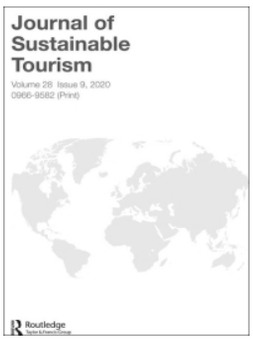

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EDITORIAL INTRODUCTION

Adapting to climate change and climate policy: progress, problems and potentials

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This introductory paper discusses tourism's role in relation to climate change mitigation and adaptation, at a time when climate change is at the forefront of many political discussions, including the 2009 Climate Summit in Copenhagen, and many business decisions. The development of tourism research in response to climate change in the past 25 years is outlined and limitations are identified. The paper also argues that while growing engagement with the challenge of climate change is evident across the tourism industry, this is still limited and not widespread. The minor role played by tourism interests in the international climate negotiations in Copenhagen is noted and discussed. Questions are raised around the willingness and ability of both the tourism industry and tourists to significantly reduce global emissions. The papers brought together in this Special Issue (*Journal of Sustainable Tourism*, 18.3) both highlight key challenges that tourism faces in its attempts to better understand and manage the problem of climate change, and suggest valuable ways forward.

Keywords: adaptive management; air travel; climate change; policymaking; tourism development

Introduction

Public and political interest in climate change has increased considerably in recent years, culminating in the United Nations Climate Change Conference (officially known as Conference of the Parties 15) in Copenhagen in December 2009. The conference represented a critical milestone in the negotiating process to strengthen international cooperation on climate change and replace the Kyoto Protocol of 1997. The Copenhagen Conference was the focus of unprecedented public and media attention and was attended by 115 heads of state and an estimated 40,000 delegates, representing the United Nations and other intergovernmental organizations, governments of all levels, non-governmental organizations (NGOs), faith-based organizations, scientists and the business community. The great anticipation with which many concerned about climate change awaited the conference in Copenhagen was reflected in the event's nickname of "Hopenhagen". Expectations were high that the international community would negotiate substantial greenhouse gas (GHG) emissions reduction targets for all major emitters as well as emissions targets for developing countries with larger economies and GHG emissions, agree upon terms to mobilize technology transfer

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to foster emissions reductions in developing nations, provide a framework and financial incentives to protect the remaining great forests in developing countries and provide a large increase in reliable funding for climate change adaptation in most vulnerable countries. Such a landmark agreement would have major implications for economies and economic sectors around the world – and tourism would be no exception. With such large stakes on the table, a wide range of key tourism stakeholders, such as the United Nations World Tourism Organisation (UNWTO), International Civil Aviation Organization (ICAO), International Air Transport Association (IATA), World Travel and Tourism Council (WTTC) and several NGOs were present in Copenhagen to represent the sector's interests.

With tourism's recognized growing contribution and key regional vulnerabilities to climate change, the *Davos Declaration on Climate Change and Tourism* (UNWTO-UNEP-WMO, 2008, p. 4) declared that climate change "must be considered the greatest challenge to the sustainability of tourism in the twenty-first century". This Special Issue brings together research on both of these aspects of climate and tourism (mitigation and adaptation), at a time when climate change is at the forefront of many political discussions and business decisions. The *Journal of Sustainable Tourism* has fostered a dialogue on the sectoral implications of climate change for well over a decade, with its first publication on the issue 17 years ago (Wall & Badke, 1994) and two Special Issues in 2006 on the risks of climate change for tourism destinations, and tourist transport and related GHG emissions.

To better situate the place of tourism at the recent Copenhagen Climate Conference, this paper begins with a brief overview of the evolution of the climate change issue within tourism research and practice. The nature of the discussion at the two tourism-specific side events in Copenhagen is then reviewed in the context of the outcomes of the conference. The final section introduces the nine papers that comprise this Special Issue and their respective contributions to this rapidly developing area of tourism research.

The evolution of climate change and tourism research and practice

The timeline in Figure 1 outlines the development of climate change as an increasingly salient issue for the field of tourism studies as well as for the tourism sector (including industry, government and NGOs).

Progress in climate change and tourism research

Scholarship on tourism and climate change now extends over a period of 25 years, with the first scientific paper on the potential implications of climate change for tourism (the impacts of warming temperatures on the ski industry) published in 1986 (Wall, Harrison, Kinnaird, McBoyle, & Quinlan, 1986). Very little progress to advance the understanding of the implications of climate change for tourism was made over the next decade, and the First Assessment Report (1990) of the UN Intergovernmental Panel on Climate Change (IPCC) did not mention tourism. Wall's (1998, p. 68) review of the place of tourism in the Second Assessment Report (1995) concluded that "[w]hile it is encouraging that tourism is receiving greater attention in IPCC reports, it is also apparent that the likely consequences of climate change for tourism and recreation are not well understood".

Climate change and tourism scholarship saw substantive growth towards the end of the 1990s, with the number of publications increasing threefold between 1990–1994 and 1995–1999 (Scott, Wall, & McBoyle, 2005). The contribution of tourism to global climate change through GHG emissions from the transportation of millions of tourists was first discussed in 1996 (Bach and Gössling, 1996) and was quantified for a destination by Becken (2002).

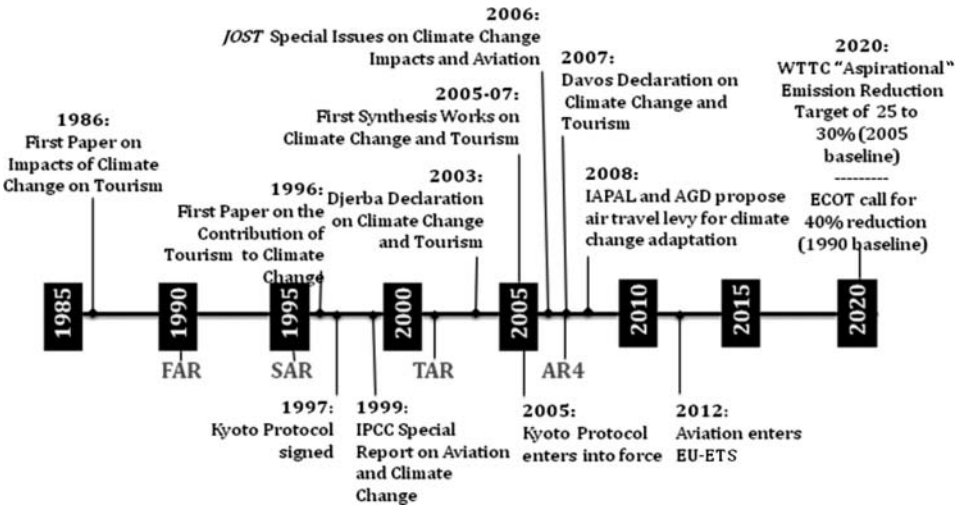

Figure 1. The development of climate change as an issue for tourism. WTTC = World Travel and Tourism Council, IAPAL = International Air Adaptation Levy, AGD = Aviation Global Deal, *JOST* = *Journal of Sustainable Tourism*, EU-ETS = European Union Emission Trading System, ECOT = Ecumenical Coalition on Tourism, FAR = First Assessment Report of IPCC, SAR = Second Assessment Report of IPCC, TAR = Third Assessment Report of IPCC, AR4 = Fourth Assessment Report of IPCC.

The IPCC Third Assessment Report (2001) did not recognize the contribution of tourism to climate change through GHG emissions. The volume of publications on climate change and tourism once again doubled between 1995–1999 and 2000–2004 (Scott et al., 2005), with contributions from North America, Europe and New Zealand and the seminal IPCC Special Report on Climate Change and Aviation (Penner, Lister, Griggs, Dokken, & McFarland, 1999). The diversity of contributions from academic fields increased substantially, and while the multidisciplinary nature of the field is a strength, it is also a challenge, with differing research approaches and perspectives on the validity of assumptions (see the debate between Gössling & Hall, 2006a and Bigano, Hamilton, Maddison, & Tol, 2006 as an example). The three synthesis works for the field were published in 2005 through to 2007 (Becken & Hay, 2007; Gössling & Hall, 2006b; Hall & Higham, 2005). A much greater body of research was available for the IPCC Fourth Assessment (2007) with considerably more attention given to tourism in the regional chapters on Africa, Australia and New Zealand, Europe and small island states (e.g. Becken, 2005). However, a number of regional chapters (Africa, Asia and small island states) also noted that while tourism was extremely economically significant, there was a paucity of research to draw on. In 2007, a tourism-focused climate change assessment was commissioned by the UNWTO, United Nations Environment Programme (UNEP) and World Meteorological Organization (WMO) (Scott et al., 2008a). It provided a comprehensive review of projected climate change impacts, evaluated the relative regional vulnerability of tourism destinations, discussed the state of adaptation within the sector, provided the first quantitative estimate of the contribution of the global tourism sector to climate change (approximately 5% of CO_2 emissions in 2005) and set out options for decoupling future growth in the tourism sector from GHG emissions.

Key knowledge gaps on climate change and tourism

While climate change and tourism continue to mature and attract more and more attention from scholars and the tourism community, a number of key knowledge gaps and limitations remain. One of the most obvious limitations is the geographic scope of research, which has largely focused on tourism in Western countries. Addressing the major gaps on how climate change will affect the natural and cultural resources critical for tourism in Africa, the Caribbean and Pacific Islands, South America and large parts of east Asia must be a priority, considering the relative importance of tourism to the economies of some of these nations. Questions related to the north–south social inequities of climate policy also require greater attention.

Climate change adaptation research remains far less developed than in other economic sectors, with risk appraisals among tourism operators consistently finding low awareness of climate change and little evidence of strategic planning in anticipation of future changes in climate (Scott, de Freitas, & Matzarakis, 2008b). The ability of the tourism industry to cope with a range of recent shocks, including Severe Acute Respiratory Syndrome, terrorism attacks and the Asian tsunami, suggests a relatively high adaptive capacity in the sector; however, knowledge of the capacity to cope successfully with future climate regimes and the broader environmental impacts and societal ramifications remains rudimentary.

Research on tourism's contribution to climate change is still hampered by issues relating to data availability, accessibility and compatibility. Data quality is also a major problem when trying to quantify tourism's GHG emissions. These affect current inventories and also our ability to provide meaningful predictions and scenarios for future developments. From a mitigation perspective there is still an insufficient integration of research that offers technical solutions (e.g. engineering, logistics) into the tourism context. Behavioural changes necessary to reduce tourism's carbon footprint are just starting to be explored by tourism researchers, for example in the context of "slow travel" as an alternative form of tourism. But a number of authors have noted the challenges associated with changing tourist behaviours in order to reduce travel-related GHG emissions (Becken, 2007; Canadian Tourism Commission, 2007; Dargay, Menaz, & Cairns, 2006; Ipsos Mori, 2006; McKercher et al., 2010: in this Special Issue; Tourism Australia, 2008). Finally, policy analysis in relation to climate mitigation and tourism is very rudimentary and at this point does not provide meaningful insight as to which policies might be effective in achieving emissions reductions without undermining tourist activities as such (if this is possible at all).

With their capacity to alter travel decisions by substituting the place, timing and type of holiday, tourists could play a pivotal role in the eventual impacts of climate change on the tourism industry and destinations (Scott et al., 2008a). Information on tourist climate preferences and tourist perceptions of the environmental impacts of global climate change at destinations remain critical areas for further research if long-range effects on tourism demand are to be more accurately projected (Scott, Gossling, & de Freitas, 2008c). How will consumers respond to the environmental and social impacts of climate change? How will travellers react to increased travel costs or knowledge of the climate impacts of their holiday choices? How will factors like proximity to major markets or destination loyalty influence the climate change vulnerability of destinations? What are the national political repercussions for governments that try to change consumer behaviour by taxation developments? We also know little about how media representations of climate change travel decisions. Travel writers continue to cite unfounded statements, such as "by 2030, the traditional British package holiday to a Mediterranean beach resort may be consigned to the scrap-heap of history", and that major international ski resorts like Kitzbühel, Austria and

Whistler, Canada, will be "made redundant" by climate change by 2030 (Halifax Travel Insurance, 2006), with unknown reputational damage to these destinations. Tourism studies have much to contribute on all of these issues.

There is also very limited understanding of how climate change impacts will interact with other long-term social and market trends influencing tourism demand and development, including the following: ageing populations in industrialized countries, increasing travel safety and health concerns, increased environmental and cultural awareness, advances in information and transportation technology and shifts towards shorter and more frequent holidays. Partly, this is due to our inability to fully capture the complexity of tourism and develop new methods and theories that allow for non-linear and multi-dimensional problems.

The aforementioned limitations illustrate that progress in this field has been slow, which is not atypical of sustainability initiatives in tourism more broadly (Lane, 2009), and that the field is just beginning to emerge from what we would define as an "awareness-raising phase", both within tourism studies and within the tourism sector. Scholars are only now beginning to develop the capability to deliver relevant scientific knowledge that can be used by the tourism decision-makers in both the public and private sectors. Given the increasing recognition of the need to adapt to future climatic change, regardless of the success of mitigation efforts, greater emphasis on research that specifically addresses the informational needs of the tourism stakeholders should be considered. Future research must continue to build multi- or interdisciplinary collaborations to infuse new ideas and research techniques to address the aforementioned knowledge gaps and ensure that possible effects of climate change are effectively factored into relevant tourism policies and development and management plans.

Sectoral engagement in climate change

A meaningful engagement of the tourism sector on mitigation, vulnerability assessment and adaptation has been visible at all scales, from intergovernmental organizations, national governments, sectoral organizations, destinations and companies.[1] High-level involvement can be traced to the first international conference on climate change and tourism organized by UNWTO, together with several other United Nations agencies in Djerba, Tunisia. The *Djerba Declaration on Climate Change and Tourism* was followed by the *Davos Declaration on Tourism and Climate Change* in 2007, as part of a second international conference. This declaration was also strongly endorsed by governments at the Tourism Ministers Summit on Climate Change (London 2007) and followed by more specific activities such as the European Hotel Energy Solutions project.[2]

Recently, the tourism sector has also been identified as a potential major funding source for climate change adaptation. A proposal to charge a levy on all international air travellers was put forward by the Group of Least Developed Countries within the Bali Action Plan in 2008. The International Air Passenger Adaptation Levy was estimated to be capable of generating approximately $8 billion per year for climate change adaptation in developing nations. If such a proposal[3] were implemented, then the tourism sector would become the world's largest funder of climate change adaptation in developing countries. However, this also means that the problem would simultaneously become a solution.

The WTTC issued its first position paper on climate change in 2009 ("Leading the Challenge"), specifying 10 elements that should be part of an international agreement to be reached in Copenhagen, including the need for "deep and rapid cuts" in GHG emissions and the recognition that "delaying action will increase the costs of stabilising the climate".

The announcement of "aspirational" emissions reduction targets in the order of 25–30% by 2020 and 50% by 2035 (both from 2005 levels) were the first specified sector-wide targets. The *Tourism and Travel in the Green Economy* symposium (Gothenburg, Sweden, 2009) organized by the European Travel Commission (ETC) and the UNWTO as a lead-up to Copenhagen, supported these targets, suggesting they represent the collective position of the major international tourism institutions. The paper by Scott et al. (2010) in this Special Issue discusses whether these targets are feasible physically, let alone economically, and therefore should be considered more than rhetoric.

Much progress can be reported at a country level. Some destinations may choose to pursue very ambitious goals such as that of carbon neutrality for tourism, as discussed in this Special Issue by Gössling and Schumacher (2010) in their paper on the Seychelles and in Gössling (2009). Other nations have invested considerable resources into addressing climate change as a key issue for their tourism sector. Australia, for example, has recently undertaken substantial amounts of research and policy analysis to better manage climate change. Three papers in this Special Issue are evidence of this investment. The measurement of the Australian tourism carbon footprint by Dwyer et al. has been critical for understanding the magnitude and composition of tourism's GHG emissions, in particular in comparison with other economic sectors. In contrast, Turton et al.'s paper on destination impacts and adaptation options demonstrates how researchers and tourism stakeholders can help to create knowledge in a participatory way that might increase uptake of recommended activities. Finally, Pham et al.'s contribution on economic impact scenarios highlights the difficulty of integrating long-term climate scenarios with (meaningful) economic trends of tourist responses. There are many other examples of leading initiatives at national levels that are not presented in this Special Issue. For example, the New Zealand Ministry of Tourism developed a Tourism and Climate Change plan with four key priority areas, covering both mitigation and adaptation. Some policies have already been implemented within this framework. The New Zealand Tourism Industry Association in partnership with the government, for example, is currently in its third stage of energy auditing for tourism businesses and disseminating energy efficiency information for the sector.

The most prominent sector associations in terms of tourism and climate change are those related to aviation, namely the IATA and ICAO. The ICAO has not made much progress (in an admittedly difficult position) since 1997, and the sector has been subject to much criticism by the media, public and politicians. In response, the industry now attempts to position itself as a responsible leader in this debate, and the IATA in particular has put forward a range of very (if not too) ambitious goals. These include an average annual aviation fuel efficiency improvement of 1.5%, carbon-neutral growth from 2020 and the aspirational goal of reducing net emissions from aviation by 50% by 2050 compared with 2005 levels. While some airlines are already making progress, and achieving some public recognition for it, the path for achieving the above targets seems a long and difficult one (as discussed by Scott et al., 2010: in this Special Issue). Some sector organizations have been active in this area for a long time (e.g. the National Ski Area Association in the United States with its "Keep Winter Cool" programme), whereas others have only recently become involved in the climate change debate, for example Pacific Asia Travel Association with their CEO Challenge in 2007 and the South Pacific Tourism Organisation with their Action Strategy for Green Tourism that explicitly sought to plan for the impacts of climate change (Hopkins & Becken, 2007).

Most change within the tourism sector can be achieved when businesses get involved. More and more tourism businesses are recognizing the benefit of saving energy (in particular, following the high oil prices in 2008), and publications such as Becken and Hay (2007)

or Scott et al. (2008a) provide a wide range of examples of leaders in their industries. Many initiatives will reward the business with tangible benefits such as cost savings or risk reduction. However, it is also commonly debated that sustainable operation provides a competitive advantage as more and more tourists choose a responsible provider. The study by McKercher (2010) presented in this Special Issue indicates that this might be an unfounded hope. An analysis of Hong Kong outbound tourists' attitudes on climate change as well as their actual behaviour shows that often those tourists with the greatest awareness are the least likely to change their behaviour. This finding raises some important questions, among others, to what extent the challenge of climate change can be left to market forces of demand and supply alone, as tourists might be unreliable "ambassadors" for climate change (Becken, 2007; Eijgelaar et al., 2010: in this Special Issue).

The encouraging signs of progress discussed above must nonetheless be put into context. A critical question from our perspective is how far has climate change discourse, and more importantly action, really penetrated the tourism industry at a wider scale? The first climate change session at the Internationale Tourismus Börse (Berlin, 2009) was a positive development, but was attended by approximately 100 of the 10,000 delegates. This may highlight the modest beginnings of the process of "mainstreaming" climate change with tourism sector decision-making. It is our view, however, that the recent climate change dialogue has increasingly become an important driver of broader discussions of more sustainable forms of future tourism development. For example, the four scenarios developed as part of the ongoing strategic tourism futures exercise in the United Kingdom (Tourism 2023 – Forum for the Future, 2009) are all dominated by developments in climate policy and/or the impacts of climate change.

After Copenhagen – what are the implications for tourism?

While there were great hopes for the Copenhagen Climate Conference, most delegates left Copenhagen highly disappointed. After two weeks of intense and at some points acrimonious negotiations (developing nations temporarily walked out of the talks midweek in protest), the world's leaders were unable to translate rhetoric about the need to address global climate change into action or overcome their large differences on who should reduce emissions and how quickly. Instead of a conclusive treaty, the conference produced a political agreement called the "Copenhagen Accord" that was agreed to by 27 of 192 countries and rejected by many developing countries. As such, the Conference of the Parties (COP) at the end of the conference simply "took note" of the Copenhagen Accord, which was attached to the decision as an unofficial document. The Accord recognizes the scientific position of the IPCC that a global temperature increase of 2°C would signify "dangerous interference in the global climate system" and calls for developed countries to commit to emissions reduction to prevent this. Non-binding pledges of emissions reductions would be established unilaterally by each nation and submitted to the United Nations Framework Convention on Climate Change (UNFCCC) early in 2010. The other major component of the Accord was the call to mobilize $100 billion annually by 2020 for developing nations to fund mitigation and adaptation activities.

The business community response to the outcome is that it perpetuates policy uncertainties. With no legally binding GHG emissions targets and the lack of a deadline to negotiate a successor treaty to the Kyoto Protocol, business leaders do not know how climate policy will affect the costs of doing business or making investments in emissions reduction initiatives. With progress at the international level stymied, the immediate focus for business has now shifted to national or sub-national policies, as indicated by Governor Schwarzenegger (California, USA) in his presentation to the COP 15 and in the Mayors' Communique

representing 80 mayors from cities all over the world (Climate Summit for Mayors, 2009). This is also reflected in the new tourism sector emissions reduction initiative called "Live the Deal" (UNWTO, 2009), which encourages all tourism businesses to adopt the emissions reduction targets as the nations in which they operate.

Tourism played a very small role at COP 15. In his role as the head of a UN agency, the Secretary General of the UNWTO, Taleb Rifai, delivered a speech to the General Assembly; however, this speech had not been made available on the UNWTO website (at the time of writing). Instead, speeches held by invited speakers as part of the jointly organized WTTC and UNWTO side event are available on the WTTC website. It is noteworthy that this side event was one out of only two tourism-specific side events in Copenhagen, out of hundreds of side events. The joint WTTC-UNWTO event was held on December 18, the last day of the Copenhagen Climate Conference, which some delegates felt was far too late to provide any meaningful input to the outcomes of the conference. Moreover, some delegates expressed extreme disappointment that this tourism event was not organized together with NGOs, in particular, since at this point in the conference NGOs had been barred from entering the main conference venue and were therefore unable to attend this side event. Notwithstanding issues of accessibility and participatory debate by all tourism stakeholders, the side event speakers provided some key messages. The Minister of Tourism of Montenegro, Mr Nenezic, emphasized the need to undertake long-term planning, foster pro-environmental investment, develop and enforce appropriate regulation and be more active in the field of public climate change education. Mari Snyder from Marriott International highlighted the critical role of business and the importance of early action, including on their experience with the Carbon Disclosure Project and goals for reducing carbon dioxide emissions (25% by 2017). Finally, Carla Aguirre from VisitSweden reported on their experience of how undergoing the carbon accounting process with the Global Reporting Initiative helped them to begin to encourage and motivate potential visitors and suppliers, and show leadership on sustainability and climate change issues.

As reflected in its title "Climate Justice and Tourism", the second tourism-focused side event was very different in nature and included participants from NGOs, academia, and national tourism officials, as well as the UNWTO. The event was organized by the Ecumenical Coalition on Tourism (ECOT) on the 10th of December and focused on emissions reductions, adaptation requirements for tourist destinations and questions around equity, justice and the role of tourism in developing countries. The session concluded that "technological measures alone won't solve the problems without accompanying structural and behavioural changes". This is consistent with the mitigation reduction scenarios developed for the UNWTO, UNEP and WMO (Scott et al., 2008a), which required the combination of substantial technological initiatives and behavioural change by tourists (e.g. transport modal shifts, longer stays) in order to achieve a 6% reduction in global tourism emissions by 2035 (over 2005 levels). The coalition of faith-based groups that organized the side event issued a statement demanding binding GHG emissions reduction targets to be imposed on the tourism sector (40% by 2020 with a base year of 1990), noting that "aspirations" by the WTTC and UNWTO and "visions" of the IATA and ICAO are insufficient and uncertain. However, no proposals of how such a dramatic change could be accomplished in a single decade were proffered.

Two further side events held at the Copenhagen Summit were of particular relevance to tourism. Both focused on the issue of international emissions from aviation and shipping. One was jointly organized by the ICAO and the International Maritime Organization, and the second one was hosted by International Maritime Emission Reduction Scheme. A deal on bunker fuels (i.e. fuel used in international transportation by shipping as well as aviation)

was not reached at COP 15, and the European Union (with its integration of international aviation emissions into its Emissions Trading Scheme from December 2011) remained largely alone in their quest to reach an agreement for addressing international aviation emissions. Key questions of targets, financing and the role of developing nations remain unresolved at these side events. Given this lack of progress, the irony of ICAO's (2009, p. 1) press release that it would continue "to move forward with its aggressive plan of action to combat climate change" is not lost on observers of this key challenge for tourism.

So, what do the outcomes of Copenhagen really mean for tourism? It depends on your perspective whether you choose to see the glass half empty or half full. Geoffrey Lipman (personal communication, January 12, 2010) from the UNWTO is optimistic, pointing out that the Copenhagen Accord achieved the creation of a framework that contains critical lines relating to global temperature stabilisation, carbon reduction levels, verification aspirations, an agreement in principle to develop a mechanism for technology transfer and the Copenhagen Green Climate Fund for the poorest states. While Lipman's piece succeeds to spread optimism, his introduction of the newly (and UNWTO-endorsed) launched campaign "Live the Deal" as a key vehicle to achieve the needed change in the tourism sector leaves the reader wondering about the actual mechanisms of the campaign. It becomes clear that organizations such as the UNWTO, WTTC, ICAO and IATA are firmly anchored in a neo-liberal view of the world, where ongoing economic growth is paramount and largely without physical limits. Such views are increasingly questioned (e.g. Lloyd, 2007) and might be at the heart of the failure of Copenhagen. Evangelischer Entwicklungsdienst (EED) Tourism Watch stated, "The tourism industry now recognizes its responsibilites (to reduce emissions) but remains on track to record growth year after year, raising serious questions about whether even the concept of sustainable tourism growth could be considered feasible". These are very fundamental questions that go beyond those commonly addressed in tourism research, such as willingness to pay for carbon offsetting or implementing energy efficiency in tourism businesses (see Gössling, Hall, & Scott, 2009, for further discussion). These questions challenge the very existence of tourism as a means to achieving sustainability (Hunter, 1997) and the underlying paradigms of neo-liberalism and capitalism in which tourism operates. It is hoped that this Special Issue contributes to deepening an evidence-based dialogue on these vexing issues.

The organization of the Special Issue

This Special Issue was put together with the goal of addressing some of the key issues outlined above and moving the tourism and climate change discourse from a descriptive problem-based discussion towards a more positive, action-oriented discourse on how tourism can work along other sectors to achieve the climate goals of the international community and enable destination communities to better adapt to forthcoming climate change.

The first three papers seek to understand tourists' contribution to climate change and the likelihood that travellers would engage in concrete action to reduce their impact. McKercher et al. find that travellers from Hong Kong are generally aware of climate change but show little inclination to voluntarily change their travel behaviour to reduce environmental impacts. As Becken (2007) has also suggested, the personal benefits of travel seem to outweigh the nebulous societal costs. Furthermore, the demand side interest in modifying travel is the lowest among those who travel the most. In sharp contrast to ECOT's desire for consumer behaviour to work synergistically with technological advancements to reduce GHG emissions from tourism, this paper suggests that changing consumer behaviour may represent the greatest challenge in reducing tourism's carbon footprint in the short to

medium term. It concludes that government intervention is probably required to create meaningful behavioural change in travel patterns.

Dawson et al. examine the paradoxical issues of long-distance, high-GHG emissions tourism to view polar bears (in Churchill, Canada) that are being adversely affected by climate change. They find that most travellers perceive climate change to be negatively impacting polar bears and confirm that the phenomenon of "last-chance tourism" is influencing some tourists to visit the region to see this species while it is possible. Despite a general understanding of the potential impacts of climate change on polar bear populations, the large majority of polar-bear-viewing tourists do not understand how their travel behaviour contributes to, or could help to mitigate against, future climate change. The findings further contribute to the long-standing debate about "loving tourism destinations to death" and question the sustainability of tourism in globally peripheral destinations such as the Arctic.

Eijgelaar et al. also examine this paradox of GHG emissions generated by long-distance tourism to peripheral polar "last-chance" destinations that are being adversely affected by climate change. They provide the most accurate estimate of GHG emissions related to cruise tourism worldwide (an estimated 1.5% of global tourism CO_2 emissions) and the especially high levels of GHG emissions related to polar cruise tourism (up to eight times higher per capita and per day than average international tourism trips). The authors also investigated the validity of the claim that such high-emissions tourism can be justified because it increases the environmental awareness of tourists and creates "ambassadors" for conservation and the visited destination. The survey of Antarctic cruise tourists found no evidence for the hypothesis that the trip developed greater environmental awareness, changed attitudes or encouraged more sustainable future travel choices, adding to the evidence in the literature that the "environmental ambassador" concept in tourism may be wishful thinking.

The next three papers address the challenge of GHG mitigation in the tourism sector at the national and international levels and the need to accurately measure and monitor tourism's emissions to inform policymaking and management. Dwyer et al. use two different GHG accounting approaches linked to tourism satellite accounts, one production-based and the other expenditure-based. The results highlight how important international aviation is in relation to GHG emissions and how different methods of GHG accounting impact on the "carbon burden" a country has to deal with.

Gössling and Schumacher then explore the challenges and opportunities entailed in a destination seeking to achieve "carbon neutrality" for its tourism sector. They outline the various countries that have declared the intention of their tourism sector to become carbon neutral and the current lack of rigour in the detailed plans to achieve that status. The case of the Seychelles is explored to estimate the extent of tourism-related carbon emissions, potential emissions reduction strategies on the island and the extent of emissions that would need to be offset by purchasing emission credits from other nations. This contribution reports that the implementation process itself may prove more challenging than raising finances from tourists, although the authors point out that the Seychelles are known as an upper-end destination, which tends to attract wealthier tourists.

The question of whether the global tourism sector can deliver on its "aspirational" GHG emissions reduction targets is examined in detail by Scott et al (2010). Achieving the postulated emissions reductions in tourism is found to be largely dependent on emissions reductions related to air travel. Because absolute emissions reductions are not forecast by the aviation sector before approximately 2035, the 2020 and 2035 emissions reduction targets specified for tourism appear implausible. The authors advise that much of the tourism community remains largely unaware of the implications of the proposed emissions reduction targets for the sector and that the consequences of the inevitable transition towards a low-carbon

tourism system for tourism development, particularly in developing nations, need far greater consideration by the tourism industry, destinations and national tourism organizations.

A third major theme in the Special Issue relates to the direct impacts of climatic change and indirect impacts of climate-induced environmental change for tourism destinations. Lambert et al. provide the first study of the potential impacts of climate change on whale-watching tourism. Here, the authors develop a framework that helps to conceptualize climate change impacts on cetacean occurrence and, as a result, the whale watching experiences of tourists. While they acknowledge the inherent complexity of this social-ecological system, the authors contribute valuable insights into how tourists are likely to respond to the environmental impacts of climate change, building on a literature that has thus far focused on mountain and coastal (beach, reef) destinations.

Turton et al. take a destination-level approach and present common findings from a participatory approach undertaken with tourism stakeholders in four Australian destinations. The study examined tourism stakeholders' knowledge of climate change and its potential impact in the destination, existing approaches to climate change adaptation and the potential for building a self-assessment toolkit that can be utilized by other tourism destinations to examine their own vulnerability. The first finding was that the ongoing leadership for climate-change-related issues was seen to rest with the public sector (especially local authorities) and not with the industry or tourists. The second major finding was that the tourism sector is not yet ready to invest in climate change adaptation because of the perceived uncertainties in the magnitude of climate change and related environmental impacts. This is evidenced by the fact that most of these themes identified by the stakeholders as adaptations to climate change were actually adaptations to climate policy (reducing GHG emissions or marketing the destination as "green") and are better described as being more generic to sustainable development rather than being specific to climate change adaptation. This limited understanding of climate change adaptation by tourism stakeholders is consistent with the literature (Scott et al., 2008a) and represents an important barrier to mainstreaming climate change in tourism development decision-making.

Pham et al. develop a novel approach to examine the potential economic impacts of climate change on tourism in five selected Australian tourism destinations. Although not well quantified in the literature, climate change was found to generate additional effects on regional tourism economies through subsequent reductions in tourism demand. Such outcomes seem likely to represent an unavoidable factor in the evolution of climate change, and these impacts should be analyzed explicitly as an additional climate change cost in any climate change analysis. Otherwise, the full impacts of climate change will continue to be underestimated, especially at the regional level and for the most visitor-intensive regions. While the economic impact of climate change on tourism at these five destinations was relatively insignificant at the national level, at the regional level it was considerable, but varied widely between regions. As tourism is relatively labour-intensive, a reduction in tourism demand will result in job losses and in lower wage incomes potentially increasing regional or rural–urban inequality and imposing further costs on society. The findings also provide additional support for the importance of investment in adaptation to reduce the impact of climate change and achieve sustainable tourism development in the longer term.

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Notes

1. It is not the intention of this paper to profile all of the positive climate change initiatives that are taking place in the tourism sector; readers are referred to Becken and Hay (2007), Scott et al. (2008a) and WTTC (2009) for many additional examples of climate change leadership (mitigation and adaptation) in all areas of the tourism sector.
2. www.ih-ra.com/...01/Hotel_Energy_Solutions_FACT_SHEET.doc
3. A similar industry-based proposal by the Aviation Global Deal Group would generate an estimated $1.5 to 5.0 billion per year through the auctioning of emission allowances in the global aviation sector to fund adaptation and mitigation in developing countries.

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