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## (Anti)-boundary work in global environmental change research and assessment

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## A B S T R A C T

In the 1990s, a discourse emerged within global environmental change research underlining the need to go beyond previously held boundaries between science and society. While not entirely new, this discourse has however reached the highest levels of scientific cooperation embodied among others in the Future Earth (FE) platform and the Intergovernmental Panel on Climate Change (IPCC). Using the concept of (anti)-boundary work developed in Science and Technology Studies (STS), we trace shifts in discourses about the boundaries between social and natural disciplines; between scientists and societal actors; and finally, between the definition of problems and the provision of solutions. We do so analyzing the emergence of global sustainability and solution-oriented science in the discourses of scientific and political actors involved in FE and the IPCC. We conclude with a discussion of challenges connected to the implementation of solution-oriented research and assessment. This article is part of a special issue on solution-oriented GEAs.

## 1. Introduction

In the last few decades, scientists and experts have assumed an increasingly prominent role in global environmental politics. From the 1980s, the growing concern for environmental problems has led to a multiplicity of international conventions that heavily rely on technical and scientific inputs (Miller, 2001; Mitchell et al., 2006). In order to provide such inputs, there has been a proliferation of scientific programs, organizations and Global Environmental Assessments<sup>1</sup>(GEAs) through which scientific knowledge is coordinated and reappropriated by policy-makers (Mitchell et al., 2006; Riousset et al., 2017). The climate change regime<sup>2</sup> is one of the best examples of this trend, with the establishment of scientific programs like the *World Climate Program* (WCP) or the *International Geosphere Biosphere Program* (IGBP) in the 1980s and of the *Intergovernmental Panel on Climate Change* (IPCC) in 1988 (Demeritt, 2001; Edwards, 2010). The new international platform, Future Earth (FE), created in 2012, is seeking to bridge existing cooperation around the notion of 'global sustainability'

science.

Most environmental – and particularly the climate – regimes have been conceived according to a rather simplistic model in which an independent and consensual expertise is expected to lead to rational policy-making (Pielke, 2007; Beck, 2011, 2012). According to such prominent but contested understanding (Morin et al., 2013), the more science is isolated from politics, the more influentially it will “speak truth to power” (Haas, 2004; p. 583). Knowledge production should be untainted by political interference and evaluated through objective peer review. Only after consensus is reached among scientists, can knowledge be transmitted to policy-makers and serve as the basis for international negotiations. A similar separation is often established between the different scientific disciplines – with the social sciences often considered secondary compared to the natural sciences (Mooney et al., 2013).

In the last decade, however, this traditional model has been increasingly questioned, particularly with reference to the climate change regime, which, it is argued, should no longer be framed as a

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<sup>1</sup> A broad definition of GEAs is given by Biermann (2002, p. 195): “the immense networks of scientists, experts, national governments, private bodies, and international organizations engaged in these major global environmental assessments can be understood as distinct international institutions within the larger endeavor of global environmental governance, consisting of internationally accepted general principles for producing, synthesizing, and legitimizing expert knowledge; international norms and rules regulating this synthesis and the evaluation of knowledge in specific cases; and pertinent decisionmaking procedures”.

<sup>2</sup> We refer to the widely used definition by Krasner (1982, p. 186) of regimes as “sets of implicit or explicit principles, norms, rules, and decision-making procedures around which actors' expectations converge in a given area of international relations”. Regimes can include both scientific and political institutions.

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problem of global pollution with marginal social and political dimensions (Hulme, 2009; Goeminne, 2012; Dahan, 2014). Under the hallmarks of ‘global sustainability’ and ‘solution-oriented’ science, a new discourse has emerged arguing against these strict separations of scientific disciplines. Such ideas are not completely new, but, in the 2010s, their uptake at the international level has benefited from the favorable political context. Since 2011, the Ad Hoc Working Group on the Durban Platform for Enhanced Action and, since 2012, the Open Working Group of the General Assembly have been important processes leading to the adoption of the Paris Agreement and the Sustainable Development Goals in 2015.

To explore such ‘paradigm shift’ (Kuhn, 1962), we build upon the concept of ‘boundary-work’ introduced by Thomas Gieryn to describe the “ideological style found in scientists’ attempts to create a public image for science by contrasting it favorably to non-scientific intellectual or technical activities” (Gieryn, 1983; p. 781). The emerging ‘solution-oriented’ discourse is, we believe, an interesting form of *anti-boundary work*, which challenges the existence of frontiers, especially between disciplines, and the roles of science and politics. We illustrated this shift analyzing the circulation of its discourse in FE and in the IPCC.

We asked ourselves what previous events and debates underpinned the emergence and circulation of the anti-boundary discourse. Secondly, we investigated what representations of the relation between science and politics it supports. And, thirdly, we explored how it was reappropriated by the IPCC. Doing so, we explored the specific circumstances that facilitated the rise of this discourse, tracing its development in several large transnational scientific initiatives. Such initiatives include a heterogeneous mix of conferences, ad-hoc organizations, individuals and institutional alliances, which go under the name of the “Science and Technology Alliance for Global Sustainability” (or the Alliance). We subsequently described how such discourse was articulated by FE and reappropriated by the IPCC, a potential ally and user of this approach. We concluded discussing several tensions raised in the implementation of this vision.

## 2. Boundary work and global environmental research and assessment: a discourse analysis

### 2.1. Boundary work as a form of scientific authority

The difficulty of tracing clear-cut separations among scientific disciplines and between science and other social spheres is a classic theme of Science and Technology Studies (STS). Inquiries in the daily practices of scientific laboratories and advisory committees have demonstrated that science and society are always to some extent ‘co-produced’ or ‘hybridized’ (see e.g. Latour and Woolgar, 1979; Jasanoff, 1990, 2004; Knorr-Cetina, 1995; Hilgartner, 2000; Callon et al., 2009) and that ‘boundary organizations’ exist specifically to facilitate these interactions (Guston, 2001). Hardly present in practice, the separation of science is, however, regularly exposed in the discourses of scientists. Thomas Gieryn calls this rhetorical strategy ‘boundary work’, pointing to the fact that “‘science’ is no single thing: its boundaries are drawn and redrawn in flexible, historically changing and sometimes ambiguous ways” (Gieryn, 1983; p. 781). Precisely because there is no such thing as a transcendent, distinct and unique character of science, scientists spend significant amounts of energy defending the specificities of their domains and opposing them to ‘non-scientific’ activities. Following Latour (2001), in this paper we use the term ‘research’ to refer to situated and ongoing practices of scientific inquiries, which are always plural, in-progress and, to some extent, uncertain. The term ‘science’ is used more generally to refer to the results produced by scientists, the ideals that animate them and the institutions that support their work.

The motivations behind such efforts are numerous and context-dependent: scientists may engage in boundary work to secure funding,

to establish their authority over key issues or defend their autonomy. According to Gieryn, ‘boundaries’ can be drawn to prevent external control over the scientific work and to protect its autonomy. They can be elevated between competing disciplines (e.g. fundamental and applied research), different knowledge systems (e.g. scientific and local knowledge) or social worlds (e.g. science, religion or politics). For instance, with regard to the science-policy interface, “any engagement with policy-makers or other potential users of knowledge is considered to be problematic because it signifies a lack of independence and objectivity and threatens the authority of science” (Turnhout et al., 2013; p. 355). Boundary work offers a powerful tool for scientists to present authoritative and unchallenged knowledge (Jasanoff, 2004). When an area of intellectual activity is labelled as ‘science’, people who are not scientists are discouraged from intervening. Vice versa, “to label something ‘not science’ is to denude it of cognitive authority” (Jasanoff, 1990; p. 14). In the science-policy interface in particular, boundary work is essential for the legitimacy of expertise and its acceptability by policy-makers.

The practical co-production and rhetorical separation of science and society should thus be seen as two sides of the same effort to maintain scientific influence: “if negotiation is the engine that drives the construction of [...] science, boundary work is the casing that gives the result legitimacy” (Jasanoff, 1990; p. 236). On the whole, this double strategy has been rather successful in establishing scientific authority over other forms of knowledge. The twentieth century has witnessed the spread of scientific expertise to many different aspects of society, from military to health and environmental issues. In environmental politics, “[...] the pervasive tendency [...], has been to draw the line to favor science: to define problems so that they require scientific solutions, thereby converting political controversies into technical puzzles” (Bocking, 2004; p. 21). Today, scientists are omnipresent in the organizations that enact norms and standards at the national but also at the international level.

### 2.2. Anti-boundary work as an alternative form of scientific authority

While the practical co-production and rhetorical separation of science and society constitute the main strategies sustaining scientific authority, opposite approaches exist. In this article, we focused on the discursive approaches that support hybridization and blurring of boundaries, describing in particular how these approaches have acquired a growing relevance in the environmental and climate debates. As they go in a direction opposite to the one described by Gieryn, we called these approaches ‘anti-boundary’ work (Table 1). While boundary and anti-boundary work is used to describe discourses about the relevance of frontiers between academic disciplines and social worlds, proceduralization and co-production can serve the purpose of strengthening or blurring boundaries in practice.

The advent of the solution-oriented research has brought about an interesting novelty: the traditional separation between science and politics is not only overcome in practice, but also challenged in rhetoric. Though boundary discourse remains important in global environmental research and assessment, which still abide by ideas of scientific independence, it is increasingly accompanied by a discourse explicitly promoting interactions across multiple boundaries. Anti-boundary

Table 1

Anti-boundary-work in the larger – non-exhaustive – debate about discourses and practices of scientific production, inspired by the distinction between purification and hybridization introduced by Latour (1993).

	Purification	Hybridization
Discourse	Boundary work (Gieryn, 1983)	Anti-boundary work
Practice	Proceduralization (Joly, 2015; Porter, 1996)	Co-production (Jasanoff, 2004; Miller, 2001)

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