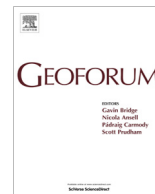




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The hydrosocial cycle: Defining and mobilizing a relational-dialectical approach to water

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ABSTRACT

The relationship between water and society has come to the forefront of critical inquiry in recent years, attracting significant scholarly and popular interest. As the state hydraulic paradigm gives way to modes of water governance, there is a need to recognize, reflect and represent water's broader social dimensions. In this article, we advance the concept of the hydrosocial cycle as a means of theorizing and analyzing water-society relations. The hydrosocial cycle is based on the concept of the hydrologic cycle, but modifies it in important ways. While the hydrologic cycle has the effect of separating water from its social context, the hydrosocial cycle deliberately attends to water's social and political nature. We employ a relational-dialectical approach to conceptualize the hydrosocial cycle as a socio-natural process by which water and society make and remake each other over space and time. We argue that unravelling this historical and geographical process of making and remaking offers analytical insights into the social construction and production of water, the ways by which it is made known, and the power relations that are embedded in hydrosocial change. We contend that the hydrosocial cycle comprises a process of co-constitution as well as material circulation. Existing work within the political ecology tradition considers the co-constitution of water and power, particularly in relation to processes of capital accumulation. We propose the hydrosocial cycle as an analytical tool for investigating hydrosocial relations and as a broader framework for undertaking critical political ecologies of water.

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1. Introduction

The relationship between water and society is as complex an historical, sociological, and regional problem as any that can be imagined (Mosse, 2003, p. 1).

The relationship between water and society has attracted significant scholarly and popular interest through issues such as global water scarcity, transboundary river basin management and water privatization. Much of this interest stems from the acknowledgement that water management is not merely a technical field that can be addressed through infrastructure provision and scientific expertise, but a political one that involves human values, behavior and organization. A notable development has been the increasing recognition that it is not just society's relationship with water that is at stake, but the social nature of water itself. This im-

plies a shift from regarding water as the object of social processes, to a nature that is both shaped by, and shapes, social relations, structures and subjectivities.

In this article, we build on scholarship in critical geography, political ecology and cognate fields to advance the concept of the hydrosocial cycle. While the term 'hydrosocial cycle' has been present in scholarship for around a decade, there is little coherence in how it has been defined and employed. The contribution that we seek to make through this paper is to define and mobilize the hydrosocial cycle as a socio-natural process by which water and society make and remake each other over space and time. Our aim is to present a concept that researchers will find useful as a framework for investigating hydrosocial relations and for undertaking critical political ecologies of water. Our conceptualization of the hydrosocial cycle is radically different from the concept of the hydrologic cycle. Originally presented as a framework for the hydrologic sciences, the hydrologic cycle has become the dominant popular means of representing flows of water in the hydrosphere. The hydrosocial cycle, in contrast, attends to the social nature of these flows as well as the agential role played by water, while highlighting the dialectical and relational processes through which water and society interrelate.

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Our approach diverges from many existing approaches to water–society relations and water politics by calling the very nature of water into question. We start from the premise that water internalizes social relations and politics, as opposed to being merely the object of politics. Through the hydrosocial cycle we seek to transcend the dualistic categories of ‘water’ and ‘society’, and employ a relational-dialectical approach to demonstrate how instances of water become produced and how produced water reconfigures social relations. We argue that unravelling this historical and geographical process of making and remaking offers analytical insights into the social construction and production of water, the ways by which it is made known, and the power relations that are embedded in hydrosocial change.

Following this introduction, Section 2 considers the genealogy and the political consequences of the hydrologic cycle, arguing that it has the effect of separating water from its social relations and privileging a particular type of hydrologic expertise. As the state hydraulic paradigm has increasingly given way to modes of water governance, we argue that there is a need to recognize, reflect and represent water’s broader social dimensions. Section 3 responds to this need by locating the concept of the hydrosocial cycle in current theoretical debates in geography and cognate disciplines around socio-natural hybridity and dialectics. Section 4 proceeds to develop and advance the concept in line with a view of hydrosocial relations that regards water and society as making and remaking each other. Section 5 then discusses the analytical potential of the hydrosocial cycle, reflecting on how the concept orients and facilitates the investigation of hydrosocial relations so as to serve as a framework for undertaking critical political ecologies of water. We conclude by outlining the contributions of the hydrosocial cycle, suggesting that it provides a way of conceptualizing water that is compatible with emerging forms of governance, and that might be mobilized to inspire change in hydrosocial relations.

2. From the hydrologic cycle to the hydrosocial cycle

Our starting point is that the hydrologic cycle¹ is not merely a neutral scientific concept, but can be regarded as a social construct with political consequences. Tracing the genealogy of the hydrologic cycle reveals that it emerged in a specific historical context in pursuit of particular objectives and interests, and that it was constructed according to a vision of nature that authorizes the realization of these objectives and interests by deploying a particular form of expertise.

2.1. The political work of the hydrologic cycle

While philosophers and scientists have always had (and debated) ideas concerning hydrologic phenomena, the concept of the ‘hydrologic cycle’ and its diagrammatic representation are actually recent inventions (Linton, 2008). They were first presented by the American hydrologist, Robert Horton, in a paper read before a meeting of the American Geophysical Union in 1931. The hydrologic cycle was introduced as a framework for the emerging science of hydrology in the United States. Making the case for this new science, Horton argued:

[H]ydrology may be regarded as charged with the duty of tracing and explaining the processes and phenomena of the hydrologic cycle, or the course of natural circulation of water in, on, and over the Earth’s surface. This definition has the advantage that it clearly outlines the field of hydrologic science (Horton, 1931, p. 192).

¹ The terms ‘hydrologic cycle’ and ‘hydrological cycle’ are synonymous; in this paper we adopt the former.

In his paper, Horton also introduced what appears to be the first diagram of the hydrologic cycle. (Fig. 1).

The original purpose of the hydrologic cycle was thus not simply to describe hydrologic processes, but also to constitute a separate field of scientific enquiry and a community of technical experts known as hydrologists. Hydrology is defined in one classic textbook as ‘the science that treats of the various phases of the hydrologic cycle’ (Wisler and Brater, 1949, p. 3). The hydrologic cycle remains ‘the most fundamental principle of hydrology’ (Maidment, 1993, p. 1.3), and a variation of the diagram representing it is featured in the introductory pages of practically every hydrology textbook.

By constituting a new field of scientific enquiry and an associated group of knowledge workers, the hydrologic cycle also helped legitimize a certain technical authority over water. Horton defined the hydrologic cycle as the *natural* circulation of water on, in and over the earth, a process that occurs independently of human involvement: ‘This immense water engine fuelled by solar energy, driven by gravity, proceeds endlessly in the presence or absence of human activity’ (Maidment, 1993, p. 1.3). Such a process can only be modified or disturbed by humans, which renders water the province of agencies and experts with technical knowledge of the hydrologic cycle and the power to engineer it:

For the hydrologist, there is a need to know as accurately as possible the modifications that man makes in the hydrologic cycle – past, present, and future – in the hope that man can progressively increase his ability to modify the hydrologic cycle to his advantage. By working with nature, adapting his needs to the natural cycle or adapting that cycle to his needs, man can obtain the greatest beneficial use of the water resources (Thomas, 1956, p. 548)

The political effects of this mode of hydrological expertise are increasingly being explored in a critical sense. Recent work in political ecology has demonstrated the partial and contested nature of hydrologic data (Bakker, 2000; Budds, 2009; Kaika, 2003; Sheridan, 1995; Swyngedouw, 1995), and has revealed how hydrologic concepts and studies are constructed according to particular views of nature, and mobilized in line with vested interests (Budds, 2009; Cohen and Davidson, 2011; Linton, 2004). This emerging literature shows how hydrology – as an ‘orthodox’ science (Forsyth, 2003) – is predicated upon ‘Western’ views of nature that reduce water to its material composition (H₂O) (Linton, 2010), the homogenization of different waters (Orlove and Caton, 2010), and the characterization of hydrologic processes as ordered and universal (Brown, 2004; Walker, 2005). These insights reveal hydrological knowledge as partial and situated, and suggest its limitations as a basis for policy- and decision-making.

2.2. Changing water paradigms and the need for a new concept of water

At the time when Horton coined the term ‘hydrologic cycle’, the ‘greatest beneficial use’ of water resources was defined and put into effect almost exclusively by state agencies in most industrialized countries (Solomon, 2010). During the twentieth century, understanding the hydrologic cycle and how to modify it could be described as the main task of state water agencies. In the United States, the concept was taken up by planning agencies of the federal government in the 1930s as a means of envisioning the nation’s water resources and rendering them ‘legible’, to use Scott’s (Scott, 1998) term (National Resources Board, 1934).

As a means of rendering water legible for administrative purposes, the hydrologic cycle has been convenient to what Gleick (2000) identifies as the ‘old’ water paradigm, characterized by an emphasis on the development of water supplies by state agencies,

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