Published Online on 3 May 2017

*Proc Indian Natn Sci Acad* **83** No. 2 May Spl. Issue 2017 pp. 505-512

DOI: 10.16943/ptinsa/2017/48965

***Research Paper***

# Indian Contributions to Antarctic Social Sciences

SANJAY CHATURVEDI*
*Centre for the Study of Geopolitics, Panjab University, Chandigarh 160 014, India*

(Received on 16 August 2016; Accepted on 29 November 2016)

The term 'social sciences' encompasses a diverse group of disciplines and fields of study and not simply the study of politics and policy. The Scientific Committee on Antarctic Research (SCAR) Humanities and Social Sciences Experts Group (HASSEG), the body representing the Antarctic social scientists, is an outstanding example of emphatic acknowledgment –in this case by SCAR—of critically important interface/interaction between natural sciences and social sciences. In case of India, both the Ministry of Earth Sciences (MoES), New Delhi and the National Centre for Antarctic and Ocean Research (NCAOR), Goa have welcomed and encouraged not onlypolicy-oriented, critically-informed social science research on a range of issues related to Antarctic governance (e.g. bioprospecting, climate change, tourism) but also the presence of social scientists in Indian delegations to the Antarctic Treaty Consultative Meetings (ATCMs). The presence and participation of an Indian social scientist in the Executive Committee of HASSEG, representing the field of Geopolitics, has opened up valuable space for India to engage in innovative, cutting edge international collaborative research in Antarctic social sciences. This article provides a synoptic overview of Antarctic social science research in India over past decade or so thematically rather than chronologically.

**Keywords: Antarctic Governance; Antarctic Tourism; Bioprospecting; Climate Change; Global Knowledge Commons; Post-Colonial Engagement; SCAR HASSEG**

## Introduction

It is difficult to find a view or policy perspective 'from nowhere'. It is least surprising that the overarching intellectual context as well as the thrust of Indian social science engagement with the complex and compelling question of 'Antarctic governance' (its past, present and future) remains firmly anchored in the notion of 'post-colonial' (Chaturvedi 2009a; Chaturvedi, 2013a; Dodds, 2006). India's quest for a 'genuine' post-colonial engagement with the Antarctic, as described in Indian social science literature, also revolves around the ethical and the geopolitical aspects of knowledge production and knowledge sharing. The dominant sense in which the term 'knowledge' is deployed here appears akin to German scholar Nico Stehr's definition of knowledge as 'a capacity for action' (Stehr, 1994; 2016).

Nico Stehr would like to "characterize knowledge not as something that is so but as a generalized *capacity to act* on the world, as a model for reality, or as the ability to set something in motion" (Adolf and Stehr, 2014:1). In his view, "knowledge is not passive knowledge –as the first step toward action and changes of reality, it is also capable of legitimizing, defending and sustaining social condition or to organize resistance against the forces of reality" (Stehr, 2016: 19). It is critically important, therefore, to acknowledge that the search for new knowledge (e.g. about the Southern Polar Region) is dictated not only by the desire to turn the "unknown into familiar" but also by "the desire to expand the volume of existing possibilities for action" (Ibid.).

## The Context and Texts of 'Post-Colonial' Indian Engagement with Antarctica: Challenges and Opportunities

One of the key policy concerns of India's post-colonial engagement, from a critical social science perspective, relates to the legal freezing of the colonial geopolitical map of competing territorial claims and counter-claims under Article IV of the Antarctic Treaty. The position

*Author for Correspondence: E-mail: csgiorg@gmail.com, sanjay@pu.ac.in

adopted by India with regard to non-recognition of this colonial-imperial legacy is both unambiguous and firm. The notes sent by the Permanent Mission of India to the United Nations Division for Ocean Affairs and the Law of the Sea (between 13 July 2005 and 31 August 2009), in response to submissions made by Australia, Argentina and Norway to the Commission on the Limits of Continental Shelf happen to be the most emphatic expression of India's non-recognition of territorial claims and counter-claims to date. For example, the note sent by India in response to the Australian submission (Republic of India, 2005) stated:

> India recalls the principles and objectives shared by the Antarctic Treaty and the United Nations Convention on the Law of the Sea, 1982 [Convention] and the importance of harmony between the Antarctic Treaty and the Convention and the continuing cooperation, security and stability in the Antarctic area. India while referring to Article IV of the Treaty, wishes to inform that it does not recognize any State's right or claim to territorial sovereignty in the Antarctic area and consequently over the seabed and subsoil of the submarine areas adjacent to the continent of Antarctica. (Emphasis given)

The note further said:

> Acknowledging with appreciation Australia's request to the Commission for not taking any action on the portion of its submission relating to the areas of the seabed and subsoil adjacent to Antarctica, India requests the Commission not to take any action accordingly (Ibid.).

Equally firm and clear is India's commitment to the provisions of the Antarctic Treaty of 1959, its underlying principles, and various instruments of governance collectively termed as the Antarctic Treaty System (ATS). But this unwavering commitment of India to peaceful uses of Antarctica in the best interests of humankind is tempered with the realization that 'democratization' of Antarctic governance is a work in progress and needs to be further broadened and deepened. This would entail, among other things, a brutally frank acknowledgement, on the one hand, of the enviable 'knowledge'(*capacity to act*) of a relatively small number of Antarctic Treaty Consultative Parties (ATCPs) to draft and drive the agenda of Antarctic governance, and equally lamentable lack of such capacities on the part of a vast majority of ATCPs, on the other hand. The latter further calls for a close and critical self-reflection on the part of major actors in the ATS like India with regard to persisting power-knowledge asymmetries within the ATS, which become most glaring on the floor of the ATCMs. Indian social science research (see Chaturvedi, 2013b) continues to raise and address following questions in self-introspection mode.

How can India further broaden and deepen its post-colonial engagement with Antarctica so as to proactively and effectively contribute to further democratization of Antarctic governance? What are the reasons behind persisting mismatch between Asia's –and for that matter India's—growing physical-scientific presence on the continent of Antarctica and the knowledge-power driven geopolitical influence within the ATS? What has been the level of Indian commitment and participation in the ATCMs? What are the geopolitical as well ethical implications of inadequate 'burden sharing' in terms of setting agendas and joint knowledge production at the ATCMs?

One of the key findings of research focusing on 'post-colonial' engagement with the question of increasingly complex and crowded agenda of Antarctic governance is that India, along with other Asian countries, will have to collectively and proactively engage with Antarctic science diplomacy especially in emerging issue-areas of critical universal importance such as biological prospecting and climate change. Failure to do so could result in wide-ranging implications for both the ATS and the role that India aspires to play as a rising and responsible power in world affairs (Chaturvedi, 2013a; Chaturvedi 2013b).

Some new research findings and insights have been added to India's first post-colonial engagement with the question of Antarctic governance dating back to 1950s; a decade of critical importance for newly independent India's engagement with both domestic and foreign policy agenda. Chaturvedi (2013c) has revisited the Indian intervention in the UN on the 'Question of Antarctica' during 1956-1957, on the basis of recently de-classified files in the National Archives of India. In his view, even though considerable grounds have already been covered on various aspects of the Indian intervention (Howkins,

2008), a key puzzle remains largely unanswered, especially in the context of a rather complex value-interests interface that confronted political leadership of post-colonial and post-partition India during 1950s. Why did the Indian intervention fall short of a genuine post-colonial engagement with Antarctica, by choosing not to directly question the colonial legacy of territorial claims on the "white" continent?

Chaturvedi argues that Nehru's approach to the 'Question of Antarctica' during the first decade of India's independence, coinciding with the east–west cold war, was a part of what he perceived as India's 'Tryst with Destiny'. It was from a high moral ground that Nehru would approach various 'pragmatic' issues at both home and abroad. One of the key factors responsible for the rise and fall of a rather short but significant Indian intervention was the interplay between Nehru's worldview (in which the Question of Antarctica joined a host of other important foreign policy calculations) and complex labyrinth of domestic and external factors that surfaced during the tumultuous decade of 1950s and early 1960s. An equally important role was played by the ways in which Indian foreign policy and diplomacy came to be institutionally conceived and conducted during this period with a few eminent personalities at the helm of affairs.

The Indian intervention in the UN General Assembly during 1950s on the 'Question of Antarctica' was largely dictated and driven by the geopolitical visions of Jawaharlal Nehru and a handful of close associates such as Krishna Menon in the then nascent and overstretched foreign policy establishment confronting wide ranging internal as well as external challenges. The ideal-normative thrust of de-colonization agenda was often tempered, if not outrightly overtaken, by the hard-core power-political considerations of the cold war agenda. The Indian intervention in the UN on the 'Question of Antarctica' could not prove an exception to the rule but it did create a space for alternative imaginations of Antarctic geopolitics of peace and international cooperation.

**Antarctica as 'Global Knowledge Commons': The Challenge of Bio-Prospecting**

With highly 'capitalized actors' and forces of the 'globalized economy' arriving on the scene (Bush, 2001: 139), Antarctica is now being re-located, slowly but surely, on the new maps of global supply chains (Khanna, 2016) and getting increasingly integrated into international geopolitical economy. The technological, political and attitudinal transitions and transformations unfolding in the wider international system (Hemmings, 2007) are also impacting the science-geopolitics interface in the Antarctic that has been conceived, constructed and privileged over the past five decades by the ATCPs, largely through the mechanism of the ATCMs. Particularly noteworthy is the new revolution in the field of biotechnology, with industries of the future increasingly targeting the materials and processes in plants, animals and microorganisms.

Mindful of such a complex and dynamic context, Indian social scientists (see Chaturvedi, 2009b) turned their attention, early on, to the implications of market-driven search for bioactive components in living organisms for the legitimacy, authority and effectiveness of the ATS. It was further noted that in global commons areas such as the Antarctic and the high seas, geopolitical considerations of access and ownership are also combined with issues of sovereignty and jurisdiction. It is this entanglement of perceptions and priorities that makes bioprospecting and related matters so complex. The following critical issues have been identified as worthy of special attention. Firstly, commercialization of publicly funded science is likely to impose 'inappropriate' limits on freedom of scientific investigation in both the Antarctic and in the high seas. Secondly, in order to ensure that benefits are shared equitably by the entire humanity in global commons, mutually agreed limitations on ownership rights over biological resources would be required. Finally, consensus will have to be negotiated and sustained by various stakeholders on how best to regulate bioprospecting in areas outside national jurisdiction of Antarctic biodiversity.

Indian social science research (Chaturvedi, 2009b) on bioprospecting has once again found the question of knowledge absolutely central to both the ethical and the geopolitical implications of this new frontier of economic-commercial exploitation in the Antarctic; yet another problematic example of 'peaceful activities'. Integral to biological prospecting is the search for knowledge in the domain of diverse biological and genetic resources. Whether or not such knowledge qualifies as 'public good', in contrast to

'private knowledge', would depend largely on the extent to which it is available (or *made* available) in a manner that is non-rival and non-exclusive in terms of *access* as well as consumption (Herber, 2006). It is important to be reminded that the Preamble to the Antarctic Treaty of 1959 emphatically points out that: "it is in the interest of all mankind that Antarctica shall continue for ever to be used exclusively for peaceful purposes and shall not become the scene or object of international discord." This in turn imposes certain moral and geopolitical obligations on the part of those already engaged—and those likely to be engaged—in this 'peaceful activity' in the Antarctic Treaty area. One such obligation amounts to an unambiguous assurance to the effect that even those who are not directly involved in the ATS or in this commercial activity in the Antarctic Treaty area – south of 60 degrees South—enjoy the benefits of such knowledge. In other words, a private good principle is not only at odds with the dominant ethos of the ATS, it is also against the principle of global knowledge commons.

Apparently, innovations make use of previously accumulated knowledge, that is, each innovation draws upon the 'global commons of pre-existing knowledge'. One important question that assumes both further significance and complexity in the case of the Antarctic is the following: how much of the returns to the innovation should be credited to the innovator and how much would be allocated to the use of the global knowledge commons? After all, in the case of Antarctica, scientific research has historically been characterized by publicly funded and internationally open knowledge, a classic example of global public good.

One of the key findings of the Indian social science research on bioprospecting is that although the nature and extent of the physical impact of bioprospecting on the Antarctic eco-systems and biodiversity is being currently addressed by the ATCPs, the task of putting into place by consensus a sound legal-political arrangement marked by principles of equity and fairness is likely to be far more complex than often assumed. The objective of developing sound and sustainable measures on bioprospecting in the Antarctic can be accomplishedonly when some basic consensus prevails on the kind of regulation and the type of management system that are desirable, practical, and most importantly, equitable. Given that bioprospecting is an activity with potentially both environmental and resource implications, the ATCPs need to work out a more comprehensive policy imagination in the first instance. Equally important would be to ensure that steadily growing, and so far unregulated, corporate bid to access and exploit the rich biodiversity of the Southern Ocean does not eclipse the first order value enshrined in the 1961 Antarctic Treaty, namely the freedom to pursue scientific research. Close cooperation with SCAR and COMNAP, and coordination with other international legal for a would be an inevitable aspect of the formation of a comprehensive Antarctic bioprospecting policy regime, anchored in the norms of equality and equity in terms of both access and benefit sharing. India is yet to articulate its official position clearly on bioprospecting at the ongoing discussions at the ATCMs. This seems to have taken at least those by surprise who have observed India vociferously championing the cause of equity and benefit sharing in relation to the Convention on Biological Diversity (CBD), along with countries like Brazil. Again, in the overarching context of post-colonial engagement, it is a matter of when rather than whether India would be presenting a working paper on this complex but increasingly compelling issue-area at one of the future ATCMs.

**The Challenge of Climate Change and the Future of Antarctic Governance**

Indian scholars writing on the multifaceted implications of climate change for the Antarctic (Chaturvedi, 2012) have noted that it is at a crucial juncture in the evolution of the ATS that climate change issue has surfaced on the ATCM agenda. The ATS is confronted with a complex, crowded and compelling agenda (e.g. tourism and biological prospecting) and its overall capacity to deliberate and deliver legally binding measures to regulate growing commercialization of 'peaceful' uses of the Antarctica seems to be under considerable stress. The voluntary restraint enshrined in Article IV of the Antarctic Treaty on the claims and counterclaims/rights over territorial sovereignty also stands considerably challenged in the wake of more recent assertions of claims to extended continental shelves (Rajan, 2011).

Chaturvedi (2012) has discussed at some length

the nature and implications of what he terms as Antarctic 'climate security dilemma' for the future of Antarctic governance. His major argument is that climate change will make Antarctica and its resource endowment both geographically more accessible and geopolitically more galvanizing to the world, especially in the wake of growing scarcities of resources (both real and imagined) and clean environment interests. Trends such as these will put to severe test the authority and effectiveness of the ATS. At the heart of contestation that might follow could be the intricate question of 'securing' on the one hand the southern polar region and its 'polar attributes' and 'Antarctic values' (e.g. historical/heritage, geopolitical, environmental, scientific, intrinsic/aesthetic) and the 'Antarctic regime' on the other, against perceived threats of climate change. Some of the key questions with far reaching policy implications that need to be answered are the following: What would a perceived inability to address climate change mean for the credibility of science–both as a value and policy guide—globally and in the Antarctic? Is climate change only a matter of physicality and physical-ecological transformations, as largely framed and explained by climate science? What does the notion of security imply in the Antarctic-specific context of climate change? What is it that is being secured against the threats posed by climate change and by whom: instruments of governance, values enshrined in the Antarctic Treaty, national interests and alignments, colonial geographies of various territorial claims and rights?

In the decades ahead, the Antarctic climate security dilemma is likely to acquire greater complexity as well as visibility. Even the most innovative Antarctic-specific responses to the 'management' of climate change in the 'Antarctic Treaty Area', both in terms of intentions and outcomes, will not be able to conceal the fact that the 'white continent' remains at the receiving end of the total quantum of green house gases being released into the atmosphere by the ATCPs themselves. Can the Antarctic governance be quarantined from the complex and compelling issues related to the ethics and the geopolitics of climate change on the agenda of 'global' climate change diplomacy; including the critical question of who is polluting the atmosphere more, where, and why?

The ATCPs no doubt are confronted with difficult choices. If they choose not to engage with normative-ethical issues related to climate change, they might somehow be able to deter highly contentious 'North-South' debate from entering into the domain of Antarctic governance and thereby threaten the principle of consensus on which the security of Antarctic regime rests. On the other hand, a willful decision to disengage from more contentious ethical issues could make the ATCPs look like an accomplice to the 'business as usual' attitudes and actions (including their own in some cases) north of 60 degrees south. Consequently this might also seriously undermine the physical-ecological integrity of the 'natural reserve devoted to peace and science' that the ATCPs, as the first order value, are committed to secure in the wake of climate change.

Even a cursory glance at the key recommendations of the SCAR Antarctic Climate Change and the Environment (ACCE) report would show that despite great progress made in Antarctic climate change research in recent years, "there are still major gaps in our knowledge and many areas where we require additional instrumental data gathering and model development" (SCAR, 2009: 389). Such gaps no doubt would demand and deserve much greater attention and collective-collaborative-proactive action on the part of the ATCPs.

Apparently, it is the mismatch between 'securing the Antarctic' (both continent and the Southern Ocean in terms of physicality and physical impacts) and 'securing the Antarctic regime' and its core values that gives rise to the Antarctic dilemma of climate security. At the heart of this mismatch remains the question of who represents Antarctica, including its values, and for whom? The Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR), ATCMs and the Committee on Environmental Protection (CEP) are challenged in various ways with an issue area that demands holistic, coordinated, proactive and effective responses. Given that there is both a complex and contested spatial-geography (both material and symbolic) underlying the question of who or what is at 'risk', where, when, and how, the challenge of realizing a comprehensive climate security for the southern polar region, in the best interest of humankind, will remain rather daunting.

**Regulating Antarctic Tourism: Indian Contribution to the 38th ATCM Debate (IP 104)**

The decision to include Information Paper (IP) 104, presented by India at the 38th ATCM, held in Sofia, Bulgaria from 1-10 June 2015, in an article providing an overview of recent advances made by Indian social sciences in Antarctic studies demands some explanation. The reason is two-fold. Firstly, the IP 104, entitled 'Towards a Comprehensive, Proactive and Effective Antarctic Tourism Policy: Turning Recommendations into Action'is the outcome of extensive collaborative research and dialogue between researchers and policy makers. Secondly, IP 104 was very well received and appreciated at the Sofia ATCM in terms of its policy-orientation and has provided further impetus to interdisciplinary, policy-oriented research in India on issues related to the regulation of Antarctic tourism. What follows next is a brief summary of IP 104.

IP 104 is based on the assumption that the 'institutional memory' (who said, what, when and why at various ATCMs) is critically important for making the on-going dialogue on how to regulate Antarctic tourism more focused, less repetitive and action oriented. What IP 104 chooses to do therefore is to selectively map out the origins and evolution of ATCM dialogue on 'regulating' Antarctic tourism, highlighting the recommendations (formal and informal) made in this regard by the three categories of stakeholders; Regulators, Organisers and Monitors. It is hoped that this exercise will shed some light on durability and consistency of various issue-areas as perceived, framed and flagged by various stakeholders over a rather long time.

IP 104 borrows the useful classification deployed by a seminal study on Antarctic tourism (Liggett *et al*., 2011) to identify key Antarctic tourism stakeholders. These are: (a) *Regulators*: 'government representatives directly involved in Antarctic policy'; (b) *Organizers*: 'tour operators and industry representatives'; and (c) *Monitors*: 'representatives of environmental NGOs and Antarctic tourism researchers'. While acknowledging the overall usefulness of this classification, IP 104 points out that (i) there prevails a remarkable diversity of perspectives and priorities within each category of stakeholder, which in turn carries significant implications for Antarctic tourism policy; (ii) the texts adopted by various stakeholders from time to time have been dictated to a large extent by the wider regional and global geopolitical, geoeconomic and legal contexts; and (iii) the Antarctic tourism policy environment is increasingly shaped by the forces of globalization, flows and networks operating both within and across state actors.

It is the peculiar and challenging geographical legal-geopolitical setting of the region that makes Antarctic tourism different from tourism in other parts of the globe. Despite the remarkable improvement in technology and logistics in recent years, it is the physical geography of the area (environmental constraints) that dictates the when and where of the Antarctic tourism. As a result, tourists tend to visit the most accessible parts of the Antarctic (as such, the Ross Sea region, and particularly the Antarctic Peninsula and the Subantarctic or peri-Antarctic islandsand coincide --even clash-- with the most productive period for scientific research, the Antarctic summer. In the prevailing circumstances, it is clear that regulation of Antarctic tourism will continue to take place at (1) the ATS level, (2) the governmental level and (3) the tourism industry level. All three have their own contributions to make to Antarctic tourism policy.

One of the key arguments made in the IP 104, reflecting India's position, is that the 'strategic vision' of regulating Antarctic tourism (Tourism with a Difference) is integral to the kind of ' common futures' that the Antarctic Treaty parties would want to visualize and realize in the best interest of humankind. It looks like many issue-areas, such as the port state control, demand and deserve a far more robust and regular engagement than has been possible thus far. Many such issue-areas have remained on (and for some time off) the agenda of the ATCMs for a long time and have invited rich and rewarding interventions by delegations to the ATCMs.

One of the key conclusions of IP 104 is that a large number of issue-areas related to the regulation of Antarctic tourism have remained on the ATCM agenda over decades and in some cases repeatedly discussed and highlighted. At the same time the contexts in which some of these 'enduring concerns' were discussed have also changed. With both the

numbers of stakeholders and their concerns fast multiplying, a building-block approach to the 'Strategic Vision' of Antarctic tourism would necessitate in the first place making good use of the institutional memory to avoid duplication of debate on certain issues on the one hand, and to underline the urgency to continue to discuss several such issues in their fast changing contexts, on the other. It appears that it is not so much a question of whether but when the ATCPs would turn to a more focused discussion of how best to formalize, institutionalize and operationalize the insights, resolutions, recommendations and measures that have accumulated over the decades at various ATCMs. There is not an iota of doubt that the major onus of responsibility/accountability/action lies on the part of Antarctic tourism *Regulators* since there are obvious (at times not very obvious) limits to self-regulation by the *Organizers*, as also pointed out by many *Monitors* from time to time.

IP 104 concludes by drawing attention to the fact that according to the United Nations World Tourism Organization (UNWTO, 2014), "Despite occasional shocks, international tourist arrivals have shown virtually uninterrupted growth —from 25 million in 1950 to 278 million in 1980, 528 million in 1995, and 1087 million in 2013" (Ibid.2). According to the UNWTO's long-term forecast 'Tourism Towards 2030', "international tourism arrivals worldwide are expected to increase by 3.3% a year from 2010 to 2030 to reach 1.8 billion by 2030" (Ibid.).Again, it is not a question of *whether* but *when* (more likely sooner than later) some of the ATCPs from Asia would find themselves far more engaged and involved with the challenge of Antarctic tourism regulation; as increasing number of Asians from some of the fastest growing economies in the world would be heading to the Southern Polar Region as tourists. A political economy perspective on tourism in the era of climate change and 'resource scarcities' compels all the three categories of Antarctic tourism stakeholders to ensure continuity of a multi-sectoral, multi-disciplinary research, dialogue and constructive critique on the one hand, and a robust science-diplomacy directed at implementing and enforcing legally binding measures on the other.

## Conclusions

The domain of Antarctic social sciences is steadily expanding (Steel, 2015). It is largely from a critical post-colonial perspective that Indian social science contributions to Antarctic studies have evolved during the past decade or so, with new issue-areas such as bioprospecting and climate change being added to research agenda. The policy orientation of this research has become more pronounced with regard to Antarctic tourism issues, especially as articulated in IP 104 presented by India at the 38th ATCM held in Sofia. It is quite obvious from the sources cited in this synoptic overview that the nature and scope of social science research in India on the Antarctic is still quite narrow and needs to be broadened and deepened. Participation of Indian researchers in international collaborative research on various social science issues (Hemmings *et al*., 2015), including the question of Antarctic values, also needs to be further enlarged and encouraged.

## Acknowledgements

I would like to thank the two anonymous referees for their meticulous reading of the paper, insightful comments and helpful suggestions. I cannot thank Dr. Shailesh Nayak, former Secretary, and currently Distinguished Scientist, MoES, Government of India, enough for his vision and support for social science research on the Polar Regions.

## Disclaimer

The views expressed in this article are those of the author and do not represent those of the Ministry of Earth Sciences (MoES), or any other Ministry or Department of Government of India.

## References

Adolf M and Stehr N (2014) Knowledge, Routledge

Bush W (2001) The next 40 years: The Challenge of economic globalisation and 21st century security threats. In: The Antarctic Past, Present and Future (Eds: Jabour-Green J and Howard M) pp. 126-146, Cooperative Research Centre for the Antarctic and Southern Ocean

Chaturvedi S (2009a) Antarctica. In: International Encyclopedia of Human Geography, (Eds: Thrift N and Kitchin R) pp. 132-139, Elsevier

Chaturvedi S (2009b) Biological prospecting in the southern polar region: science-geopolitics interface. In:Final Frontiers or Global Laboratories? The Interface between Science and Politics in the International Polar Year (Eds: Tenberg M and J Shadian) pp 171-188, Ashgate.

Chaturvedi S (2012) The Antarctic 'climate security' dilemma and the future of Antarctic governance. In: Antarctic Security in the Twenty First Century (Eds: Hemmings AD, Rothwell DN and Scott K N) pp 257-283, Routledge

Chaturvedi S (2013a) India and Antarctica: towards post-colonial engagement. In: The Emerging Politics of Antarctica (Ed: Brady A M) pp50-74, Routledge

Chaturvedi S (2013b) Antarctic as 'Global Knowledge Commons': Geopolitics, Science and Trusteeship. In: Scientific and Geopolitical Interests in Arctic and Antarctic (Eds: Ramesh, D, Sudhakar M and Chattopadhyay S) pp 11-32, LIGHTS

Chaturvedi S (2013c) Rise and Decline of Antarctica in Nehru's Geopolitical Vision: Challenges and Opportunities of the 1950s in *The Polar Journal* **3** 301-315

Dodds K (2006) Post-colonial Antarctica: an emerging engagement in *Polar Record* **42** 59-70

Government of India (2005) Republic of India: Permanent Mission of India to the United

Nations: 'Notification Regarding the Submission Made by Australia to the Commission

on the Limits of the Continental Shelf', 5 July 2005 [Accessed 21 August 2016] http://

www.un.org/depts/los/clcs_new/submissions_files/aus04/clcs_03_2004_los_ind.pdf

Hemmings A (2007) Globalization's cold genius and the ending of Antarctic isolation. In: Looking South: Australia's Antarctic Agenda (Eds: Kriwoken L K, Jabour J and Hemmings A. D.) pp. 176-190, Federation Press

Hemmings A, Chaturvedi S, Leane E, Liggett D and Juan Francisco Salazar (2015) Nationalism in Today's Antarctic in *The Yearbook of Polar Law***7**531-555

Herber B P (2006) Bioprospecting in Antarctica: the search for a policy regime in *Polar Record* **42** 139-46

Howkins A (2008) Defending polar empire: opposition to India's proposal to raise the 'Antarctic Question' at the United Nations in 1956 in *Polar Record* **44** 35-44

IP 104 (2015) Towards a Comprehensive, Proactive and Effective Antarctic Tourism Policy: Turning Recommendations into Action. Presented by India at the 38th ATCM, Sofia, 1-10 June.

Khanna P (2016) Connectography: Mapping the Future of Global Civilization. Random House

Liggett D, McIntosh A, Thompson A, Gilbert N and Storey B (2011) From frozen continent to tourism hotspot? Five decades of Antarctic tourism development and management, and a glimpse into the future' *Tourism Management* **32** 357-366

Rajan S (2011) Antarctic continental shelf and the law of the seas: A future winter of discontentment? In: Science & Geopolitics of Arctic and Antarctic *Proceedings of SaGAA National Conference* pp 32-38

SCAR (2009) Antarctic Climate Change and the Environment (ACCE) Review Report (accessed 20 October 2016) http://www.scar.org/scar_media/documents/publications/acce/ACCE_25_Nov_2009_sm.pdf

Steel G D (2015) Polar, social, science: A reflection on the characteristics and benefits of the polar social sciences in *The Polar Journal* **5** 1-7

Stehr N (2016) Information, Power, and Democracy. Cambridge University Press

Stehr N (1994) Knowledge Societies. Sage

UNWTO (2014) Tourism Highlights, World Tourism Organization United Nations, pp. 1-16.