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Larjosto V. Islands of the Anthropocene. *Area*. 2018;00:1– 9. which has been published in final form at <https://doi.org/10.1111/area.12515>. This article may be used for non-commercial purposes in accordance with Wiley Terms and Conditions for Use of Self-Archived Versions."

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ISLANDS OF THE ANTHROPOCENE

Abstract

The accelerating and intensifying dynamics of the Anthropocene are highly topical for island studies. Manifold effects of urbanization, offshoring, migration and climate change become heightened in the context of island spatiality as global connections, fascination and conservation ideals produce tax havens, mass tourism, ecological enclaves, and novel island ecosystems. The Anthropocene calls for rethinking relations between humans and nature. Recent research highlights the usefulness of islands in providing models of intensely coupled human–environmental systems. However, there is little research about where and how the factors actually intersect and how island spatiality intervenes. Contributing to a better understanding of island landscapes and seascapes, this paper explores how the scales and volumes of the Anthropocene shape spaces in small islands. Considering islands' characteristics of smallness, borders, isolation, and littorality, the paper illustrates the distinct spatial developments on islands in the Anthropocene, such as resort sprawl, airports, and artificial coastlines. The observations demonstrate how forces of the

Anthropocene challenge island isolation, stretch and reshape island borders, manipulate islands' smallness and congest small island spaces, intervene in the manageability of systems and highlight the paradoxical and hybrid nature of islands. I suggest that developing and better understanding concepts of island spatiality can be meaningful for informing future spatial transformation in, and for adopting contextualized approaches to, both islands and the Anthropocene.

Keywords: island spatiality, the Anthropocene, island urbanization, landscape research, offshoring, spatial transformation

Introduction

The Anthropocene engenders new spatial trajectories on islands worldwide. Islands are a diverse category that encompasses attributes like smallness, isolation, boundedness, and littorality (Depraetere & Dahl, 2007; Fernandes & Pinho 2017). Island spatiality not only places a spotlight on the impacts of global dynamics (Graham et al. 2017; Urry, 2014) but also facilitates the study of complex interrelations of natural and human systems (Chapman, 2011; Helmus et al. 2014; Vitousek & Chadwick 2013). The emerging island spaces thus deserve careful investigation. In addition, studies of the Anthropocene necessitate localized approaches (Biermann et al., 2016, p. 342) – which could be offered in the context of island spatiality. I postulate that bringing together concepts of islandness and the Anthropocene is mutually beneficial to both lines of study. Although no single paper can comprehensively cover the topic, some of the more pronounced effects of the Anthropocene on island landscapes and seascapes are explained here.

Island spatial development in the Anthropocene is very much a case of the making of islands, or ‘islanding.’ Considering both the real and metaphorical, Sloterdijk encapsulates that “islands have shifted from the register of ‘found’ to ‘made’” (2016, pp. 287–295). This paper refers to geographical entities, and handles small islands with an area of land masses fewer than 2,000 km², with some exceptions such as Greenland. From mixed landscape architecture and island geography perspectives, the goal is to illustrate what happens when the scales and volumes of the Anthropocene meet island spatiality, pursuing a “spatially sensitive” understanding of islands (Chapman, 2011, p. 5) in the Anthropocene. The observations are largely based on open-access satellite images. A research-by-design approach including mappings, typology-building, and virtual or real visits has contributed to the reflections of this article. For this paper, I have also produced 39 drawings studying island airports (Figure 1.).

First, this paper introduces the concept of the Anthropocene and an overview of how islands enter the scheme. The second part conceptualizes island spatiality and illustrates how selected features of the Anthropocene materialize on islands. Approaching both conceptual and concrete intersections, the paper shows how the Anthropocene highlights ambiguities and spatial hybridity in islands and encourages attributes of islandness to develop. This can help to avoid overgeneralizations and exaggerated exceptionalism in island studies (King, 2009). In addition, island spatiality, in turn, provides a nuanced context in which to navigate the Anthropocene.

The Anthropocene and islands

The Anthropocene is a proposed geological time interval and theoretical concept that is epitomized by and emphasizes the considerable human impact on the

Earth and its natural systems (Biermann et al. 2016; J. Zalasiewicz, Williams, Steffen, & Crutzen, 2010). The Anthropocene, as understood here, began around the 1950s, with the Great Acceleration of socioeconomic and Earth systems trends such as growth in urban populations, GDP, international tourism, biosphere degradation, and resource use (Will Steffen, Broadgate, Deutsch, Gaffney, & Ludwig, 2015; Zalasiewicz et al. 2015), which have effects far beyond their origins (Biermann et al., 2016). Furthermore, the Anthropocene is a conceptual framework that is “useful in improving our understanding of social-ecological complexities” (Biermann et al., 2016, p. 348) and is a philosophical position that underpins humans’ role in transforming the planet and rethinking man-nature relations (Görg, 2016; Hight, 2014; Jonas, 2014; W. Steffen et al., 2011). The Anthropocene is criticized as a “one-worlder” idea (Escobar, 2016; Morrison, 2015), and Biermann et al. (2016) highlight the importance of contextualizing global phenomena. Beyond the scope of this paper, island perspectives could enrich the discussion. A focus on island geographies is meaningful because they entail closely interconnected human and natural systems and idiosyncrasy. While urbanization, networks and telecommunications, offshoring, geopolitics and climate change are global issues, insularity accentuates many of their dynamics and impacts (Chapman 2011; Coccossis, 1987; Graham et al. 2017; Lewis 2009; Vitousek & Chadwick 2013).

Human influence on islands’ terrestrial and marine systems began long before the 20th century (Graham et al. 2017; Erlandson, Braje, Gill, & Rick, 2017; Hennessy & McCleary, 2011). Early extinctions of species, deforestation and habitat alteration on a local scale for settlement and subsistence (Anderson, 1977) were followed by centuries of European colonialization, causing overwhelming changes in island societies and landscapes (Lewis, 2009). This era enabled urbanization and fueled global capitalism (Sheller, 2003), incubating the

Anthropocene. What distinguishes the current time period is “the scale, significance and longevity of [human-driven] change (...) to the Earth system” (Jan Zalasiewicz et al., 2015, p. 199).

Zalasiewicz et al. (2015) date the start of the Anthropocene to the beginning of nuclear testing. Bikini Atoll, among other archipelagic sites (Royle, 2014, pp. 79–83) thus symbolizes the start of the time interval and its dramatic impacts on islands. The Pacific, one of the last regions in the world to be inhabited, is today most at risk from climate change. Moore (2015) recognizes that in the Caribbean, the Anthropocene idea is a “problem space” that frames island development. However, islands are not just objects or powerless victims. Through developments of the Anthropocene, they gain increasing attention and a new spatial presence almost independent of geographical location – this even includes the archipelagic Arctic (Grydehøj, 2014a; Grydehøj, Grydehøj, & Ackrén, 2012). Viewing its planetary reach (with consideration of the divergent origins and implications), this paper considers all islands, in one way or another, to belong to – and to be affected by – the Anthropocene.

Island dynamics in the Anthropocene

There is an abundance of geographical investigations into the dynamism of island spaces in what this paper identifies as the Anthropocene. Urbanization and climate change are primary traits of the Anthropocene (Biermann et al. 2016; Brenner and Schmid 2011; Graham et al. 2017; Wolkovich, Cook, McLauchlan, & Davies, 2014). Island urbanization is recognized in both planning and development literature (Barnett & Margetts, 2013; Clarke, 1974; Coccossis 1987; UN-Habitat, 2015), and urban island studies emphasize the implications of island spatiality for urbanization (Grydehøj, 2015a; Hong 2017; Sheng et al. 2017;

Grydehøj et al., 2015; Johnson, 2016; Rodrigues, 2015). Linked topics of mobility, migration, tourism, and offshoring often appear in island studies (Baldacchino 2010; Karampela, Kizos, & Spilanis, 2014; King, 2009).

Islands are particularly popular locations for offshoring finance, wealth and leisure (Baldacchino 2010). Tax evasion, shipping, jet-set aeromobility, casinos, touristic fantasies, and other phenomena drive mighty industries to islands. (Urry, 2014). Sheller (2009, p. 189) portrays the contemporary Caribbean as “a series of places in motion, with its islands especially stitched together by arriving and departing flights, the to and fro of cruise ships and private yachts, the flows of freight and ports, satellite dishes and high-speed Internet connections, monetary remittances and return migrants, taxis and mobile phone calls, smugglers and refugees”. Developments of the Anthropocene facilitate links between islands and rest of the world, accelerating changes and the re-positioning of islands on the global agenda. The mainlanders’ eternal fascination is liberated to such an extent that it represents a major force that modifies islands in the Anthropocene. Islands themselves can better access and provide resources and services, but their carrying capacity and limited landscapes and seascapes are strained.

Climate change is tangible in islands: sea-level rise, ocean acidification, and extreme weather events couple with challenges of urbanization and livelihoods (Barnett & Margetts 2013; Biermann et al. 2016; Graham et al. 2017; Lauer et al., 2013; UN-Habitat 2015). Small island developing states (SIDS) are icons of climate change (Baldacchino & Kelman, 2014). Advocating environmental policies is characteristic of the Anthropocene – and island spatiality is ideal for sustainability rhetoric, hence the widespread marketing and production of eco-islands, which engage in greenwashing and dangerous contradictions (Grydehøj

& Kelman, 2016, 2017). Island nature is both idealized and offshored (Hong, 2017); for example, this is seen in “*ecological island enclaves*” (Baldacchino 2010, p. 185). The Anthropocene also boosts globalization of island ecosystems. In economically favorable locations, transport patterns advance exotic species distribution, and the implications of isolation in island biogeography and evolution have drastically changed (Graham et al. 2017; Helmus, Mahler, & Losos, 2014). A global metabolism has driven even the “Evolutionary Eden” of the Galápagos to crisis point (Hennessy & McCleary, 2011). The paradox is reproduced in numerous island resorts that are marketed as unspoiled and exotic.

Catalyzing spatial transformation in islands, these dynamics of the Anthropocene are inseparable from local, specific geographies. Graham et al. (2017, p. 323) state that “global environmental change has been accentuated on islands, expressly because of their unique insular properties.” Despite being a heterogeneous category, islands share certain abstracted spatial characteristics (Coccosis, 1987; Fernandes and Pinho 2017; Grydehøj, 2014b). The following section uses concepts of islandness and island spatiality to contextualize the impacts of the Anthropocene.

Island spatiality

Fernandes and Pinho conceptualize the spatial dimension of islandness as smallness, borders or boundedness, isolation or connectedness, littorality, and fragmentation (2017). Furthermore, islandness produces paradoxes and hybridity (Lauer et al. 2013; Baldacchino, 2008; Hay, 2006; Stratford, 2003). Small island spaces are characterized by proximity and interconnectedness of ecological,

social and economic systems, resources, and places (Chapman 2011; Coccossis, 1987, p. 85).

Smallness implies a scarcity of land and resources and often a concentration of diverse ecosystems (Bass & Dalal-Clayton, 1995) and hazard-prone sites (Fernandes & Pinho, 2017). The limited suitability for human uses further conditions the land-use patterns on islands (Fernandes & Pinho, 2017). Physical boundaries and smallness engender densification, and cities on small islands are relatively large in comparison to the total area of the land masses (Clarke, 1974, p. 223). There is no periphery in which to expand or relocate functions such as agriculture and ports. Everything is local. Smallness facilitates ubiquitous infiltration, rendering the impacts of the Anthropocene tangible.

High ratios of the land-sea interface are characteristic of islands (Fernandes & Pinho, 2017). “[M]any small islands are entirely coastal entities.” (Bass & Dalal-Clayton, 1995, para. 3.2) Human activities, key ecosystems and infrastructures and internal and external interests all concentrate along the coast, where connections, fantasies, urbanization, and climate change materialize. Not all islands are prone to sea-level rise and storms, but some deal with coral bleaching, pollution, privatization, and coastal erosion. The combination of coastality and smallness thus seems most crucial to island geographies in the Anthropocene. At the land-sea interface, smallness and boundaries are reshaped and stretched by engineering measures that today upscale to new cities (i.e., Grydehøj, 2015b).

Spatial discontinuity has developed unique environments and fragile ecosystems that contribute to global diversity. The fragmentation of archipelagos has led to polarized migration flows (Clarke, 1974, pp. 225–227). However, the Anthropocene challenges the island attributes of borders and isolation. If space

is mapped in time of travel, aeromobility has brought islands and mainlands closer (for those who can afford it). Transoceanic data cables link remote islands overseas, and satellite viewing makes them visible for the curious. A geographic location defines less and less the isolation of an island (Depraetere & Dahl, 2007; Helmus et al. 2014; Karampela et al. 2014). The idea of openness and connectedness being inherent to islands (Baldacchino, 2010, pp. 115–116; Fernandes & Pinho 2017) is reinforced in the Anthropocene – with spatial consequences.

This paper now takes a landscape-architecture perspective to explore what happens when the Anthropocene materializes on islands. The examples represent traits that are particularly salient in island spatiality, that seek island locations and make islands favored, or just (re-)make islands, and thus blur the human-made and the natural. Each island is individual in terms of landscape, topography, settlement patterns, socioecological systems, microclimate, and economy; similar dynamics are found on the mainland, but island spatiality distills the effects.

Shaping islands

Hyperdense and reproduced

If urbanization is the dominant trend today, islands of the Anthropocene are urban. “Island spatiality per se encourages urbanization.” (Grydehøj, 2015a, p. 5) Boundedness and smallness trigger density and verticalization, while clusters of mass tourism devour coastal interface. There are fully built islands, from archipelago capitals in the Maldives, Kiribati and the Bahamas to hyperdense island cities such as Manhattan, Guangzhou, and Mumbai. Global brands make island towns more alike across the planet, and their architectures often stand out

against small-scale morphology. Sprawl is a more recent form of development (Fernandes & Pinho, 2017), reaching a climax in the Caribbean with time-shares, private (mega)resorts, and gated communities (Moore 2015; Sheller 2009, Urry 2014). An inward spread of house-and-garden units fragments island habitats and cultural landscapes, generating the “leisuring” (Bunce, 2008) of landscape or the abandonment and conversion of agricultural lands to resort amenities. Covered by sprawl and golf courses, the example of Bermuda suggests a new reading of an island landscape in the Anthropocene.

New ground and artificial nature

Whether an island runs out of land or not, reclamation and new islands proliferate in the Anthropocene, leading to iconic developments in places such as Dubai and Macau (Grydehøj, 2015b). Geologically speaking, island materiality is being protected, shaped and (re)created. Waterfronts and islandness are so desired that despite vast hinterlands, Bahrain and Abu Dhabi opt for artificial islands (Grydehøj, 2015b, p. 105). In the Seychelles, Mahé is developing new waterfront with islands, leaving the inland untouched. Relative to its original size, the Macau archipelago is perhaps the most radically enlarged in the world (Sheng et al. 2017). The Cotai Strip, a stretch of reclaimed land between two islands, is an embodiment of offshoring fantasy with theme parks, golf course, shopping malls, and casinos, contrasting in scale and essence to the original archipelagic fragments. A closer look reveals it could be re-islanded by the rising sea level.

In the Maldives, resorts with cartoonish designs form whole islands. Thilafushi, in contrast, is a waste island, representing the unbalanced metabolism and new geology of the Anthropocene, an island turning a spatial problem into a spatial resource. Reclaimed Hulhumalé is “the city of hope” in the face of climate

change (Housing Development Corporation). Oil platforms and bird sanctuaries are found in the category of artificial islands. Archipelagic mainlands offshore renewable energy or nature conservation to their secondary islands. On the barren Sao Vicente island in Cabo Verde, the wastewater treatment plant located between the airport and the city is a human-made haven for migratory birds (Biosfera1, 2016).

Humans' geological presence has a dark side: heaps of slowly sedimenting plastic mark the Anthropocene on uninhabited islands such as St. Lucia in Cabo Verde and Pitcairn island in the Pacific (Gomes, 2013; Hunt, 2017). Smallness has contributed to Nauru becoming a melting pot of the Anthropocene: intensive phosphate extraction since the 1960s has devastated its inland, which is now scattered with offshore immigrant camps that subsidizes the islands' economy (Royle, 2014, p. 44). A coastal settlement (and an airport!) form a boundary around this paradoxical landscape of apocalypse and rehabi(li)tation.

Islands of airports

Even where developments are less illustrious, infrastructures of the Anthropocene amend island landscapes. Harbors have long been quintessential and essential to islands, but facilities for cargo and cruise ships claim large proportions of coastline in small islands, leading to an expansion into the sea. For islands, aeromobility might be the ultimate symbol of the Anthropocene, which manifests itself in airports and indirectly through emissions and fluxes of people. Some land-use patterns stem directly from the history of aviation, as WWII expanded geopolitical realms to islands, creating military settlements in the Pacific Ocean, Indian Ocean, Arctic Ocean, and elsewhere. The tiny San Felix off the coast of Chile and Midway Atoll are curiosities in this category.

On the small islands considered here, airports occupy large proportions of the scarce space (Figure 1.). While their impacts on the urban fabric depend on context (metropolises vs. locations tailored for tourism), such infrastructure is inevitably close to human settlements or key ecosystems. Unlike towns, agriculture, and other anthropogenic features that adjust to local island geographies, airports are universal modules to which the island itself must adapt. (The same applies to golf courses.) Due to the need for flat land, they are often built on coastal and/or reclaimed land. Some archipelagos and atolls have separate airport islands, as is seen in Mayotte, the Maldives, Bermuda, Helgoland, and Hong Kong. Looking at coastal cities, such as Rio de Janeiro or Incheon, I ask why airports are constructed on islands, many of which aren't considerably larger than the airports themselves. Would another location for the airport not have spared Governador island in Rio from congestion? Why has Tromsø not relocated its airport from the island-city?

St. Helena, the island symbol of isolation, inaugurated its airport for commercial flights in 2017 (Cropley, 2017). Its universal geometry overrides a rugged terrain, and urbanization on the island may now take off in unforeseen ways.

This epitomizes the apparent conquest to eradicate the isolation of small islands in the Anthropocene. Aeromobility coupled with socioeconomic trends of the Anthropocene can engender vital centers and development bubbles even in remote and relatively hostile geographical environments such as Svalbard and Nuuk in the Arctic (Grydehøj et al., 2012). In Cabo Verde, over the course of a few decades, coastal zones of the desert islands Boa Vista and Sal have experienced the implantation of touristic oases. The periphery of one archipelago has become an attractive global spot that contrasts with its surroundings. Coastality entices development, while smallness draws attention to scale. Dealing with land scarcity, islanders make innovative use of areas officially reserved for transport:

examples are picnics being held on the runway in Kiribati (Warne, 2015), the dedication of an operating airport as bird sanctuary, and the converting military airfields to contemporary needs such as industry, education, leisure, farming, and commerce in Malta. How will future logistics shape islands?

Hybrid and paradox

These hybrid entities and paradoxical landscapes are embodiments of the Anthropocene on islands. They prompt hazards and creativity and raise essential questions about the transformations of islands. Baldacchino and Kelman (2014) postulate that sea-level rise might turn island land-use patterns inwards. It might lead to the need for floating solutions. What about when an island becomes full – or, in the case of Nauru, when an island is hollowed out? To what extent can islands offshore nature and landscape? Does universal replication merge with idiosyncratic island spaces? Which models occur between the polarized scenarios of congested metropolises and eco-pioneered enclaves?

Conclusions

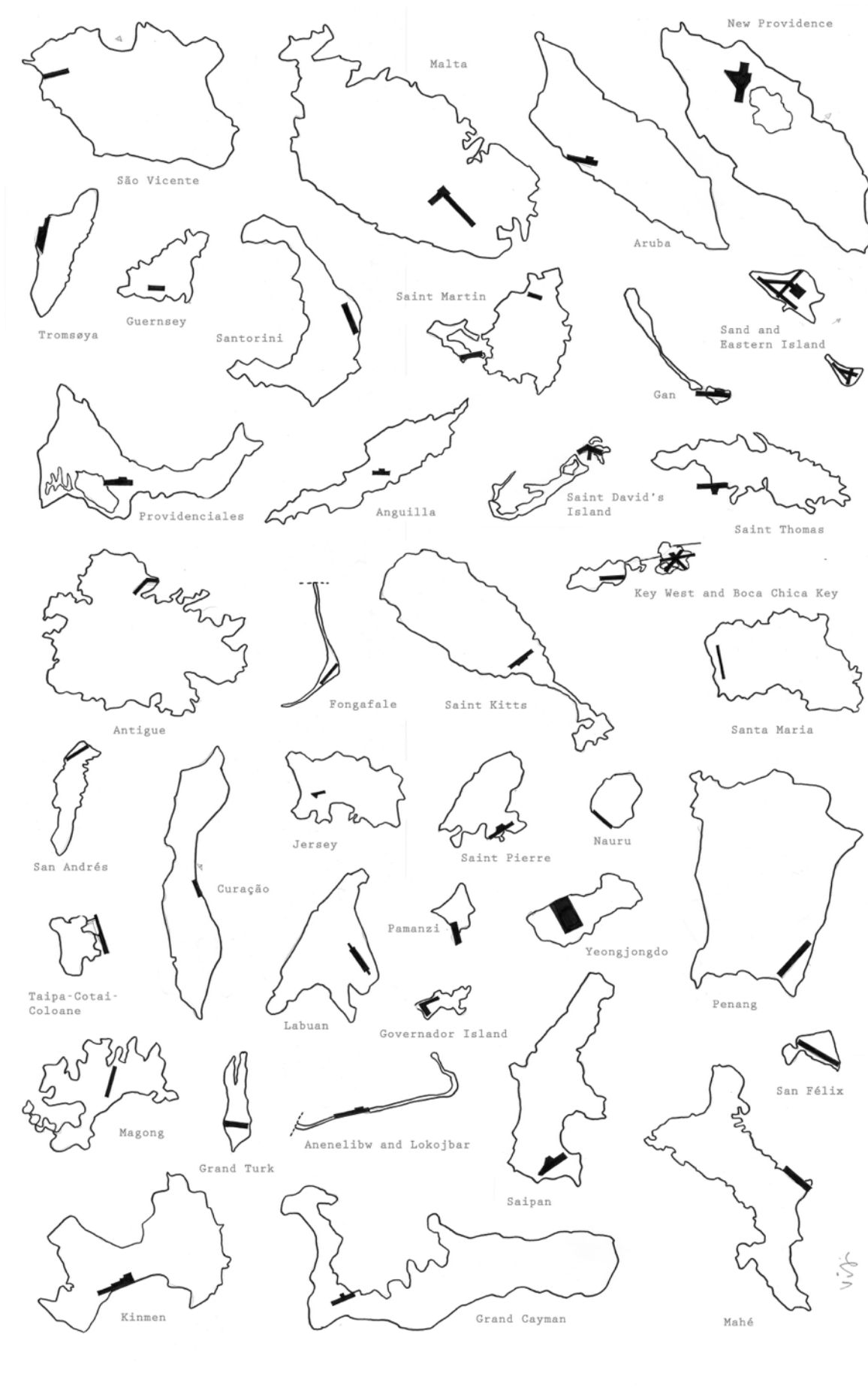
This article considered the Anthropocene as a geological time interval epitomized by humankind's planetary impact and as a concept that pursues new understandings of humans and nature. To contextualize global-scale dynamics, the paper has reflected on the spatial conceptualization of islandness and exemplified spatial features of the Anthropocene on islands. The research demonstrates that in/for islands, the Anthropocene is not only a “problem space” (Moore, 2015) but a spatial problem (and opportunity).

Drawing upon phenomena of the Anthropocene and spatial attributes of islands, this paper points out that smallness and littorality combine to render humanity's

capacities of altering island geology and geography in a highly visible manner. Many dynamics of both the Anthropocene and islands culminate at the land-sea interface. Forces of the Anthropocene challenge islands and the conceptualization of islandness by intervening in isolation, stretching boundaries and literally expanding the smallness of islands thereby highlighting their paradoxical and hybrid spatial character. The Anthropocene bolsters emancipation from marginalization and peripherality, but it also may locally marginalize. The context of the Anthropocene thus encourages the development of concepts of islandness. Reciprocally, the concepts may be meaningful if islands are to “provide a useful model for understanding how coupled human and natural systems experience the Anthropocene” (Vitousek & Chadwick, 2013, p. 1). In my understanding, proximity and hybridity are key qualities for spatial transformation and handling the emerging dynamics of urbanizing landscapes and seascapes beyond islands.

While urbanization, sea levels, and offshoring are not limited to islands or the Anthropocene, this paper shows that island spatiality makes for an informative context in which to study their extended reach and intensification of the phenomena. Further inquiries might reveal whether particular dynamics of the Anthropocene render certain kinds of islands (e.g., coastal vs. oceanic, high-GNI vs. SIDS) more prone to certain impacts. In the light of hyperdensification, replication, expanding mass-tourism, islanding, airport-implants, conversion, unique habitats, and hazards, one thing becomes evident: when the scales and volumes of the Anthropocene meet small islands, new spatial solutions are required. When thinking of island futures, I hypothesize that islandness concepts can help to mediate between global forces and the specificities of each island.

Figure 1. The drawings illustrate spatial dimensions of airports in small islands as embodiments of the Anthropocene. (Based on Google Earth imagery)



Data statement

All the data produced for this paper is included in the submission.

Acknowledgement

I would like to thank the Finnish Cultural Foundation for funding, and the editor of this Special Section, Adam Grydehøj, for comments on an earlier version of the manuscript. I express my gratitude to three anonymous reviewers for insights and wisdom. Any errors remain my own.

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