

# Performing 'blue degrowth': critiquing seabed mining in Papua New Guinea through creative practice

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## 1. Introduction

Scripted as a sustainable alternative to terrestrial mining, the world's first commercial deep-sea mining (DSM) site - named *Solwara 1* - has, since 2011, planned to extract copper and gold from a deposit situated 1600m below the surface of the Bismarck Sea in Papua New Guinea. Against the backdrop of ongoing financial struggles, DSM's proponents continue to locate the industry as an emergent yet key part of a 'blue economy' discourse and practice in which the seabed is scripted as a new economic frontier (Johnson and Dalton 2018; UNECA 2016). On the other hand, its critics point to the significant ecological and economic uncertainty that characterises an activity that is exacerbated by a lack of commercial precedent (Niner et al. 2018; Miller et al 2018).

The contemporary emergence of DSM and its debates pose particular challenges for the research community. Both the qualitative uniqueness and relative

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invisibility of the deep sea – its seabed, water column, and associated biology – continue to limit the possibilities of apprehending it scientifically. On the one hand, the barriers to direct human experience presented by the deep sea present challenges for politically *contesting* deep-sea mining and the model of extraction of resource extraction upon which it is based. In other words, how can communities affected by DSM's expansion challenge and shape the socio-material assemblage of deep-sea mining politics, and the power relations that it inheres, given the difficulty of making their particular political vision legible? On the other hand, it also raises serious issues for its study in the social sciences and humanities. Not the least of these is how to conduct an ethnography of communities closest to proposed seabed mine sites, given that their extreme location defies a physical relationship between human and deep-sea environments. **Bringing these strands together, this paper critically considers the ways in which communities proximate to deep-sea mining activity contest blue-growth imperatives through creative practice. As alternative cosmologies are expressed that seek to counter narrate the 'fixing' of the ocean by capital (Brent et. al. 2019), what sort of narratives emerge? How do these relate to other forms of political contestation against blue growth?**

These questions are nowhere more pressing than amongst those communities in Papua New Guinea, who are geographically closest to *Solwara 1* and who recognise and contest DSM as the colonisation of an indigenous episteme associated with the deep-sea. These people take profound issue with a conceptualisation of deep-ocean space that views DSM as remote and with a limited spatial and temporal footprint vis-à-vis other terrestrial forms of mining.

As is further explained in the following section, such positions are central to the narratives put forward by both *Solwara 1*'s corporate contractor, the Canadian mining firm Nautilus Minerals and the Papua New Guinean state. Counter to this emerges a competing cosmology that seeks to bring the deep-ocean 'closer' to political debates over DSM, many of which have commonalities with an emerging 'blue degrowth' agenda (as discussed in the editorial). Such contention can be located in the context of profound socio-ecological uncertainty in an extractive deep-seascape far removed from the social terrain associated with terrestrial mining. This is significant because it raises questions of how to 'perform' the degrowth of an emergent industry which is out of the reach of human experience. Given that the vast majority of humanity has never encountered the deep seabed before, whose knowledge counts in contesting it as a site of resource extraction?

Against this background, this paper analyses the ways in which 'blue degrowth' - as a distinct form of counter-narrative - might be 'performed', and which imagined (and alternative) geographies are invoked accordingly. To do this it critically reflects upon two years of participatory research in the Duke of York Islands, Papua New Guinea by focusing on three, community-generated methods of resisting DSM. In particular it examines creative practices such as sculpture, participatory drama and drawing, all of which all seek to 'perform' a deep-ocean environment imagined as relational whilst simultaneously questioning the very notion of 'economy' central to the discourse of 'blue growth'. These cultural and artistic interventions can be seen as an example of the ways in which creative expression and practices move beyond simple representations of deep-sea space

and towards an agentive means of 'doing political work in the world' (Marston and De Leeuw 2013: iv).

The article proceeds in section two, by theoretically situating deep-sea mining politics in Papua New Guinea as part of a blue growth narrative where claims to the industry's sustainability are central to the contention raised. It continues by outlining its counterpoint - 'blue degrowth' - as an analytically diverse entry point for counter-narrating the deep-ocean, not as a capitalist site of extraction but as a space of justice and conviviality. Starting with a vignette, section three then highlights the relevance and potential of indigenous, creative practices for attuning to the new realities of DSM in the region and for challenging the economic foundations upon which claims to sustainability are constructed. It also details the methodological approach and practices followed in Papua New Guinea. Section four analyses these practices as part of an alternative vocabulary for articulating resistance to the blue growth imperatives of deep-sea mining. Crucially, it assesses the extent to which the indigenous worldviews expressed through these practices align with contemporary debates around degrowth. Are they merely the empirical expressions for the degrowth of an emergent extractive industry, or rather, do they have a distinct ontological position that enriches anti-capitalist struggle more broadly as it enters into *dialogue* with degrowth? Section five concludes by highlighting the importance for sustainability science to open up to situated, creative methods for performing extreme environments as one way of challenging a continuation of the destructive and violent nature of colonial relations wrought during the current ecological moment.

## 2. From the 'blue growth' to the 'degrowth' of deep-sea mining in Papua New Guinea

Deep-sea mining has emerged as a key example of the ways in which marine and coastal resources are being articulated into a discourse of 'blue growth' (Barbesgaard 2018). This is nowhere better exemplified than by the approach taken by the Papua New Guinean government. Since its issuing in January 2011, it remains the only country in the world to have granted a mining lease (ML154) for a commercial deep-sea mining project - *Solwara 1* - to Nautilus Minerals. In the face of widespread national and international concern relating to *Solwara 1*'s environmental impacts and their monitoring, and a perceived lack of public consultation over the untested nature of the industry, successive Ministers for Mining in Papua New Guinea have moved to stress the importance for Papua New Guinea's sustainable growth strategy. As the former Minister for Mining who oversaw the granting of the lease, Byron Chan, stated, the 'PNG government is committed to ensuring that our mineral wealth is harnessed in the most optimal and responsible way' (Chan 2012).

At a general level, blue growth has emerged as a central rhetorical device for policy makers across the globe in order to make the case for marine space to be appropriated to simultaneously deliver economic wellbeing, encourage international cooperation and deliver reduced environmental costs (Hoegh-Guldberg et al. 2015; Patil et al. 2016; Gov Sechelles and Commonwealth 2018). The more specific link between DSM and blue growth has been enthusiastically explored by both supranational organisations such as the European Commission

(EC 2019) and The United Nations Economic Commission for Africa (UNECA 2016) and individual nation states such as Japan and Papua New Guinea. In each case these institutions have embraced the potential for the DSM industry to stimulate growth and to transform economies at national and international scales.

The nascent industry's advocates point to its advantages over terrestrial mining, and, in line with the 'blue growth' narrative, highlight its ability to be both economically beneficial *and* more environmentally sustainable. First it is argued that high grade ore can be mined from areas of the seabed that have a significantly smaller footprint than those associated with terrestrial mines (Barker and Schmidt 2015). Secondly, the industry continues that the extractive 'life-span' of a deep-sea mine site is significantly shorter than those on land and with 'no human impact' (*ibid.*). Finally, and most provocatively, the question is raised that if global environmental policy seeks to transition towards the widespread adoption of green technology and green infrastructure, then how far is humanity prepared to go to supply the metals needed to build it (Carrington 2017)?

Yet, DSM's rhetorical simplicity (it is nearly always referred to in the singular) belies the fact that it comes in a variety of forms, operates at different depths, targets both conventional metals and rare earth elements, and occurs in both national and international jurisdictions<sup>2</sup>. In other words, it is an extremely diverse industry in which a huge range of issues and political actors - both human and more-than-human - are implicated in different ways. This has made it the target

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<sup>2</sup> Comprehensive reviews of DSM's political and environmental multiplicity can be found at Petersen et al. 2016 and Miller et al. 2018.

of an increasing array of critics, many of whom have highlighted the unknown socio-environmental consequences of seabed mining and the vulnerability of unique deep-sea ecosystems to deep sea mining (Miller et al. 2018; Van Dover et al. 2018).

Following these criticisms industries like DSM are, despite their claims to novelty, merely reproducing the sort of power imbalances seen in the green economy and manifested as a new kind of 'ocean grab' (Barbesgaard 2018; Hadjimichael 2018). This new attention upon questions of oceanic territorialisation and security has spawned an emergent interest in an analogous critique of such relations - 'blue degrowth'. Building upon a burgeoning but more general literature on degrowth<sup>3</sup> which has sought to deconstruct the primacy of economic growth to contemporary global political economic ordering, it addresses the possibilities of 'more with less' for marine policy. Thus far, most work in this regard has centred upon fisheries in particular yet it is no less relevant when applied to DSM and the other marine sectors addressed in this special issue.

Blue degrowth has its roots in the concerns of the degrowth movement. Degrowth presents 'numerous streams of critical ideas and political actions converge' which are all broadly concerned with efforts towards a *different* set of socio-environmental futures (Demaria et al. 2013: 191). It offers generous analytical scope for understanding socio-environmental problems and, *inter alia*, draws upon traditions relating to and arguing for a deepening of democracy (Illich 1973),

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<sup>3</sup> See for example the special issues in *Futures* in 2017 or *Sustainability Science* in 2015

the degrowth of injustice (Ariès 2005) and a critique of a utility maximising *homo economicus* (Latouche 2009).

Some of these traditions see nature as relational, lively and multiple. Often framed as a 'convivial' form of degrowth, such perspectives understand that humans and nature are not separate but rather must find ways of 'living with' each other (Turnhout et al. 2013). This notion opens up the related point that degrowth, even with its variations, is only one of many alternative worldviews which also offer an alternative to the sustainable development paradigm (Kothari et al. 2014). Whilst many of these ontological positions (from *Buen Vivir* in Latin America to *Ubuntu* in Southern Africa) do engage with degrowth, they do so through dialogue and do not necessarily advocate it.

There is an increasing body of work which has introduced some of these worldviews to scholarship on mining politics everywhere from Peru (Li 2015) to Colombia (Escobar 2017). However, these examples of 'cosmopolitics' (de la Cadena 2010) have tended to centre on the Latin American context and it remains understudied how spiritual belief shapes politics in other resource rich terrestrial spaces, let alone those in a marine setting as is the case in this paper. In this context, questions remain of the relationship between DSM and its spiritual relations that are taken up by indigenous communities highlighted in here in Papua New Guinea. Chief amongst these is the extent to which the indigenous views of those affected by DSM, expressed through creative practice, come into conversation with critiques of blue growth as expressed above.



In response to the pro-growth position of the PNG government outlined at the beginning of this section, communities are well aware of the country's troubled history with mining. Foremost amongst these are the Ok Tedi disaster which left 10,000s of people suffering the injustices of mining waste being directed into the local river system (Kirsch 2014). Similarly, the *de-facto* civil war surrounding Panguna mine and the violence which has followed it (Allen 2013), has left a legacy of mistrust towards mineral extraction amongst communities. This, together with a worldview at odds with the (deep-sea) 'mining-as-growth' narrative, has served to shape the politics for those living only 30km from *Solwara 1* on the Duke of York islands.

As this politics of DSM comes into dialogue with the themes common to blue degrowth, what forms of resistance might emerge? Setting up the analysis in section 4, problem ranking conducted between 2016 and 2018 revealed that the Tolai people of the Duke of York Islands major concern over DSM was the potential impacts upon spirits (*masalai*) and eruptions (*maunten I pairap*) relating to both earthquakes (*guria*) and volcanoes. In other words, it is the material and spiritual dimensions of these factors (and not growth) that come together in outlining a particular cosmology threatened by DSM. As a clan leader from the Duke of York Islands put it during an interview:

*'The sea is not another world. It is part of graun [earth]. You see people, fish, masalai [spirits], volcanoes, what you call land, the sea – it is all connected. We understand that we are at one with the sea. But we are also are at one with the spirits. If you*

*disturb this world, you are in trouble...this is why this seabed mining company will be in trouble – it does not understand how us people connect to something deeper'*

In short, deep-sea mining is, in this sense, nothing short of an act of geopolitics. The creative practices introduced in the following section are community-led interventions that seek to push back against the inevitability of growth-inspired DSM framed as 'sustainable' or not. Inspired by a particular geo-spiritual formation (Szerszynski 2017), the artistic practices described are a political means of performing a counter narrative to blue growth.

### 3. Creatively engaging with deep-sea mining in Papua New Guinea

Sitting at a *kibung*<sup>4</sup> at the beginning of a two year research project, over 200 people representative of the Duke of York Islands weighed up how they perceived the risks the of deep-sea mining. 'The thing is', began a clan leader, 'Nautilus doesn't understand how we visualise the sea'. Another fisherman continued that 'I don't understand why they call [this project] *Solwara 1*. We don't divide the sea up into different numbers. It is all one thing'. After much debate, the discussion of community members, which lasted over four hours, centred on the question of how to demonstrate a worldview which stands in opposition to the claims of 'sustainable' deep-sea mining. In particular, participants of the *kibung* grappled with the question of how to physically manifest their spiritual membership of a

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<sup>4</sup> A *kibung* is a public meeting in Tok Pisin, one of the most widely spoken languages in Papua New Guinea. This particular meeting was called by the clan leaders of the Duke of York Islands in order to explore the politics of deep sea mining at *Solwara 1*.

deep-sea ontology. As one participant asked of the group, 'We know that I am connected to the deep ocean, to its *masalai* [spirits], its fish and its volcanoes. But how do I show this company that? They [Nautilus Minerals] think that it will not affect people like other mining but it does! How do we show this company that when they mine this seabed, they mine our culture!'

This vignette serves to show the provocation that began a research process, largely grounded in a participatory action research methodology, which aimed to ultimately and simultaneously 'perform' a critique of blue growth and render visual an alternative way of describing the geopolitical imagination of the deep-sea. Inspired by a turn towards 'ethical relationality' with indigenous philosophies (Hall 2015; Todd 2015) and to decolonise the language of 'sustainable' deep-sea mining, the research aim was to consider seriously ways in which DSM's politics could be understood otherwise and how those ways of understanding speak and perform back against conventional 'sustainable growth' narratives. 'Ethical relationality' is defined by its author, indigenous scholar Dwayne Donald as, 'an enactment of ecological imagination[...]It is an ethical imperative to see that despite our varied place-based cultures and knowledge systems, we live in the world together and must constantly think and act with reference to those relationships' (Donald 2010 in Todd 2015). This version of an 'art in the Anthropocene' (Davis and Turpin 2015), understands the 'ecological imagination' to be descriptive of 'the webs of relationships that you are enmeshed in, depending on where you live. So, those are all the things that give us life, all the things that we depend on, as well as all the other entities that we relate to, including human beings' (Donald 2010 in Todd 2015).

Creative practice has begun to emerge as a particular form of political intervention for all manner of environmental crises globally. Moreover, when combined with a concern for the ontological turn in the social sciences (see, for example, Viveiros de Castro 2003, 2004), some have argued for a focus on ‘nonhuman material agency’ as a centrally ‘important factor in propelling subversive behaviour into sustained political change’ (Mould 2019). Art and creative practice’s political potential has also begun to be researched with specific reference to the ocean. For example, Elizabeth Deloughrey (2017) has analysed submarine sculpture in the Caribbean Sea as a form of politics in which objects are transformed both their material interactions with the ocean and its ecosystems (erosion, relations with fish etc.) and its sunken histories (of slavery and capital accumulation). Other scholars have examined the political implications of understanding water as emotional (Straughan 2012), embodied (Neimanis 2017), or immersive (Straughan and Dixon 2014).

Yet, these perspectives must remain attuned to the very specific and different ways of understanding art and creativity in situated circumstances, in settings beyond the global north and in ways in which particular understanding of these terms conjoin with histories of colonialism. To put it in the words of West Papuan independence leader Benny Wenda: “You can’t separate the object from the human being, because the humans are part of the objects and the objects are part of the people” (Wenda 2017: 159). **The examples that follow all offer ‘submerged perspectives’ that seek to ‘pierce through the entanglements of power’ associated with blue growth and proclamations of ‘sustainable’ deep-sea mining and which**

seek to 'differently organize the meanings of social and political life' (Gomez-Barris 2017: 11).

Yet, for all the value in highlighting these approaches in sustainability science, there is a need to remain attuned to the dangers of appropriating and fixing creative practice in time and place. Overly romanticised accounts of art and performativity of indigenous groups in PNG have been around for centuries, in which reductive appeals to a 'traditional' way of being are often made. Yet, these do little more than to reproduce damaging inequalities so familiar to the studies of postcolonial development contexts everywhere (West 2016). Papua New Guinean culture is often seen as exemplar of the 'Melanesian Way', an 'overly idealised' epithet thrust upon those in Papua New Guinea by western explorers, scholars and corporate actors alike (Narokobi 1980: 9). To treat the artistic practices of the *Tolai*, the cultural group analysed in this paper, in such a way is to only have 'a limited ability to capture the reality of life on the ground in the country' for those people (Golub 2014: 179).

Through three periods of fieldwork conducted over several months between 2016 and 2018, the research team<sup>5</sup> and communities in the Duke of York Islands discussed, identified and designed research methods in line with the general aims of participatory action research methodology (Kindon et al. 2007). Cognisant of the epistemological concerns of decolonial approaches to research, notably the need to avoid the reproduction of extractive research practices and unequal

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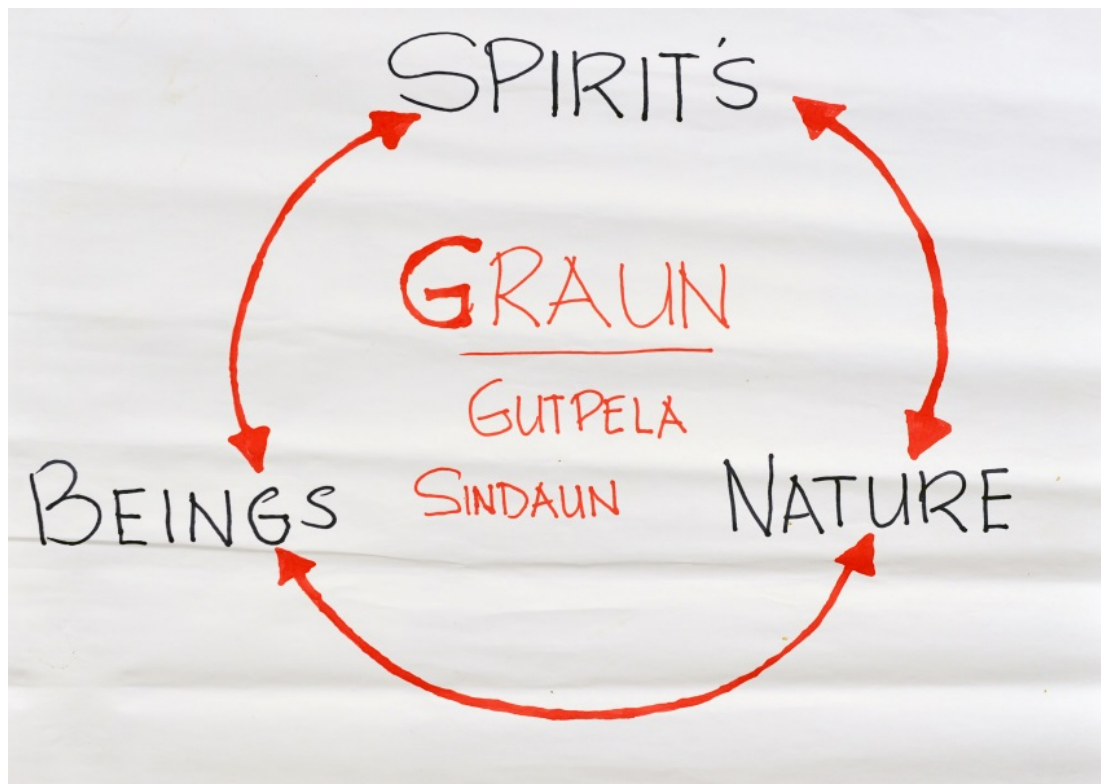
<sup>5</sup> The research team consisted of the author of this article, an indigenous participatory artist, **Leonard Tebegetu**, currently residing in Papua New Guinea's capital, Port Moresby and a Papua New Guinean research assistant with prior experience of the community.

power relations (Kesby 2000), several days were devoted to discussing *which* research methods would be used and *how* they would be carried out. For example, communities insisted that creative practice be a centrepiece of the research design, that the dynamism of sea-based culture be celebrated and that it should be video recorded in the interests of both transparency and to produce a film as an education/advocacy tool. In the following three subsections, I detail the methods used to 'perform' a counter-narrative to the blue growth of DSM.

a) Drawing the deep sea

As an early response to the challenge of rendering visible a counter-narrative to deep-sea mining extraction, communities chose to draw the deep sea. In 12 small groups of up to ten participants each, members discussed and then drew a response to the ontological question of 'what is the deep-sea?' With no exceptions, all groups' pictures featured spiritual beings - *masalai* - as well as a range of other human and animal beings (see figure 3 for an example). In one instance, and with little hesitation, one group drew a representation of *graun* (see figure 1), a circular and relational concept of the earth in which 'being well' (*gutpela sindaun*) is to be achieved through the coming together of nature, beings and spirits.

Figure 1: A relational understanding of *graun* (inclusive of the sea)



b) Participatory sculpture

The members of the *kibung* argued forcefully that they wanted to create a piece of art that simultaneously captured the dynamism and variety of their deep-sea ontology yet was permanently visible so as to provoke a response from corporate or government visitors. In collaboration with the research project's participatory artist Leonard Tebegetu, the response was to create a sculpture with 'civic value that helps define cultures' (Tebegetu 2017) and to position it at the main landing point for boats arriving on the Duke of York Islands for maximum impact. The group also wanted to use objects found in and around the island to constitute the sculpture itself in order to express the importance of materiality to their world view. As a result, over 50 people painted an individual flag, typically used to

decorate boats in the area, with a subjective image that best encapsulated what the deep-sea is. These were arranged in a composite image which together represented a visual 'performance' of their deep sea ontology. Finally, this was set into the ground by repurposing plastic waste washed up on the shore and filling it with cement to create the foundations. An example image of the result is seen in figure 2 below.

Figure 2: Participatory sculpture, Molot, Duke of York Islands, East New Britain



### c) Participatory theatre

A final way in which a counter narrative to blue growth was articulated was through the design and performance of a short play which sought to confront the politics of DSM. This was wholly at the suggestion of a small party of five residents



of the Duke of York Islands who lived over two days' walk from the main location of the *kibung* and subsequent research activities. The performance, though unscripted and improvised, was aimed at confronting difficult issues and was in the form of a 'negotiation' between different political actors identified by the group as being of central importance to DSM's politics. One character chose to literally embody the role of the Papua New Guinean nation and its material constitution by wearing several culturally significant artefacts that were representative of the country's different resources. Another person assumed the role of a Papua New Guinean politician brokering a deal with a third character, a corporate representative of Nautilus Minerals. This performance was enacted twice, and viewed by several hundred spectators who reacted in animated fashion to the themes discussed. The 'knowledge' that it produced was created 'through interaction with others, and that reciprocity between participants created new forms of social and cultural capital' (Nicholson 2005: 39). The analytical significance of these methods and their implications for 'doing' sustainability science differently are addressed in the following section.

#### 4. Performing blue degrowth

This section highlights two cross-cutting themes that counter narrate the deep-ocean as a space of capitalist expansion. Firstly, the deep sea is understood by Duke of York Islanders as a relational congregation of different actors in which nature is not separated from human politics. Secondly, the deep-sea is performed as a dynamic space, in which it is never 'fixed' and ready to be exploited, but rather

constantly changing through time and which symbolically evades its political economic securing by capital.

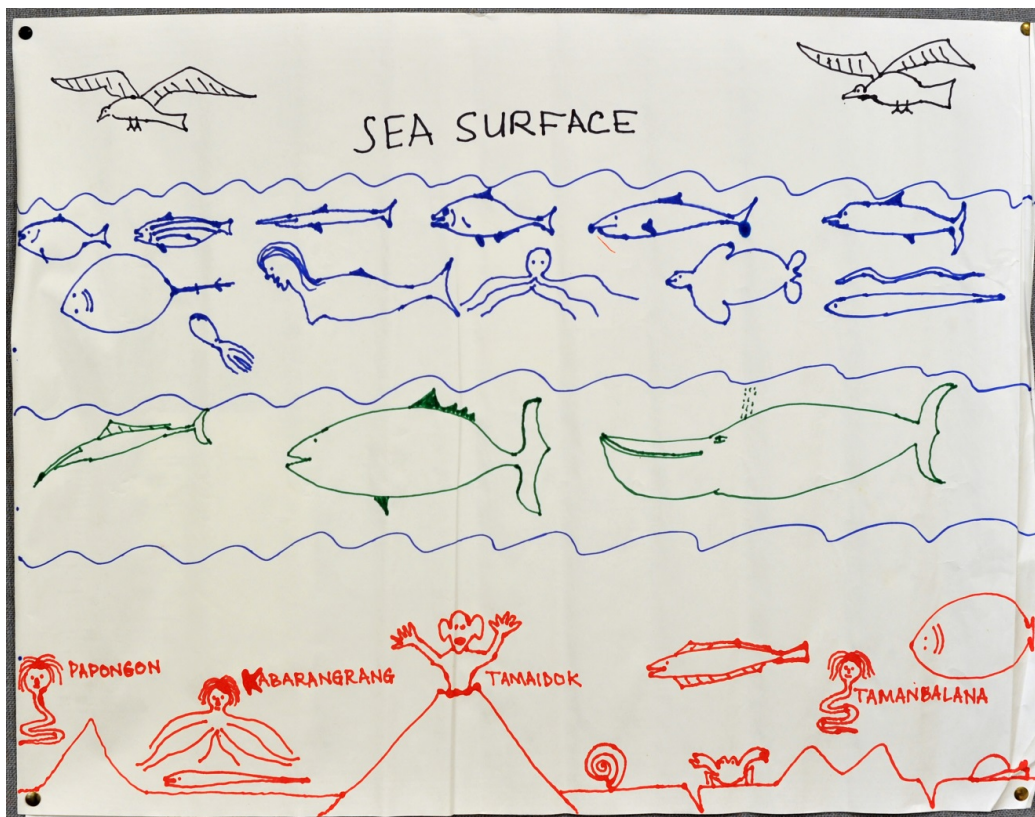
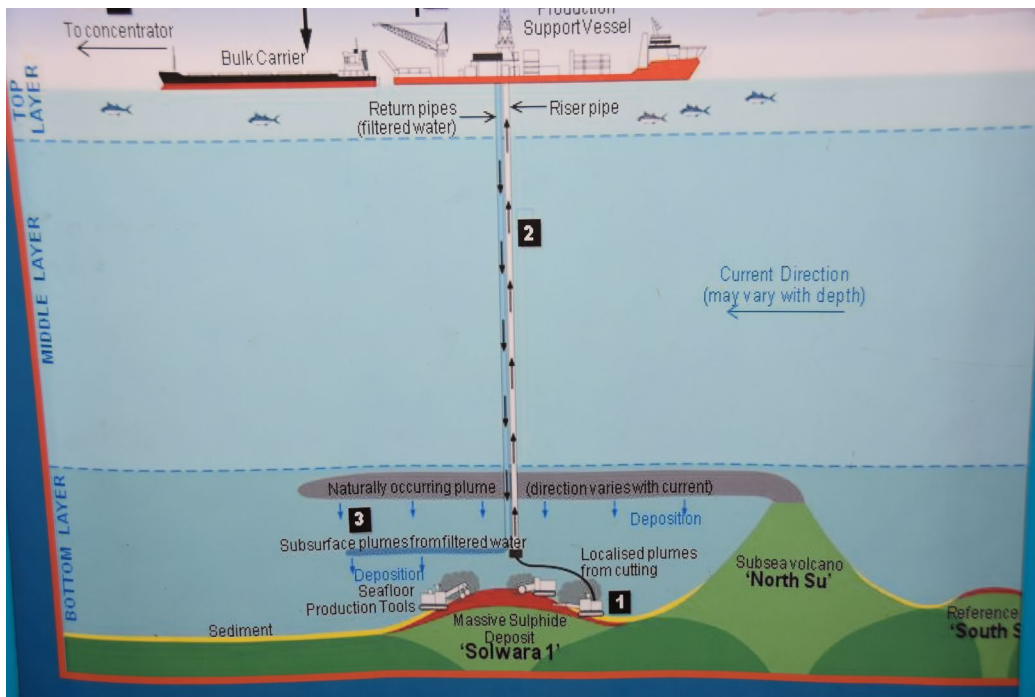
a) Performing the relational deep sea

Several responses emerged from drawings of the deep sea that pointed to the critique of the deep ocean as a space separated from human intervention. Perhaps the most telling of these was the image depicted in figure 1 above. Here, the deep sea is not presented as the next 'frontier' of resource extraction, the language so familiar to both industry and many scholarly debates concerning DSM's sustainability. Instead, the notion of *graun* is offered as a way of describing a relational cosmology that *includes*, but doesn't excise, the sea in its political worldview. As one of the artists explained, 'the ocean is a part of the earth, what we call *graun*, and we [people] are part of *graun*. So are the fish that we eat and the *masalai* [spirits] we speak with'. The implication is profound. As has been noted elsewhere in the context of terrestrial mining in Melanesia, for these people the arrival of deep-sea mining 'means not just social and economic disruption; it rends the very fabric of the world and a vivid, direct, sacred link with the land is irrecoverably lost' (Macgregor 2017).

In other drawings of the deep sea, the corporate imaginary of deep-sea mining used during 'stakeholder consultations' was subverted by communities. Nautilus Minerals used the concept of 'depth' in order to mitigate concerns that fish stocks would be affected by mining activity, in particular by dividing oceanic space into three distinct 'layers' (see figure 3). The suggestion by the corporation that the

different layers 'didn't mix' and that any mining impacts would be isolated to the bottom layer was rejected by community artists. Instead, spiritual beings were depicted as inhabiting space previously rendered as empty by Nautilus. Although they have a variety of incarnations and attachments to the sea, for these people they transcend the oceanic boundaries implicated by the corporate framing and connect relationally to other political actors in the *graun* cosmology. One spirit named *Tamaidok*, frequently featured and was described as a 'volcano god' who 'defends the seabed' and is a 'protector of the seabed's treasures'. This resonates with similar *Tolai* gods associated with terrestrial volcanoes in the area who have the 'power to destroy and create' (Epstein 1992: 167). Volcanoes are, for these communities, the personification of the spirits' will. The implication being that disrupting volcanic activity through DSM is to incite a violent response from the spirits. It recalls other clashes surrounding land-based mining projects such as the contention between mining corporation Vedanta and the Dongria Kondh tribe over the value of the Niyamgiri hill in Orissa, India. Just as, from a corporate approach centred on growth, the hill might be seen as rich in bauxite, from the tribe's perspective it might be seen as spiritually rich. As has been neatly put elsewhere, 'We could ask them: how much for your God? How much for the services provided by your God?' (Martinez-Alier 2009). The same might be asked of the underwater mountains (seamounts) at the centre of this deep-sea mining dispute.

Figure 3: Two depictions of deep-sea space (Nautilus Minerals on top, group from the Duke of York Islands below).



Most noteworthy in these understandings of deep-sea space is the way in which the presence of deep-sea mineral deposits are understood, recognised and

ontologically part of a sense of self. Although 'science' communicated through community consultation is often recognised as legitimate by communities (in fact, many welcomed the limited interaction that they had with the DSM company), it isn't perceived as 'revealing' or 'communicating' anything new. A female elder of the village succinctly summarised this position:

'You know, there is sometimes scientists that come here and tell us that this mining will be sustainable and that the different layers of the ocean don't mix. They tell us how the ocean works, that it has the volcanoes and things like this. But we already know this! Our beliefs go back many years before these scientists came here.'

Deep-sea mining's politics of sustainability is presented by Nautilus Minerals' science as 'new' with the assumption that effective community engagement is about communication of that novelty. Yet, what the creative responses of the islanders begin to highlight is that the ways of being and knowing deep sea environments are *already* apprehended and embodied by those living closest to the mine site. It illustrates what the prominent theorist of Papua New Guinean human-environment relations Paige West has called 'discovering the already known' (West 2016). In her argument, it is not just corporations dealing in sustainability science but also scholars working on it that have yet to confront this conceit. Indeed, much has been made of the ontological turn in the social sciences in which different ways of being in the world, especially those expressed by indigenous groups, are recognised and understood as emergent and foundational to understating the social world (Viveiros de Castro 2004; Holbraad et al. 2014).

This is important work, but it fails to account for ‘the kinds of dispossessions that affect Papua New Guineans and others daily (West 2016: 110).

In this example, research participants made strong links between the impacts and various types of dispossession wrought by land-based mining in Papua New Guinea and the proposed deep-sea version. 18 of the 220 people involved in primary research identified as having previously worked in the mining industry elsewhere in the country. They were seen by the group as having particularly authoritative voices. Several expressed concerns over the government’s historical management of mine-related issues. As one male elder pointed out, ‘there has been many times when the government and companies have not listened to communities affected by mining in Papua New Guinea. Lihir, Ok Tedi, Simberi – they have all given some jobs but caused big problems. These people don’t take communities seriously.’ Most of the former miners worked at Lihir, a large gold mine operated by Newcrest Mining, and related their experience there to *Solwara 1*. For one erstwhile mine worker, ‘I don’t see how Solwara 1 won’t have an impact on the sea. At Lihir they were putting the waste into the sea, so why not here? We are island people. As you can see from that drawing over there [referring to figure 1], the sea and its life is part of one thing. It is part of us’. There is scientific evidence for the sea-based tailings dumping highlighted (Hughes et al. 2015), yet it is with reference to creative practice that the miner is able to most forcefully assert the perceived threats posed by deep-sea mining. As he continued, ‘these people need to *see* our culture and how it is being threatened. I hope this sculpture can do that’.

Previous anthropological work that has examined the Lihir mine, has highlighted the ways in which the clash between indigenous and scientific knowledge comes together. A quotation from a community leader during a workshop on 'indigenous peoples and the extractive industries' highlights the ways in which former corporate-community mining relations matter for shaping the kinds of responses to new, more 'sustainable' versions such as that presented by DSM: 'The company visits our villages sometimes to tell us about the environment. They give us flashy reports, which many people cannot read... They try to explain the science that nobody on this island really understand or believe. We have naturally grown up here and we believe that we know the environment better. When there is a change, we can tell straight away. We don't necessarily need scientific explanation' (Forest Peoples 2003).

One of the prevailing themes from the various forms of creative practice was the need to counter-narrate environmental knowledge of deep-ocean space. As the indigenous participatory artist who guided the sculpture put it, 'seabed mining is a hard thing to talk about and to visualise. Our community beliefs don't easily translate well to scientific documents. So this is what art can enable: it can help us to speak about this topic and to inspire change.' Central to all artistic interventions was the need to highlight in some way the relational aspects of the indigenous worldview. The participatory sculpture (see figure 2) sought to capture this dimension. After each participant painted a flag with an image or text that represented their individual connection to the deep-ocean, the group of nearly 100 different artists debated how best to arrange them into a holistic image. A key part of these discussions was the repeated reference to the worldview of *graun*.

As one participant asserted, 'we should bring all these parts together, the fish, the people and *masalai*. We can show them [government and company visitors to the island] how *Solwara 1* is about *graun*.' The relational view of the earth which is inclusive of the sea has gained traction in more formal political circles too. Indeed, former Prime Minister and Governor of New Ireland Province - the legislative district in which *Solwara 1* is based - Sir Julius Chan recently stated that he 'is working on amendments' to the state mining act of Papua New Guinea, 'so that *mama* and *papa graun* can be fully recognised as owners of these minerals' (Chan 2017).

The participatory theatre also revealed the ways in which a relational understanding of the deep-sea shifts the focus away from a conceptually separate seabed and onto political identity itself. The central protagonist of the performance was an eighty-one year old woman who created and assumed the role of *graun*. To do so, various items foraged from the sea and the island's coastline (including seagrass, other flora and coral) were worn, each one representative of a different 'resource' important to Papua New Guinea's national economy (gold, timber and deep-sea copper respectively). The intention was to show how, according to the woman, 'the resources are part of who we are'. Thus *graun* as a concept inclusive of the sea, became a byword for political identity itself. This was nowhere better illustrated than at a moment in which a type of seagrass which had been woven into the woman's hair, was forcibly removed. Given that its removal actually simultaneously removed a few strands of the woman's hair, the implication was clear. Speaking to the man who played the Papua New Guinean government character responsible for allowing the



'resource's' removal, the implication became clear: 'we wanted to show that when you take the resources from our sea, you are taking a part of who we are. This is our identity. It was painful for this woman but this is what she wanted to do. Deep-sea mining will be painful for us'. In this case, deep-sea mining is transformed from a concern as a matter of economic and environmental geography into one that opens up geographies of emotion and affect. Duke of York Islanders are not 'closed off' from ideas of trade and prosperity ('we still want to live well' as one person put it), but they are clearly opposed to examples of 'growth' in instances where resource extraction collides with a sense of self.

#### b) Performing the dynamic deep-sea

Time emerged as another key dimension in the performative counter-narration to deep-sea mining. On the one hand, communities expressed through their artistic performances that their cosmology is about a dynamic deep-sea which is simultaneously forged over the *longue durée*, but is always different in form. On the other hand, they pointed to a critique of the temporalities of capitalist exploitation of the seabed driven by the volatile and unpredictable rhythms of finance and returns on investment. These concerns have been echoed elsewhere where the geopolitics of DSM has been conceptualised as needing to 'include a fourth dimension, *time*, more centrally into its analysis' (Childs 2018).

As the individual flags were consolidated into the sculpture and were arranged as a whole, it became clear how important movement and dynamism were to the representation of the deep ocean. For example, each flag was only fixed at one

point to the horizontal wiring so that they moved at different speeds, forming different shapes in the wind. As the lead artist Tebegetu explained, 'the wind currents change the shape of our picture of the deep sea just as it is shaped out there by the currents on the water. The point that is being made is that the sea is always changing, never stable and doesn't just sit there waiting to be mined'. Such thinking finds commonality with theories of the resource frontier in which it has been pointed out that for capital to do the work of securing new spaces like the seabed it has to make it 'appear inert: ready to be dismembered and packaged for export' (Tsing 2003: 5100).

The dynamism of the flags in the sculpture also served to continuously reshape the contours of deep-sea territoriality. Although 'land' is represented through the congregation of green flags and 'sea' as blue, the movement of the wind works to constantly redefine the boundaries between the two. In doing so, it evokes the relational assemblage of the deep-sea earlier described and provides a critique of the separation of land and sea common to much of western thought. As the artist described: 'I love the way that the people have arranged the flags. It really shows the ways in which our sea is connected with the land as part of a moving whole. The company thinks that they can mine the *solwara* and it won't affect anything else. This shows that they are wrong'.

One coloured flag was placed at the centre of the map in order to represent that language and culture are at the heart of their worldview. The local language, unique to the people of the Duke of York Islands is known as 'Ramuaina'. One of over 800 languages in Papua New Guinea it translates, according to its speakers,

as 'one world'. It is made up, in their words, of 'many people, many beings and things but only one voice'. This form of language is 'placed' at the heart of the visual representation of the deep-sea because, as Lissant Bolton has put it elsewhere in the context of Melanesian culture, 'all movement is oriented to where the sea is - landscape is used to describe place' (Macgregor 2017). Taken together, this presents a challenge to the ontological singularity of current DSM strategies, most notably expressed through the blue economy, which finds expression not just in terms of governance but also in terms of a more profound problem: how does one politically engage with 'a world in which many world's fit' (Escobar 2018: 13)?

The perceived environmental risks of deep-sea mining were understood to be a threat not just now, but in the future. Such perspectives were again forged largely with relation to past experience in terrestrial mines, most notably in the context of the environmental violence wrought by the Ok Tedi mine, then operated by BHP, in Western Province of Papua New Guinea. In that case, time was considered as centrally important, not just to academics who noted the attempts by the mining corporation to slow down the 'time' of releasing information concerning environmental impacts on over 50,000 people (see Kirsch 2014). Notwithstanding the continuing pollution from the mine into the local river system that were well known to Ok Tedi campaigners and their attempts to make visible the mine's impacts to a wider audience (Kirsch 2014: 83), conventional NGO activism had limited success in preventing environmental catastrophe. As a former worker at that mine pointed out, 'look what they [BHP] said there. For years, there was no

problem, no problem. And then, suddenly, everyone knows it is a problem. I feel like it's going to be the same here with this seabed mining'.

During group discussions relating to the sculpture's fabrication, one participant noted that the fixtures should be as permanent as possible 'to show that we will never want seabed mining. Not now, not ever'. Because the Duke of York Island group can only be accessed by boat, government and corporate visitors are limited to two major landing points close to the archipelago's guest houses. This was seen as an opportunity by some as the following exchange shows.

Participant 1: 'We should place it where they will see it and fix it strong. The shape of our flags might change but the structure will always be there.'

Participant 2: 'Yes, and we should send photographs of this to the Alliance of Solwara Warriors. They can use this on the internet.'

The mention of the Alliance of Solwara Warriors, an activist group based in New Ireland province but with members from the Duke of York Islands, is significant. They are the most organised indigenous group against seabed mining whose message has been connected to the 'Deep Sea Mining Campaign' (based in Australia) the leading global network coordinating the critical response to DSM. They are a leading example of the new virtual networks which have emerged to 'enrol participants who might not participate in more conventional forms of NGO politics' (Kirsch 2014: 199) and have distributed films, artistic media and press releases to international audiences (Deep Sea Mining Campaign 2019). The digital

spread of artistic intervention builds on similar instances in PNG where art has been used to contest resource extraction and development narratives in the country (AKRokefeller 2019). Whether or not the shifting of the 'social terrain' (Dougherty and Olsen 2014) to new, virtual geographies helps to consolidate the critique of growth-led DSM remains to be seen. A new artistic commission from the Thyssen Borzemisa Foundation that juxtaposes deep-sea mining footage and its human impacts, suggests that it might. The exhibition entitled 'Prospecting Ocean' aims, in its own words to 'deconstruct the idea of a marine-based blue economy and policy commonly supported by governments' (TBF 2018). Whatever new forms of engagement continue to arise for DSM's politics, it is clear that the relationship between art, activism and new media will be at the heart of this particular counter-narrative to blue growth.

Finally, communities wanted to question the way that the sea has highlighted the effects of development in a gradual, slow but persistent manner. They pointed, for example, to the fact that 'more and more rubbish is slowing coming to our island. It comes all the time and lands up over there. But no one apart from us knows it is there'. This recalls Rob Nixon's widely cited book *Slow Violence* which describes the environmental impacts that 'occurs gradually and out of sight, a violence of delayed destruction that is dispersed across time and space'; violence that is 'typically not viewed as violence at all' (Nixon 2011: 2). Much of his argument operates, as one reviewer calls it, as 'a call to arms for new forms of creative languages to represent the many unseen effects of environmental disaster' (Kuc and Jury 2018: 1002). Without having read or heard of this book, the lead participatory artist nonetheless shared Nixon's concern to give voice to artists and

thinkers beyond the global North and to articulate forms of creative practice that can give voice to the voiceless. Thus, in a kind of response to Nixon's question of 'how can we convert into image and narrative the disasters that are slow moving and long in the making' (Nixon 2011: 2), he articulated a specific conceit. 'We built this sculpture into foundations made out of the waste washed up on shore and filled them with concrete. People's waste threatens our culture here but we can use it to say, no, this sea is for everyone and we do not know what kinds of trash deep-sea mining will bring in the future.' How, might we ask, are the potential physical impacts of DSM perceived to leave 'traces' and 'contaminate' not only the seabed and water column but also the spiritual figures central to their belief systems? What 'ghosts' of DSM, as an example of 'industrial ruin' (Edensor 2005), will be left behind?

## 5. Conclusion

This paper has shown one example of how creative practice can emerge as a counter-narrative to a DSM industry depicted as a 'sustainable' version of blue growth. This is a useful starting point for considering how creative practice, as a form of political intervention, can both give voice to marginalised communities and provide an alternative vocabulary for human encounter with extreme environments. For the communities **described in Papua New Guinea**, the emergence of DSM is simultaneously a continuation of the violence of colonial relations in the region and a new threat to indigenous thought and ontologies concerning the ocean. The political 'work' done by the creative practices analysed in this article seek to find modes of expression that can counter the dominant thinking of DSM policy makers and academic thought. To pay attention to these

alternative vocabularies for contesting blue growth is to consider ‘nonpath dependent alternatives to capitalist and extractive valuation’ (Gomez-Barris 2017: 12) and to think about new forms of sustainability science.

Whilst it is true that the sort of deep-sea ‘world making’ performed by Duke of York Islanders does offer insight into alternative ways of engaging with the politics of DSM, the question remains concerning whether such creative practice is synonymous with the varied versions of the degrowth movement? As the indigenous poet Jacob Simet reminds us, Tolai art, along with other cultural forms of representation in Papua New Guinea, is not supposed to be ‘preserved materially or removed from its setting...it is a living thing, responding to each new situation’ (Simet 1980 in Golub 2014). Those ‘situations’, include of course, painful engagements with the legacies of colonialism and resource extraction - particularly mining - in the region. Thus, the creative practices described speak at once to a situated and unique indigenous cosmology *and* the imperatives of global capital. The ways that the deep sea is performed ‘always engage with ongoing dispossessions on a daily basis’ and those people who created them ‘constantly revise and rupture their epistemes in order to understand these dispossessions’ (West 2016: 112).

The efforts of activists in the region has already had real political effects. For example, in 2017 (after the described research process first began), legal proceedings were issued by coastal communities of Papua New Guinea against the government in order to gain access to documents detailing the potential impacts of DSM (Deep Sea Mining Campaign 2019). As the community leader of the

campaign explained **at the time**, 'My people live only 25km from the proposed location for the Solwara 1 mine in the Bismarck Sea. If the mine goes ahead it will impact our lives and livelihoods' (*Ibid.*). During a subsequent interview with the same leader, the subject of art's relationship with politics was addressed: 'If Nautilus Minerals doesn't think our culture will be affected, then we'll show it to them... **We have simple lives, not like these mining companies who want more and more metals to make more and more stuff like TVs and phones**'. **At the time of writing, Nautilus Minerals has gone into administration and the Papua New Guinean state is facing intense pressure from other states in the region to issue a ten-year moratorium.**

In short, communities like these studied here don't creatively articulate their cosmopolitics without intimate understanding of their historic dispossession in the name of growth and institutions that they 'perform' against. As growth becomes coloured with a 'blue' descriptor, the challenge is to transform or create new forms of 'institutions'. These must include the alternative knowledge and belief systems concerning the sea that both challenge the hegemony of a growth-led DSM sector and that *already exist*. Indeed, the sorts of critique proffered by the creative interventions of those communities in PNG affected by DSM, invoke indigenous forms of knowledge and belief that can counter narrate the ocean as a world constituted *with* and not in opposition to human-based extractive design. Such thinking can be linked to other conceptual turns in the political geography of resource extraction which, whilst not necessarily defined by a 'degrowth' agenda, do nonetheless come into conversation with it and offer theoretical alternatives to the business-as-usual approach of ever expanding resource frontiers. **Recent**



work has sought to decolonise the degrowth agenda by ‘recognizing assaults on living worlds of places, peoples, and naturecultures beyond visible, legible and formally published environmental conflicts’ (Nirmal and Rocheleau 2019:481). This work emphasises the need for new strategies for visualising and imagining post-capitalist futures that are not reliant on the expansion of extractive regimes. An engagement with creative practice can help to do just that.

## References

- AKRockefeller (2019) Available online at <https://akrockefeller.com/>
- Allen, M. G. (2013). Melanesia’s violent environments: towards a political ecology of conflict in the western Pacific. *Geoforum*, 44, 152-161.
- Ariès, P. (2005) *Manifeste pour une décroissance équitable*. Edition Golias.
- Barbesgaard, M. (2018). Blue growth: Savior or ocean grabbing?. *The Journal of Peasant Studies*, 45(1), 130-149.
- Batker, D. and Schmidt, R. (2015), ‘Environmental and Social Benchmarking Analysis of the Nautilus Minerals Inc. Solwara 1 Project’, Available on line at: <http://www.nautilusminerals.com/irm/content/pdf/earth-economics-reports/earth-economics-may-2015.pdf>
- Brent, Z., Barbesgaard, M., & Pedersen, C. (2018). *The blue fix: Unmasking the politics behind the promise of blue growth*. Amsterdam: Transnational Institute.
- Carrington, D. (2017). ‘Is deep sea mining vital for a greener future - even if it destroys ecosystems?’, Guardian, Available online at <https://www.theguardian.com/environment/2017/jun/04/is-deep-sea-mining-vital-for-greener-future-even-if-it-means-destroying-precious-ecosystems>
- Chan, B. (2012) ‘Ministerial Statement in Response to Recent Media Interest in the Solwara 1 Deepsea Mining Project’, Available online at [http://www.mra.gov.pg/Portals/2/Publications/Ministerial%20Statement\\_Solwara%201%20Project.pdf](http://www.mra.gov.pg/Portals/2/Publications/Ministerial%20Statement_Solwara%201%20Project.pdf)
- Chan, B. (2017) ‘Chan reaffirms stance against Solwara 1 project’, Available online at <https://ramumine.wordpress.com/2017/12/26/chan-reaffirms-stance-against-solwara-1-project/>

- Childs, J. (2018). Extraction in Four Dimensions: Time, Space and the Emerging Geo (-) politics of Deep-Sea Mining. *Geopolitics*, 1-25.
- Davis, H., & Turpin, E. (2015). *Art in the Anthropocene: Encounters among aesthetics, politics, environments and epistemologies*. Open Humanities Press.
- De la Cadena, M. (2010). Indigenous cosmopolitics in the Andes: Conceptual reflections beyond “politics”. *Cultural anthropology*, 25(2), 334-370.
- Deep Sea Mining Campaign (2019) ‘Legal action launched over the Nautilus Solwara 1 Experimental Seabed Mine’, Available online at <http://www.deepseaminingoutofourdepth.org/legal-action-launched-over-nautilus-solwara-1/>
- DeLoughrey, E. (2017). Submarine Futures of the Anthropocene. *Comparative Literature*, 69(1), 32-44.
- Demaria, F., Schneider, F., Sekulova, F., & Martinez-Alier, J. (2013). What is degrowth? From an activist slogan to a social movement. *Environmental Values*, 22(2), 191-215.
- Donald, D (2010), “On What Terms Can We Speak? Lecture at the University of Lethbridge,” [www.vimeo.com/15264558](http://www.vimeo.com/15264558).
- Dougherty, M. L., & Olsen, T. D. (2014). Taking terrain literally: grounding local adaptation to corporate social responsibility in the extractive industries. *Journal of business ethics*, 119(3), 423-434.
- Edensor, T. (2005). The ghosts of industrial ruins: ordering and disordering memory in excessive space. *Environment and planning d: society and space*, 23(6), 829-849.
- Epstein, A. L. (1992). *In the Midst of Life: Affect and Ideation in the World of the Tolai* (Vol. 9). Univ of California Press.
- Escobar, A. (2017). Sustaining the Pluriverse: The Political Ontology of Territorial Struggles in Latin America. In *The Anthropology of Sustainability* (pp. 237-256). Palgrave Macmillan, New York.
- Escobar, A. (2018). *Designs for the pluriverse: radical interdependence, autonomy, and the making of worlds*. Duke University Press.
- European Commission (2019) ‘Seabed Mining’ Accessed online at [https://ec.europa.eu/maritimeaffairs/policy/seabed\\_mining\\_en](https://ec.europa.eu/maritimeaffairs/policy/seabed_mining_en)
- Forest Peoples (2003) A Case Study on Indigenous People, Extractive Industries and the World Bank, Papua New Guinea, Presented at the workshop on “Indigenous Peoples, the Extractive Industries and the World Bank”, Exeter College, University of Oxford, UK, 14th and 15th April. Available online at

<http://www.forestpeoples.org/sites/fpp/files/publication/2010/08/eirinternatwshoppngcaseapr03eng.pdf>

- Johnson, K., & Dalton, G. (Eds.). (2018). *Building industries at sea: 'Blue Growth' and the new maritime economy*. River Publishers.
- Kothari, A., Demaria, F., & Acosta, A. (2014). Buen Vivir, degrowth and ecological Swaraj: Alternatives to sustainable development and the green economy. *Development*, 57(3-4), 362-375.
- Golub, A. (2014). *Leviathans at the gold mine: Creating indigenous and corporate actors in Papua New Guinea*. Duke University Press.
- Gómez-Barris, M. (2017). *The extractive zone: Social ecologies and decolonial perspectives*. Duke University Press.
- Government of Seychelles & the Commonwealth (2018.) *Seychelles Blue Economy. Strategic Policy Framework and Roadmap: Charting the Future (2018-2030)*
- Hadjimichael, M. (2018). A call for a blue degrowth: Unravelling the European Union's fisheries and maritime policies. *Marine Policy*, 94, 158-164.
- Hall, L. (2015). 'My Mother's Garden: Aesthetics, Indigenous Renewal, and Creativity' in *Art in the Anthropocene: Encounters among aesthetics, politics, environments and epistemologies*, Davis, H. and E. Turpin (eds.), pp. 283-92.
- Hoegh-Guldberg, O., Beal, D., Chaudhry, T., Elhaj, H., Abdullat, A., Etesy, P., et al. (2015). *Reviving the Ocean Economy: the case for action*. Geneva, Gland, Switzerland: WWF International.
- Holbraad, M., Pedersen, M. A., & de Castro, E. V. (2014). The politics of ontology: Anthropological positions. *Cultural Anthropology*, 13.
- Hughes, D. J., Shimmield, T. M., Black, K. D., & Howe, J. A. (2015). Ecological impacts of large-scale disposal of mining waste in the deep sea. *Scientific reports*, 5, 9985.
- Illich, I., 1973. Tools for Conviviality. London: Calder and Boyars. Li, T. M. (2014). What is land? Assembling a resource for global investment. *Transactions of the Institute of British Geographers*, 39(4), 589-602.
- Kesby, M. (2000). Participatory diagramming: deploying qualitative methods through an action research epistemology. *Area*, 32(4), 423-435.
- Kindon, S., Pain, R., & Kesby, M. (Eds.). (2007). *Participatory action research approaches and methods: Connecting people, participation and place*. Routledge.

- Kirsch, S. (2014). *Mining capitalism: The relationship between corporations and their critics*. Univ of California Press.
- Kuc, K. and S. Jury (2018) 'Slow violence exposed', *Cultural Studies*, 32:6, 1002-1006
- Latouche, S. 2009. *Farewell to Growth*. Cambridge: Polity.
- Li, F. (2015). *Unearthing conflict: corporate mining, activism, and expertise in Peru*. Duke University Press.
- MacGregor, N. (2017). 'Living With The Gods: The Other Side of the Leaf', Radio 4, Available online at <https://www.bbc.co.uk/programmes/b09fy6fz>
- Marston, S. A., & De Leeuw, S. (2013). Creativity and geography: Toward a politicized intervention. *Geographical Review*, 103(2), iii-xxvi.
- Martinez Alier, J. (2009). Socially sustainable economic de-growth. *Development and change*, 40(6), 1099-1119.
- Miller, K. A., Thompson, K. F., Johnston, P., & Santillo, D. (2018). An overview of seabed mining including the current state of development, environmental impacts, and knowledge gaps. *Frontiers in Marine Science*, 4, 418.
- Mould, O. (2019). The spark, the spread and ethics: Towards an object-orientated view of subversive creativity. *Environment and Planning D: Society and Space*.
- Narokobi, B. (1980). *The Melanesian way: total cosmic vision of life*. Institute of Papua New Guinea Studies.
- Neimanis, A. (2017). *Bodies of water: Posthuman feminist phenomenology*. Bloomsbury Publishing.
- NICHOLSON, H. (2005), *Applied Drama: the gift of theatre*, London: Palgrave
- Niner, H. J., Ardron, J. A., Escobar, E. G., Gianni, M., Jaeckel, A., Jones, D. O., ... & Van Dover, C. L. (2018). Deep-Sea mining with No net loss of biodiversity—an impossible aim. *Frontiers in Marine Science*, 5, 53.
- Nirmal, P. and Rocheleau, D. (2019) 'Decolonizing degrowth in the post development convergence: Questions, experiences, and proposals from two Indigenous territories', *ENE: Nature and Space* 2(3): 465-492
- Nixon, R. (2011). *Slow Violence and the Environmentalism of the Poor*. Harvard University Press.

- Patil, P., Viridin, J., Diez, S.M., Roberts, J. & Singh, A. (2016). *Toward a Blue Economy: A Promise for Sustainable Growth in the Caribbean*. Report No. AUS16344. World Bank. Washington, D.C. <http://documents.worldbank.org/curated/en/965641473449861013/main-report>
- Petersen, S., Krätschell, A., Augustin, N., Jamieson, J., Hein, J. R., & Hannington, M. D. (2016). News from the seabed—Geological characteristics and resource potential of deep-sea mineral resources. *Marine Policy*, 70, 175-187.
- Simet, J (1980) 'From a letter to the editor of *Gigibori*' in *Voices of Independence: New Black Writing from Papua New Guinea*, edited by Ulli Beier, 216-217. New York: St Martin's.
- Straughan, E. R. (2012). Touched by water: The body in scuba diving. *Emotion, Space and Society*, 5(1), 19-26.
- Straughan, E., & Dixon, D. (2014). Rhythm and mobility in the inner and Outer Hebrides: Archipelago as art-science research site. *Mobilities*, 9(3), 452-478.
- Szerszynski, B. (2017). Gods of the Anthropocene: geo-spiritual formations in the Earth's new epoch. *Theory, Culture & Society*, 34(2-3), 253-275.
- Tebegetu, L. (2017) 'Journey of Tebegetu', Available online at <http://www.looppng.com/entertainment/journey-tebegetu-founder-kreativ-kanaka-51589>
- Thyssen Borzemisa Foundation – TBF (2018) 'Prospecting Ocean'. Available online at <https://www.tba21.org/#item--ProspectingOcean--1797>
- Todd, Z. (2015). 'Indigenizing the Anthropocene' in *Art in the Anthropocene: Encounters among aesthetics, politics, environments and epistemologies*, Davis, H. and E. Turpin (eds.), pp. 241-54.
- Tsing, A. L. (2003). Natural resources and capitalist frontiers. *Economic and Political Weekly*, 5100-5106.
- Turnhout, E., Waterton, C., Neves, K., & Buizer, M. (2013). Rethinking biodiversity: from goods and services to "living with". *Conservation Letters*, 6(3), 154-161.
- UNECA (2016). *Africa's Blue Economy: A Policy Handbook*. UN Economic Commission for Africa (UNECA), Addis Ababa.
- Van Dover, C. L., Arnaud-Haond, S., Gianni, M., Helmreich, S., Huber, J. A., Jaeckel, A. L., ... & Steinberg, P. E. (2018). Scientific rationale and international obligations for protection of active hydrothermal vent ecosystems from deep-sea mining. *Marine Policy*, 90, 20-28.

Viveiros de Castro, E. (2003). After-dinner speech at 'Anthropology and Science', the 5th Decennial Conference of the Association of Social Anthropologists of Great Britain and Commonwealth, 14 July 2003. *Manchester Papers in Social Anthropology*, 7, 2003.

Viveiros de Castro, E. B. (2004). Exchanging perspectives: the transformation of objects into subjects in Amerindian ontologies. *Common knowledge*, 10(3), 463-484.

Wenda, B. (2013) 'Songs of Freedom' in Bolton, L., Thomas, N., Bonshek, E., Adams, J. A., & Burt, B. (Eds.). (2013). *Melanesia: art and encounter*. British Museum Press, pp. 159-160

West, P. (2016). *Dispossession and the Environment: Rhetoric and Inequality in Papua New Guinea*. Columbia University Press.