamont, M. Scheffer, H. Österblom, S. R. Carpenter, F. S. Chapin, III, K. C. Seto, E. U. Weber, B. I. Crona, G. C. Daily, P. Dasgupta, O. Gaffney, L. J. Gordon, H. Hoff, S. A. Levin, J. Lubchenco, W. Steffen, and B. H. Walker. 2021. Our future in the Anthropocene biosphere. *Ambio* 50:834-869.
- Janssens, M., J. Vilà-Guerau de Arellano, M. Scheffer, C. Antonissen, A. P. Siebesma, and F. Glassmeier. 2021. Cloud Patterns in the Trades Have Four Interpretable Dimensions. *Geophysical Research Letters* 48.
- Johan Bollen, M. t. T., Fritz Breithaupt, Alexander T.J. Barron, Lauren Rutter, Lorenzo Luaces and Marten Scheffer. 2021. A surge of cognitive distortions in societal language. under revision.
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- Levin, S. A., J. M. Anderies, N. Adger, S. Barrett, E. M. Bennett, J. C. Cardenas, S. R. Carpenter, A. S. Crépin, P. Ehrlich, J. Fischer, C. Folke, N. Kautsky, C. Kling, K. Nyborg, S. Polasky, M. Scheffer, K. Segerson, J. Shogren, J. van den Bergh, B. Walker, E. U. Weber, and J. Wilen. 2021. Governance in the Face of

Extreme Events: Lessons from Evolutionary Processes for Structuring Interventions, and the Need to Go Beyond. Ecosystems.

- Mirza, M. U., C. Xu, B. v. Bavel, E. H. van Nes, and M. Scheffer. 2021. Global inequality remotely sensed. *Proceedings of the National Academy of Sciences* 118:e1919913118.
- Scheffer, M., I. van de Leemput, E. Weinans, and J. Bollen. 2021. The rise and fall of rationality in language. *Proceedings of the National Academy of Sciences* 118.
- Scheffer, M., E. H. van Nes, D. Bird, R. K. Bocinsky, and T. A. Kohler. 2021. Loss of resilience preceded transformations of pre-Hispanic Pueblo societies. *Proceedings of the National Academy of Sciences* 118:e2024397118.
- van Bavel, B. and M. Scheffer. 2021. Historical effects of shocks on inequality: the great leveler revisited. *Humanities and Social Sciences Communications* 8:1-9.
- van der Bolt, B., E. H. van Nes, and M. Scheffer. 2021. No warning for slow transitions. *Journal of the Royal Society, Interface* 18:20200935.
- Barrett, S., A. Dasgupta, P. Dasgupta, W. Neil Adger, J. Anderies, J. van den Bergh, C. Bledsoe, J. Bongaarts, S. Carpenter, F. Stuart Chapin, III, A. S. Crépin, G. Daily, P. Ehrlich, C. Folke, N. Kautsky, E. F. Lambin, S. A. Levin, K. G. Mäler, R. Naylor, K. Nyborg, S. Polasky, M. Scheffer, J. Shogren, P. S. Jørgensen, B. Walker, and J. Wilen. 2020. Social dimensions of fertility behavior and consumption patterns in the Anthropocene. *Proceedings of the National Academy of Sciences of the United States of America* 117:6300-6307.
- Bathiany, S., J. Hidding, and M. Scheffer. 2020. Edge Detection Reveals Abrupt and Extreme Climate Events. *Journal of Climate* 33:6399-6421.
- Carpenter, S. R., B. M. S. Arani, P. C. Hanson, M. Scheffer, E. H. Stanley, and E. Van Nes. 2020. Stochastic dynamics of Cyanobacteria in long-term high-frequency observations of a eutrophic lake. *Limnology and Oceanography Letters* 5:331-336.
- Folke, C., H. Österblom, J. B. Jouffray, E. F. Lambin, W. N. Adger, M. Scheffer, B. I. Crona, M. Nyström, S. A. Levin, S. R. Carpenter, J. M. Anderies, S. Chapin, III, A. S. Crépin, A. Dauriach, V. Galaz, L. J. Gordon, N. Kautsky, B. H. Walker, J. R. Watson, J. Wilen, and A. de Zeeuw. 2020. An invitation for more research on transnational corporations and the biosphere. *Nature Ecology and Evolution* 4:494.
- Gijzel, S. M. W., J. Rector, F. B. van Meulen, R. S. van der Loeff, I. A. van de Leemput, M. Scheffer, M. G. M. Olde Rikkert, and R. J. F. Melis. 2020. Measurement of Dynamical Resilience Indicators Improves the Prediction of Recovery Following Hospitalization in Older Adults. *Journal of the American Medical Directors Association* 21:525-530.e524.
- Hennekam, R., B. van der Bolt, E. H. van Nes, G. J. de Lange, M. Scheffer, and G. J. Reichart. 2020. Early-Warning Signals for Marine Anoxic Events. *Geophysical Research Letters* 47.
- Lever, J. J., I. A. van de Leemput, E. Weinans, R. Quax, V. Dakos, E. H. van Nes, J. Bascompte, and M. Scheffer. 2020. Foreseeing the future of mutualistic communities beyond collapse. *Ecology letters* 23:2-15.
- Polasky, S., A. S. Crépin, R. O. Biggs, S. R. Carpenter, C. Folke, G. Peterson, M. Scheffer, S. Barrett, G. Daily, P. Ehrlich, R. B. Howarth, T. Hughes, S. A. Levin, J. F. Shogren, M. Troell, B. Walker, and A. Xepapadeas. 2020. Corridors of clarity: Four principles to overcome uncertainty paralysis in the anthropocene. *BioScience* 70:1139-1144.
- Rodríguez-Sánchez, P., E. H. Van Nes, and M. Scheffer. 2020. Neutral competition boosts cycles and chaos in simulated food webs: Neutral competition boosts chaos. *Royal Society Open Science* 7.
- Rodríguez-Sánchez, P., E. H. van Nes, and M. Scheffer. 2020. Climbing Escher's stairs: A way to approximate stability landscapes in multidimensional systems. *PLoS computational biology* 16:e1007788.
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- Usman Mirza, M., A. Richter, E. H. van Nes, and M. Scheffer. 2020. Institutions and inequality interplay shapes the impact of economic growth on biodiversity loss. *Ecology and Society* 25:1-11.
- Walker, B., S. R. Carpenter, C. Folke, L. Gunderson, G. D. Peterson, M. Scheffer, M. Schoon, and F. R. Westley. 2020. Navigating the chaos of an unfolding global cycle. *Ecology and Society* 25:1-4.
- Xu, C., T. A. Kohler, T. M. Lenton, J.-C. Svenning, and M. Scheffer. 2020. Future of the human climate niche. *Proceedings of the National Academy of Sciences* 117:11350-11355.

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- Dakos, V., B. Matthews, A. P. Hendry, J. Levine, N. Loeuille, J. Norberg, P. Nosil, M. Scheffer, and L. De Meester. 2019. Ecosystem tipping points in an evolving world. *Nature Ecology and Evolution* 3:355-362.
- Fan, R., O. Varol, A. Varamesh, A. Barron, I. A. van de Leemput, M. Scheffer, and J. Bollen. 2019. The minute-scale dynamics of online emotions reveal the effects of affect labeling. *Nature Human Behaviour* 3:92-100.
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