WIREs Climate Change 2018: an editorial

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It was just over 10 years ago in 2007 that I was approached by John Wiley & Sons inquiring as to my interest in taking the lead editor's role in shaping a new interdisciplinary review journal covering climate change. After two years of planning, the first issue of *WIREs Climate Change* was published in February 2010 and this issue marks the beginning of Volume 9. As the journal approaches its tenth anniversary I reflect here on recent developments in the journal and further afield in climate change publishing and research. This editorial should therefore be seen as following in the line of my earlier editorials (Hulme, 2010; 2014).

This editorial also signals my recent move from King's College London to the University of Cambridge, in both cases holding positions in departments of geography. For those who have heard me speak on climate change you will know that I make no apologies for my belief in the primacy of 'geography' as a disciplinary space in which the many dimensions of climate change as a socio-natural phenomenon can best be studied and taught. Geography, at least in the UK, knows no intellectual boundaries and this is reflected in my approach to curating the content of *WIREs Climate Change*. The scope of climate change reviews published here very deliberately covers humanities disciplines and interpretative social sciences, as well as the social sciences more broadly, and environmental geography, the natural sciences and economics. Over the last four years we have published an average of 50 review articles per year, with a growing number of reviews looking at aspects of climate engineering (e.g. Linner & Wibeck, 2015; Irvine et al., 2016) and from Chinese authors (e.g. Fan, 2015; Liu et al., 2017; Zhang, 2017). We have also published reviews from environmental theologians (e.g. Clingerman and O'Brien, 2017), eco-critics (e.g. Boulton, 2016) and visual arts scholars (e.g. Nurmis, 2016).

There have been a few changes to the Executive Editorial Board of the journal since 2014 and these are reflected in Table 1. Lisa Dilling has taken over the domain of vulnerability and adaptation to climate change from Maria Carmen Lemos, Anita Engels the domain of the social status of climate change knowledge from Myanna Lahsen, Karin Bäckstrand the domain of climate policy and governance from Matt Hoffman and Jessica Trancik the domain of the carbon economy and climate mitigation from Kelly Gallagher. Of the 14 executive editors, eight are from Europe, four from the USA and one each from South America and southeast Asia. Women outnumber men, eight to six. It is also worth pointing out two related *WIREs* titles: *WIREs Energy and Environment* which started publishing in 2012 and *WIREs Water* publishing since 2014. Also publishing review articles, these two journals publish some inter-disciplinary material which intersects with the content of *WIREs Climate Change* in the areas of climate mitigation and climate impacts respectively.

The Continued Emergence of New ‘Climat’ Journals

In my original 2010 editorial on the launch of *WIREs Climate Change* (Hulme, 2010), I listed the 14 academic journals which were then publishing using the string ‘climat’ in their title. *WIREs Climate Change* was the 15th such journal to launch in a history dating back to 1948 with the publication of *Theoretical and Applied Climatology*. By 2014 this number had doubled to 27 (Hulme, 2014). Since then, another 11 ‘climat’ journals need adding to the list, including four that I had missed back in 2014—*Environmental and Climate Technologies* (2009); *Climate Law* (2010); *Advances in Climate Change Research* (2010); *British Journal of Environment and Climate Change* (2011). This brings the total to 38, nearly three times the number when *WIREs Climate Change* was launched in 2010 (see Table 2).

These 11 additional ‘climat’ journals reflect the continued salience of climate in everyday public and political life around the world, as well as the evolving scope of climate research and academic scholarship. New journals have launched covering climate and law, climate and ecology (e.g. *Climate Change Responses*) and climate services, as well as a clutch of new wide-ranging multidisciplinary journals (e.g. *Current Climate Change Reports*). The disciplinary scope or boundaries of some of these new journals is not always clear (e.g. *British Journal of Environment and Climate Change*), but the topic of climate (as captured through the string ‘climat’) continues to be a popular attractor around which new journals emerge and publishers commitⁱ. These new titles are nearly all fully open-access, reflecting the changing academic journal publishing environment, with just a couple offering mixed-mode publishing—i.e., subscription access plus an open-access ‘gold’ option. Predatory journals remain a serious threat to the integrity of the scientific enterprise (e.g. Moher et al., 2017) and care should always be exercised by prospective authors in establishing the integrity of the practices and credentials of journals in which they have not previously published.

Table 2 also shows journal impact factors for 2016 using the established Web of Science JCR scores, but also the new Scopus CiteScore Index. *WIREs Climate Change* has established itself as one of the top handful of ‘climat’ journals for average citations, being placed second in JCR lists and third for CiteScore index. All *WIREs* articles now also have an Altmetric score which is a new measure of article salience according to a portfolio of social media platforms (Thelwell et al., 2013). Altmetric scores are a way of capturing the amount of rapid attention an article is getting on social media, but they remain unconvincing as a measure of serious engagement with, assimilation of or reflection on new ideas. For example, recent work by Robinson-Garcia et al. (2017:1) showed that “much human tweeting [is] almost entirely mechanical and devoid of original thought”. In their case study of the field of dentistry they found that less than 10% of tweets about journal articles reveal any form of active engagement with the content of the article. Despite the rise of Altmetrics, traditional citation metrics of individual articles continue to be widely used as a measure of academic impact. Table 3 lists the ten most-cited *WIREs Climate Change* articles, although these counts are not normalised for different citation practices pertaining in the different disciplinary fields covered by the journal. There is now widespread agreement that using

journal impact factors as a proxy for the quality or relevance of *individual* articles (or authors) is inappropriate (Callaway, 2016). Nevertheless, journal impact factors continue to have comparative value as an index of the visibility, quality and impact of a given journal as a publishing platform for new research and scholarship.

The readership of *WIREs Climate Change* continues to grow. In 2016, 3,424 institutions offered access to the latest content, via either a Wiley License or a traditional (title-by-title) subscription. Philanthropic initiatives extend low-cost or free access to current content to a further 4,053 developing world institutions, so the journal is available to read in nearly 7,500 institutions world-wide (see Figure 1). *WIREs Climate Change* offers gold-access for authors if they wish and have the funds to pay. Around 15% of articles now appearing in *WIREs Climate Change* are fully open-access.

Figure 1: Institutional access to *WIREs Climate Change* by country and region (2016).

What Makes a Good Review Article?

WIREs Climate Change is explicitly a ‘review’ journal, as are all 12 *WIREs* titles from Wiley. That is, it publishes synthesised reviews of published work rather than new empirical studies or findings. But what constitutes a review article? One definition, adapted from Meyer (2009) would be:

A critical, constructive, stand-alone analysis of the literature in a specific field through summary, classification, analysis, comparison. It should rely upon previously published literature and/or data.

Typically, review articles summarise, organise, synthesise and evaluate existing literature, identifying patterns and trends, bringing forward new insights or arguments and identifying deficiencies and opportunities for further work (Pautasso, 2009). The primary audiences for review articles, and this is true of *WIREs Climate Change*, would be experts in specific fields of study seeking introductions in adjacent/relevant fields, students or novice researchers and those working in policy advice and/or decision-making. A good example of the latter is

the WIREs review of robust decision-making by Weaver et al. (2014), an article which has been widely cited and used in climate adaptation policy design and implementation.

There are a number of key principles involved in writing a good review. First, emphasise what is well known and what is less well known and also identify where there is ignorance or gaps in understanding. Susi Moser's review of climate change communication (Moser, 2010) is an exemplar of this principle. Second, is to offer clear and transparent criteria for bounding the issue/field being reviewed and how relevant literature is selected. The WIREs review by Linner and Wibeck (2015) nicely operationalises this principle. Third, is to be critical, to pass judgement on a field of published literature or to develop an argument. Many *WIREs Climate Change* reviews are critical in this sense, whilst our shorter-form Opinion Articles allow authors to offer informed personal opinion (e.g. Mazzocchi & Pasini, 2017).

Review articles can also be categorised by either methodology or objective (Meyer, 2009). Methodologically, there is a difference between narrative, systematic and best-evidence reviews. In *narrative reviews* selected studies are compared and summarised on the basis of the author's experience and according to existing theories and models. Interpretation is usually qualitative rather than quantitative. Head et al. (2014) in their survey of literature on climate change and Australia offer an example of a narrative review. In a *systematic review* findings from many disparate studies are synthesised in a (semi-)formal manner, possibly through a meta-analysis of a defined corpus of work. The review of the concept of 'co-production' in climate research by Bremer and Meisch (2017) offers a good example of this. Third, in a *best evidence review*, where reviewers focus on only carefully and transparently selected studies (e.g. see the review by Hewitson et al., 2017).

Categorising by objective can suggest four types of review articles. A *status quo review* presents the most current research for a given topic/field (e.g. Tschakert et al., 2017, on loss and damage). A *historical review* surveys and summarises the development of a specific field of research over time (e.g. Lamb & Steinberger, 2017, on well-being). An *issue review* investigates a specific issue in a field of research (e.g. maybe a point of disagreement amongst experts or a particularly important question). Weber (2010) offers an example of this in relation to the question of what shapes perceptions of climate change. Finally, a *theory/model review* introduces and applies an existing theory/model to a new field, as done by Rosenschöld et al. (2014) with regards to new institutionalism applied to the governance of climate change.

Given that the content of *WIREs Climate Change* crosses many different disciplines it is necessary to be flexible with regard to how these principles and categories of 'review articles' are applied. What works as a review in oceanography may not work in climate ethics or in eco-criticism for example. Similarly, drawing hard and fast lines between Overviews, Advanced Reviews, Focus Articles and Opinion Articles—our four article styles—is often impossible and requires judgement and interpretative latitude. The central principle that holds, however, is that the content of *WIREs Climate Change* articles will always rely very heavily upon published data and literature, albeit data and literature skilfully identified, reviewed and communicated by our authors. These articles are original in the sense of their

synthesis, interpretation and provocation, rather than in terms of simply introducing new observations, experiments or arguments to the scholarly world. For the latter, other journals outlets should be sought.

Looking Ahead

WIREs Climate Change will continue to welcome approaches from prospective authors for new review topics which survey fields relating to climate change not yet addressed in the journal or which open up new inter-disciplinary perspectives. A forthcoming WIREs review of the implications of climate change for the sugar-cane industry (Linnenluecke et al., 2018) is a good example of how these two goals come together in a single review. Prospective authors may either approach a Domain Editor directly with their suggestions or else submit a proposal to the editorial office (See proposal guidelines here: http://media.wiley.com/assets/2266/18/WCC_Proposal_Guidelines.pdf). Our Executive Editors will also continue to be proactive in identifying new review topics and matching them with appropriately experienced researchers and scholars through extending be-spoke invitations to write for WIREs. We aim to reach an initial decision, guided by peer-review, on full invited manuscripts in under 100 days; and the period from final acceptance to on-line publication averages between 4 and 6 weeks.

As the Intergovernmental Panel on Climate Change (IPCC) embarks on its Sixth Assessment Report--due in 2021/22--it is worth commenting briefly on the relationship between the IPCC and *WIREs Climate Change*. The IPCC exerts a considerable influence, not only on the governmental negotiations of the UNFCCC, but also on the modes, institutions and practices of knowledge-making within universities and research institutes around the world (see Hughes & Paterson, 2017). In this sense, the IPCC is a hegemon in the world of climate change research, i.e., 'having dominant influence and authority over others'. As the demands of the UNFCCC upon the IPCC become ever greater (Beck & Mahony, 2017), it is important that there are other independent venues where inter-disciplinary reviews of climate change research and scholarship can be made visible and can circulate widely. *WIREs Climate Change* will continue to offer such a publishing platform without being constrained by the specific agendas or conditions under which the IPCC has to operate. As I remarked two years ago (Hulme, 2016:223),

“... there are many roles for climate research and knowledge production beyond servicing the needs of the IPCC. These include curiosity-driven research such as attempts to better understand the dynamics of the Earth system or processes of social and cultural change, inquiry and scholarship that challenge dominant assumptions about climate–society interactions and that offer alternative frames for thinking about policy interventions, and research oriented towards decision support for the large and diverse constituency of stakeholders beyond the state, as in support of climate services or city planning.”

It is interesting to note that a significant number of review articles published in WIREs were cited in the IPCC's Fifth Assessment Report in 2013/14 (see Table 4), and I am sure many

WIREs reviews will be found as useful sources of authoritative knowledge for the IPCC's Special Report on global warming of 1.5°C in 2018 or for its 6th Assessment Report in 2021/22. By design, however, the content of *WIREs Climate Change* is more expansive than the knowledge assessed by the IPCC. On the other hand, both enterprises are limited because of their reliance upon the (largely academic) published literature. Valuable as this knowledge is, it is increasingly the case that for the purposes of effecting change in the world some of the most important knowledge about climate and its implications for politics, cultural practices and material technologies is emerging in places outside conventional research institutions or academic publishing ventures. This may be, for example, in place-based communities, religious institutions, communities of practice, technology start-ups, professional bodies and associations, lay experts, corporations, civil society organisations. Neither the IPCC nor *WIREs Climate Change* are necessarily the right venues for these types of knowledge to be consolidated and made available for public sharing and scrutiny.

As a final word let me offer my thanks on behalf of the journal to the hundreds of people who have completed peer reviews of submitted *WIREs Climate Change* manuscripts over the past 4 years. Your dedicated work has been central to maintaining the integrity and quality of the journal.

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Table 1: Present list of WIREs Climate Change executive Domain Editors and their Domain topics

Domain Editor	Editor Affiliation	Domain Subject Area
Karin Bäckstrand	Stockholm University, Sweden	Climate Policy and Governance
Tim Carter	Finnish Environment Institute, Finland	Assessing Impacts of Climate Change
Lisa Dilling	University of Colorado, USA	Vulnerability and Adaption to Climate Change
Anita Engels	University of Hamburg, Germany	The Social Status of Climate Change Knowledge
Stéphane Hallegatte	World Bank, Washington, USA	Climate Economics
Matthias Heymann	Aarhus University, Denmark	Climate, History, Society, Culture
Mike Hulme	University of Cambridge, UK	Transdisciplinary Perspectives
Anja Karnein	Binghamton University, New York, USA	Climate, Nature, Ethics
Louis Lebel	Chiang Mai University, Thailand	Climate and Development
Irene Lorenzoni & Lorraine Whitmarsh	University of East Anglia, UK & Cardiff University, UK	Perceptions, Behavior and Communication of Climate Change
Matilde Rusticucci	University of Buenos Aires, Argentina	Paleoclimates and Current Trends
Josef Settele	UFZ Centre for Environmental Research, Leipzig, Germany	Climate, Ecology, and Conservation
Jessica Trancik	MIT, USA	The Carbon Economy and Climate Mitigation
Eduardo Zorita	Institute for Coastal Research, Hamburg, Germany	Climate Models and Modelling

Table 2: The 38 English language academic journals currently publishing with the string 'climat' in their title¹. NB. By listing a journal in this table, no judgement is being made on the quality of the editorial processes operated by that journal.

Year	Title	Academic Field(s)	Publisher	2016 Impact Factors	
				Web of Science JCR	Scopus CiteScore
1948	Theoretical and Applied Climatology	Climatology	Springer	2.6	2.1
1962	Journal of Applied Meteorology and Climatology	Meteorology & climatology	American Meteorological Society	2.4	2.7
1965	Paleogeography, Paleoclimatology, Paleoecology	Quaternary sciences	Elsevier	2.6	2.6
1977	Climatic Change	Inter-disciplinary	Springer	3.5	3.5
1981	International Journal of Climatology	Climatology	Wiley-Blackwell	3.8	3.5
1986	Climate Dynamics	Meteorology & climatology	Springer	4.1	4.0
1988	Journal of Climate	Meteorology & climatology	American Meteorological Society	4.2	5.1
1990	Climate Research	Climatology & geography	Inter-Research	1.6	1.8
2001	Climate Policy	Policy sciences	Taylor & Francis	2.7	2.2
2005	Climate of the Past	Paleoclimatology	EGU	3.5	4.0
2007	Carbon and Climate Law Review	Policy & regulation disciplines	Lexxion	n/a	n/a
2009	Climate and Development	Development sciences	Taylor & Francis	2.1	1.7
2009	Weather, Climate and Society	Social sciences	American Meteorological Society	2.6	2.3
2009	International Journal of Climate Change Strategies & Management	Policy & management disciplines	Emerald Group	0.6	0.7
2009	Environmental and Climate Technologies	Technology	De Gruyter	n/a	1.8

¹ Two journals are excluded from this survey – *Journal of Space Weather and Space Climate*; *International Journal of Indoor Air Quality and Climate* – since their use of 'climat' pertains to extraterrestrial and indoor climates respectively.

2010	WIREs Climate Change	Inter-disciplinary	Wiley-Blackwell	4.6	4.7
2010	J of Water and Climate Change	Water Science	IWA Publishing	0.9	1.0
2010	Climate Change Economics	Economics & policy disciplines	World Scientific	n/a	n/a
2010	Int J of Climate Change Impacts and Responses	Inter-disciplinary	Common Ground Publishing	n/a	n/a
2010	J of Earth Sciences and Climatic Change	Earth sciences	OMICS International	n/a	n/a
2010	Climate Law	Law	Brill Publishing	n/a	0.7
2010	Advances in Climate Change Research	Multi-disciplinary	Ke Ai (Beijing Climate Centre)	n/a	1.2
2011	Nature Climate Change	Multi-disciplinary	Nature Group	19.3	10.0
2011	Atmospheric and Climate Sciences	Meteorology & climatology	Scientific Research	n/a	n/a
2011	British J of Environment and Climate Change	Multidisciplinary	Science Domain International	n/a	n/a
2012	American J of Climate Change	Physical climate sciences	Scientific Research	n/a	n/a
2012	Urban Climate	Inter-disciplinary	Elsevier	n/a	2.9
2013	Climate	Multi-disciplinary	MDPI	n/a	n/a
2013	Weather and Climate Extremes	Climatology & meteorology	Elsevier	n/a	2.8
2013	Climate Risk Management	Climatology, risk analysis, decision sciences	Elsevier	n/a	2.3
2013	Journal of Climatology	Meteorology & climatology	Hindawi	n/a	n/a
2013	Journal of Climatology and Weather Forecasting	Climate & atmospheric sciences	OMICS International	n/a	n/a
2013	Interdisciplinary Climate Studies (Section Platform)	Physical climate sciences	Frontiers (Switzerland)	n/a	n/a
2014	Climate Change Responses	Ecology	BioMed Central	n/a	n/a
2015	Climate Services	Climate information	Elsevier	n/a	n/a
2015	Current Climate Change Reports	Multi-disciplinary	Springer	n/a	n/a
2016	Environmental Pollution and Climate Change	Environmental sciences	OMICS International	n/a	n/a

2017	Climate and Atmospheric Science	Climate and atmospheric sciences	NPJ (Springer-Nature)	n/a	n/a
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Table 3: The ten top-cited articles in WIREs Climate Change, since 2010 launch. Citations from Scopus, as of 11 October 2017.

Review Title	Citations	Author	Volume
Drought under global warming: a review	772	Dai	2011, 2(1), 21pp.
Indices for monitoring changes in extremes based on daily temperature and precipitation data	285	Zhang et al.	2011, 2(6), 20pp.
Communicating climate change: History, challenges, process and future directions	257	Moser	2010, 1(1), 23pp.
State-of-the-art with regional climate models	220	Rummukainen	2010, 1(1), 15pp.
Land use/land cover changes and climate: Modeling analysis and observational evidence	204	Pielke snr., et al.	2011, 2(6), 23pp.
What shapes perceptions of climate change?	185	Weber	2010, 1(3), 11pp.
Detection and attribution of climate change: A regional perspective	155	Stott et al.	2010, 1(2), 20pp.
Institutions and policy processes: The means to the ends of adaptation	131	Dovers & Hezri	2010, 1(2), 20pp.
Individual understandings, perceptions, and engagement with climate change: Insights from in-depth studies across the world	125	Wolf & Moser	2011, 2(4), 23pp.
A values-based approach to vulnerability and adaptation to climate change	114	O'Brien & Wolf	2010, 1(2), 11pp.

Table 4: Number and percentage of WIREs Climate Change review articles cited in the IPCC AR5 reports (across all three Working Groups). The cut-off date for 'formally accepted' articles to qualify for AR5 was 15 March 2013 (WG1), 31 August 2013 (WG2) or 3 October 2013 (WG3).

Published Volume	WIREs CC articles cited in IPCC AR5	Column 2 as a percentage of total articles published in WIREs Climate Change
2010	29	41
2011	35	56
2012	11	26
2013	9	20
2014	5	9

ⁱ These ‘climat’ journals are far from being the only places where research on climate and climate change is published—for example, *Science*, *Global Environmental Change*, *Bulletin of the American Meteorological Society*, *Current Anthropology*, and many, many others, also publish articles on climate change. The ‘climat’ search filter simply offers one unambiguous way of selecting for comparison relevant journals that blatantly signal climate content through their titles.