Editorial

Addressing climate change – science journals could lead via themed issues

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Based on current trends in global CO_2 emissions, the world is heading towards a 3°C temperature increase above pre-industrial levels by the end of the century.[1] The overwhelming majority of scientists agree that such an increase will have devastating effects on Earth, affecting our biosphere and our societies in serious and unpredictable ways. Yet although most people are aware of climate change to at least some extent, governments, companies, and individual consumers seem extraordinarily reluctant to take concrete steps to mitigate the consequences. It is important that science journals take a lead in challenging passivity and helplessness, and encouraging change.

Evidence and projections

The overall thrust of scientific evidence is unarguable. Preliminary data point to a 2.7% increase in fossil CO_2 emissions for 2018[2] compared with 2017, attributed mainly to China and the United States whereas an annual growth rate of 2% was generally assumed in the current climate models. This is bad news, since it is a prerequisite to lower CO_2 emissions by at least 49% by 2030 (as compared to 2017 emissions) to limit increase in temperature above pre-industrial levels[1] to the crucial 1.5°C. As the Intergovernmental Panel on Climate Change (IPCC) shows in its recent report, even this temperature increase will be associated with a high risk for extreme weather events, coastal flooding, melting in the Arctic region, poor yields in low-latitude fisheries, and a very high risk of damage to warm-water corals.[1] At a 2°C increase, as negotiated in Paris, risks are substantially higher, affecting also terrestrial ecosystems: crop yields, and fluvial flooding. This additional 0.5°C increase will expose an additional 1.5 billion people to deadly heat waves and hundreds of millions to vector-borne diseases.[3]

The IPCC report concludes that global warming is accelerating rather than slowing, owing to rising emissions, declining air pollution (which cools the planet), and natural climate oscillations. Yangyang *et al* point out that we could reach 1.5°C by 2030[3] rather than 2040 as projected earlier.[1] These climate changes will last centuries. Lenton *et al*. (2008) suggest that certain temperature thresholds could initiate irreversible processes. The authors point to melting of the Arctic sea-ice and the Greenland ice sheet as so-called tipping elements for irreversible destruction.[4] Although the planetary threshold is uncertain, an increase of 2°C was suggested as a tipping point.[5] The consequences on our living conditions are detailed in a recent report published in The Lancet by Watts *et al*.: for example, 18 million more people were exposed to heat waves in 2017 compared to 2016, 30 countries experienced a trend to lower crop yields, and tropical diseases like dengue fever, malaria, and cholera are occurring in new and unexpected places.[6] It is estimated that every additional ton of CO_2 released into the atmosphere will entail social costs of 417 US $.[7] Those costs, however, are unequally distributed: the burden for India will be highest, followed by the United States, Saudi Arabia, Brazil and China.[7]

The United Nations Emissions Gap Report 2018 underscores that the global peak in emissions needs to be no later than 2020 as a condition for achieving the Paris goals.[8] And by 2030, global emissions must be approximately 25% lower than 2017 to reach the 2°C goal and 55% lower to limit warming to 1.5°C.[8] This is possible, but unprecedented measures are required by all nations.

Movements and mitigation

There is hope. Political and social movements concerned with climate are becoming stronger, more focused, and engaging in all aspects of society. For example, the Global Covenant of Mayors are competing to achieve the most climate friendly cities, setting up new urban planning concepts, efficient transport systems, decentralised energy production, and waste management.[9] Technological innovations are making solar energy more competitive. The cost of solar panels has fallen by 80% within the last decade, reducing the production costs of solar energy in countries like Morocco or Chile by approximately three US cents/kilowatt hour, and making it cheaper than natural gas.[10] In 2017, the global share of renewable energy worldwide was 25%, with China and the US accounting for 50% of this unexpected growth.[11] The world-wide photovoltaic capacity reached nearly 400 GW by the end of 2017.[11] In the developing world, renewables now have the highest share of all new power generation technologies.[9] At the global action climate summit in San Francisco, 6225 companies, representing US$ 36.5 trillion in revenues from 120 countries, committed to contribute to the Paris goals.[12]

By any standard, climate change is the most pressing issue humanity is facing today. It is fair to say that climate change and its social consequences will affect every human being and virtually every realm of science. To meet this imperative, I propose that science journals, and especially members of EASE, consider preparing a themed issue to elucidate the manifold and often unpredictable consequences of climate change in a truly multi-disciplinary perspective. This could demonstrate the implications to both the readership of the respective journals and the general public, eg via press releases and other information channels. What would a themed issue look like? Maybe 2-3 articles with an introductory editorial could spark interest. A medical journal might select papers where an association of higher temperatures with adverse

outcomes is demonstrated whereas an agriculture journal could publish articles on plant drought stress and the ways to mitigate these problems. Social scientists and psychologists could investigate how people deal with the information on climate change in terms of coping strategies or changing consumer behaviours. I believe that nearly every scientific discipline will experience some impacts from climate change and hence will find exciting topics for their readership. Original research articles should be the first priority since they attract the highest attention. I volunteer to help in coordinating such a joint effort and I invite interested fellow editors to form a network for support and exchange.

References

1 Intergovernmental Panel on Climate Change. Global warming of 1.5°C. 2018 https://report.ipcc.ch/sr15/pdf/sr15_spm_final.pdf

2 Le Quéré C, Andrew RM, Friedlingstein P *et al*. Global carbon budget 2018. *Earth Systems Science Data* 2018; 10: 2141-94.

3 Yangyang X, Ramanathan V, Victor DG: Global warming will happen faster than we think. *Nature* 2018; 564: 30-2.

4 Lenton TM, Held H, Kriegler E *et al*. Tipping elements in the Earth's climate system. *Proceedings of the National Academy of Sciences* 2008; 105: 1786-93.

5 Schellnhuber HJ, Rahmsdorf S, Winkelmann R. Why the right climate target was agreed in Paris. *Nature Climate Change* 2016; 6: 649-53.

6 Watts N, Amann M, Arnell N *et al*. The 2018 report of the *Lancet* countdown on health and climate change: shaping the health of nations for centuries to come. *Lancet* 2018; 392(10163):2479-514.

7 Ricke K, Drouet L, Caldeira K, Tavoni M. Country level social costs of carbon. *Nature Climate Change* 2018; 8: 895-900.

8 UN Environment. Emissions Gap Report 2018. www.unenvironment.org/resources/emissions-gap-report-2018

9 The Global Covenant of Mayors for Climate & Energy. https://www.globalcovenantofmayors.org/

10 Figueres C, Le Quéré C, Mahindra A *et al*. Emissions are still rising: ramp up the cuts. *Nature* 2018; 564: 27-30.

11 Global Energy & CO_2 Status Report 2017 IAE 2018. www.iea.org/geco/renewables/

12 Assessing global climate action after the California summit. https://static1.squarespace.com/static/552be32ce4b0b269a4e2ef58/t/5bdb1dd08a922d1e35834d17/1541086672928/25+Assessing+global+climate+action+after+the+California+summit+-+Key+messages+for+COP24.pdf

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