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The socio-ecological dimensions of hydrocarbon development in the Disko Bay region of Greenland: Opportunities, risks, and tradeoffs

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A B S T R A C T

Efforts to develop Greenland's offshore hydrocarbon resources are well underway. Research into the interrelated social and ecological dimensions of current hydrocarbon development activity, however, remains in its infancy in both Greenland and the Arctic at-large. This study draws on insights from socio-ecological resilience and political ecology scholarship to develop a baseline understanding of the socio-ecological opportunities, risks, and tradeoffs of hydrocarbon development in Greenland's Disko Bay region. Community-based interviews ($n = 45$), key informant interviews ($n = 10$), and participant observations were carried out in Ilulissat, Aasiaat, and Qeqertarsuaq, communities that together are representative of the region's biophysical and socio-economic/political diversity. The study identifies and discusses potential socio-economic development opportunities, risks of environmental degradation and social disruption, and tradeoffs between known lifeways and new livelihood prospects. It is argued that environmental change is insufficiently analyzed in government- and industry-funded impact assessments, leading decision-makers and stakeholders to endorse hydrocarbon development activities based on information that may underreport uncertainty and the extent of potential risks.

Introduction

Climate-related cryospheric changes are well documented in Arctic regions, with reductions in the extent and duration of sea ice cover widely reported (e.g. Cavalieri & Parkinson, 2012; Markus, Stroeve, & Miller, 2009; Perovich, Meier, Maslanik, & Richter-Menge, 2011). In the context of changing global energy markets, rising global demand for oil and gas, and improving exploration and extraction technologies, changing sea ice regimes have intensified interest in the Arctic's offshore oil and gas resources (Bird et al., 2008; IEA, 2012; Nuttall, 2010b). Indeed, across the circumpolar north, the number of hydrocarbon development projects proposed and under exploration is rising rapidly (Huntington, 2007; Schiermeier, 2012).

Endeavoring to capitalize on changing environmental and socio-economic/political conditions, the Home Rule Government (HRG) of Greenland has developed proactive policies encouraging exploration of the country's potentially extensive hydrocarbon resources (~50 billion barrels of oil and oil-equivalent natural gas) (see Government of Greenland, 2013b; Nyvold, 2013c). Because oil and gas revenues could provide a pathway to Greenlandic self-determination through financial independence from Denmark (Denmark currently provides ~56% of HRG revenue), hydrocarbon development has emerged as a cornerstone of the country's political agenda and socio-economic development strategy (CIA, 2012; Nuttall, 2008, 2012). Consistent with these aspirations, the HRG has produced a detailed national-level hydrocarbon development plan outlining socio-economic and environmental considerations, providing a general framework for the oil and gas development activities being initiated in Greenlandic waters (Government of Greenland, 2004, 2009a, 2009b).

Due to its relative accessibility and promising subsea geological features, the Disko Bay region of central west Greenland has become a focus for hydrocarbon development activities (Gregersen et al., 2007; Qaasuitsup Kommunia, 2011). For example, 2007, 2008, and 2011 licensing rounds saw exploration licenses granted to Cairn Energy, ExxonMobil, Chevron, DONG Energy, Husky Energy, PA Resources, and state-owned NUNAOIL (Government of Greenland, 2013a). Notwithstanding government- and industry-funded impact assessments (e.g. Cairn/ERM, 2011; Mosbech, Boertmann, & Jespersen, 2007), however, the interaction between already-initiated hydrocarbon development activities, regional socio-ecological conditions, and concurrent processes of social and ecological change is not well understood. Accordingly, there is a deficit in knowledge regarding the local and regional implications

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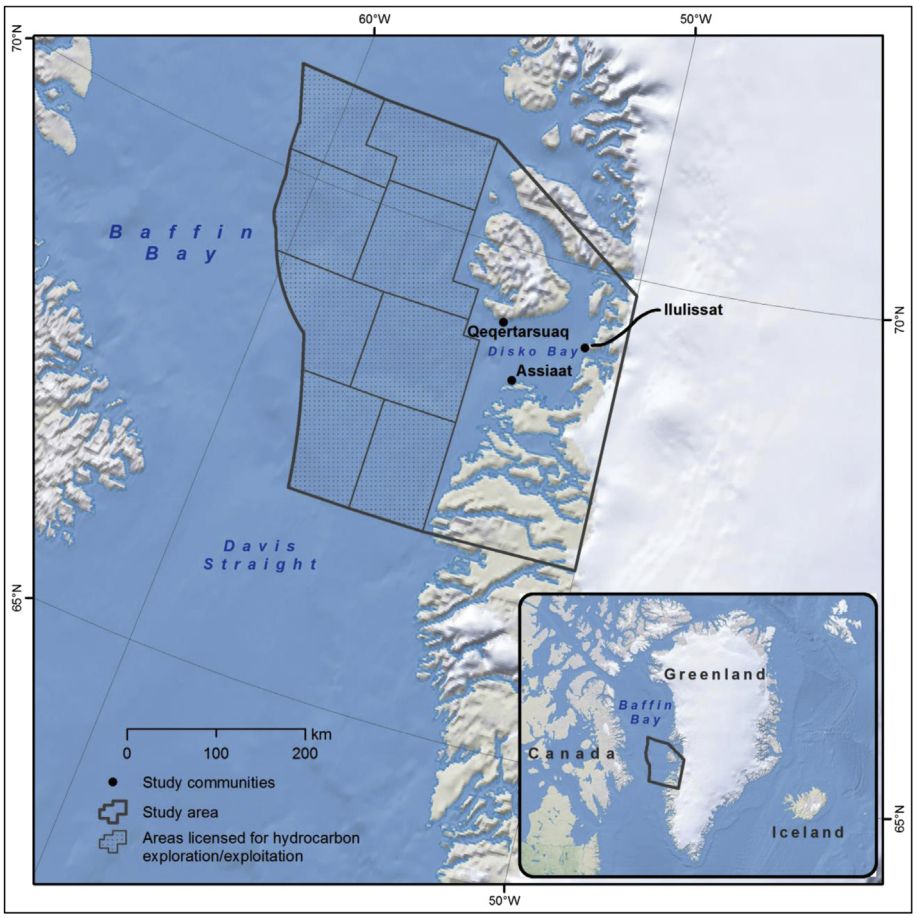

Fig. 1. Disko Bay region – offshore, inshore, and coastal areas between 67°N and 71°N and 50°W to the Greenland/Canada boarder (excluding the Uummannaq fjord system).

of Greenland's national-level hydrocarbon-based development activities. The situation is indicative of conditions across the circumpolar north, where there have been few integrative assessments of the social and ecological dimensions of oil and gas development. There is thus a pressing need for geographical approaches in Arctic resource development scholarship.

This study examines nature–society relations by drawing on insights from socio-ecological resilience and political ecology, and interviews conducted with community members and policy makers, to identify and characterize the socio-ecological opportunities, risks, and tradeoffs of hydrocarbon development activities in the Disko Bay region of Greenland. Specifically, the paper: i) reviews and synthesizes existing scholarship to characterize socio-ecological conditions and changes in the Disko Bay region; ii) identifies and examines the opportunities, risks, and tradeoffs that emerge from hydrocarbon development activities in-light of existing socio-ecological conditions and changes; and iii) situates findings in the context of emergent regional, Greenlandic, and circumpolar hydrocarbon development activities and governance arrangements. While the work focuses on a specific region of Greenland, the findings have wider relevance for examining resource development across the circumpolar north.

The study area: Disko Bay region

The effects of hydrocarbon development on socio-ecological systems (SES) are determined by the interaction of oil and gas projects with context specific social and biophysical factors. Evaluation of the implications of hydrocarbon projects therefore requires careful attention to existing socio-ecological conditions and changes. Because these dimensions have yet to be characterized for the study region in an integrative way, this section develops understanding based on a review of publicly available English language documents.

Socio-ecological conditions

The Disko Bay region is located above the Arctic Circle on the central west coast of Greenland (Fig. 1), and experiences a polar climate (Köppen ET). The marine areas of the region are located in southeastern Baffin Bay and Disko Bay proper. Macro-scale current dynamics are dominated by the relatively warm West Greenland Current, which flows northward along the west coast (Ribergaard, 2012). Sea ice––comprised of drift ice known as the 'West Ice' and more stable 'land-fast ice'––is commonly present from December to June, though there is significant inter-annual variability in the extent and duration of ice cover (Clausen, Johansen, Mosbech, Boertmann, & Wegeberg, 2012). In general, ice formation occurs from northwest to southeast with an average (1952–2001) ice formation limit of ~68°S along the west coast (Stern & Heide-Jorgensen, 2003). Icebergs are produced by marine-terminating glaciers and are especially prevalent in Disko Bay, where iceberg densities are highest in late summer (Clausen et al., 2012). The majority of icebergs travel west until becoming entrained by the northward flowing West Greenland Current or west branching eddies (Tang et al., 2004). Regional shoreline morphology is predominantly rocky and inclined, with archipelago, talus, and moraine features most common (Clausen et al., 2012). Numerous