



A Dissident Archive of Climate Change Fiction: Feminist Afrofuturist Literary Voices on the Anthropocene

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ABSTRACT: Drawing from Shelley Streeby's definition of "visionary fiction" to describe Indigenous and people of colour futurisms as fiction that "extends beyond cli-fi in its rich and deep connections to social movements and everyday struggles" (Streeby 4-5) and that attempts to decolonise the imagination of climate change, this article will propose an analysis of feminist Afrofuturist climate change fiction. The absence of climate justice from several novels that are considered to be part of the emerging canon of climate fiction, and their one-dimensional representation of gender, race, and the other-than-human (Schneider-Mayerson; Gaard), require alternative ways of responding to the climate change crisis. My analyses seek to demonstrate that feminist Afrofuturist representations of the Anthropocene not only treat climate justice as a central issue, but they also make an insightful critical intervention capable of imagining a rupture from master—and mainstream—narratives of linear progress. This article, in particular, will propose an overview of some contemporary feminist Afrofuturist writers and filmmakers, such as Wanuri Kahiu, Nnedi Okorafor, and N. K. Jemisin.

KEY WORDS: Afrofuturism, visionary fiction, climate fiction, Wanuri Kahiu, Nnedi Okorafor, N. K. Jemisin



This article intends to enter the debate on fictional representations of climate change by looking at postcolonial, Afrodiasporic, and African futurisms: to put it otherwise, work that is all too often excluded from the canon of climate fiction, and that “extends beyond cli-fi in its rich and deep connections to social movements and everyday struggles” (Streeby 4-5). In *Imagining the Future of Climate Change: World Making through Science Fiction and Activism*, Shelly Streeby posits that people of colour and Indigenous people have been to the forefront of efforts to imagine climate justice and responses to the environmental crisis since the 1990s, not only through social movements and everyday struggles—one could think of the #NODAPL movement,¹ also referred to as the Dakota Access Pipeline protests, or to the Idle No More movement, just to mention the ones with significant global resonance—but also in their speculative stories. In this regard, Streeby draws from Walidah Imarisha (2015) to define Indigenous and people of colour futurisms as forms of “visionary fiction” (Streeby 30), in that they struggle to conceive worlds that diverge from the mainstream strain of science fiction, where dominant narratives of power are usually reinforced, and use speculative fiction to decolonise the imagination and “break with mainstream stories that center on white settlers and fail to imagine deep change” (Streeby 31).² As such, they are able to imagine responses to climate change that deviate from those envisioned by the fossil fuel industry. This does not mean, adds Streeby, that such visionary fictions offer naïve optimistic and utopian representations of the climate crisis: as the short film and the novels analysed in this article highlight, there is never a simplistic fixing of the world or reconciliation between human and non-human ways of inhabiting the planet; sometimes, the world is broken to such an extent that can only be destroyed. Most of the time, “activists, artists, and writers search for possibilities in the wake of the climate change disaster already upon us rather than turning a blind eye to the many kinds of disaster comprising our current conjuncture’s ecological crisis” (Streeby 31). The absence of climate justice from several novels that are considered to be part of the emerging canon of climate fiction, and their one-dimensional representation of gender, race, and the other-than-human (Schneider-Mayerson; Gaard), require

¹ Streeby further suggests that many social movements for climate justice intersect with one another, calling attention to overlapping vectors of identity and forms of discrimination. Black Lives Matter, for example, released in 2016 a statement of solidarity with the Standing Rock Movement, defined as a movement led by warriors, women, elders, and youth. The same form of environmental racism caused by pipelines on Indigenous land, stresses the statement, can be observed in the chemicals used for fracking, and in the water crisis affecting the African American Flint community, in Michigan.

² A great place to start to decolonise the imagination of climate change is Octavia Butler’s work: her cautionary tales, especially *Parable of the Sower* (1993), anticipated plenty of the key themes explored in this article, such as the intersection of the gender, ‘race’, and class dimensions of climate change, and the concept of “slow disaster,” which, in defining global warming not just as “an incident like a fire, a flood, or an earthquake” but rather as “an ongoing trend – boring, lasting, deadly,” anticipated by two decades Rob Nixon’s *Slow Violence and the Environmentalism of the Poor* (2013). See: OEB [Octavia Estelle Butler] 3193, commonplace books (medium), Octavia E. Butler Papers, The Huntington Library, San Marino, California.



alternative ways of responding to the climate change crisis. My analyses seek to demonstrate that feminist Afrofuturist and Africanfuturist representations of the Anthropocene not only treat climate justice as a central issue, but they also make an insightful critical intervention capable of imagining a rupture from master—and mainstream—narratives of linear progress; as such, they are part of an emerging dissident archive of climate change fiction. This article, in particular, will propose an overview of some contemporary feminist Afrofuturist writers and filmmakers, such as Wanuri Kahiu, Nnedi Okorafor, and N. K. Jemisin.

THE IMPORTANCE OF VISIONARY DREAMS: WANURI KAHIU'S *PUMZI*

Among the more dynamic and radical visions of ecology, we can surely situate Afrofuturist creative efforts to imagine the future. Coined in 1993 by white American scholar Mark Dery, the term Afrofuturism refers to “speculative fiction that treats African American themes and addresses African American concerns in the context of twentieth-century technoculture” (Dery 180). Through the recovery and reclamation of often silenced histories, it aims to foreground non-white, African and African American literary and artistic production, but also to create a more inclusive genre, capable of challenging the predominant whiteness of science fiction and addressing everybody's dreams, desires, hopes (Bigoni). In *Afrofuturism: The World of Black Sci-Fi and Fantasy Culture* (2013), Ytasha Womack argues that at its core, Afrofuturism is about envisioning possible futures through a black cultural lens and reinvigorating an often-repressed culture. The African continent, indeed, has historically been depicted as locked in a temporal stasis, perpetually underdeveloped, and a place without a future. According to Kodwo Eshun, when Africa exists as the object of futurist projections, its social reality is

overdetermined by intimidating global scenarios, doomsday economic projections, weather predictions, medical reports on AIDS, and life-expectancy forecasts, all of which predict decades of immiserization. These powerful descriptions of the future demoralize us; they command us to bury our heads in our hands, to groan with sadness. Commissioned by multinationals and nongovernmental organizations (NGOs), these developmental futurisms function as the other side of the corporate utopias that make the future safe for industry. Here, we are seduced not by smiling faces staring brightly into a screen; rather, we are menaced by predatory futures that insist the next years will be hostile. [...] Africa is always the zone of the absolute dystopia. (291-92)

The twofold aim of Afrofuturism is, therefore, to recompose past and future and untie futurist projections from a single story of white Western development. Kenyan filmmaker Wanuri Kahiu is part of the current generation of Afrofuturist authors that is reimagining and charting new futures for a dying planet, making insightful interventions in current conversations about climate change.³ Her widely

³ In an interview with Oulimata Gueye, Kahiu has also contributed to the discussion about Africa and science fiction: she asserts that, in writing a story about a girl in the future, she wasn't deliberating choosing science fiction; it was only when her producer asked her to make a choice between science fiction and fantasy—the original draft of the script featuring some elements of fantasy—that she decided to go more science fiction than fantasy. This experience prompted her to argue that science fiction has ancient roots in Africa: “I think science fiction has been a genre in Africa



acclaimed short film *Pumzi* (2009) feeds into conversations on ecological concerns, as Kahiu has suggested in numerous interviews. *Pumzi*, which means ‘breath’ in Swahili, is set 35 years after World War III, a water war that caused droughts and water shortages, and torn the world apart. The reality of climate change is foregrounded immediately through doomsday newspaper captions stating “The Greenhouse Effect: The Earth is Changing Already” and “Whole Day Journey in Search of Water.” The last remaining community is the East African “Maitu⁴ Community,” an underground and self-sustaining society that produces energy and recycles water through the purification of bodily fluids. The film revolves around Asha (Kudzani Moswela), the curator of the “Virtual Natural History Museum,” containing relics of the time before nature had died, who anonymously receives a soil sample which tests low for radiation levels and high for water content, suggesting that life might be able to flourish again outside the community. When she inhales the smell of the soil, moreover, she falls into a vision in which she is swimming in a pool full of water; afterwards, a blooming tree appears, in stark contrast with the surrounding desert. Suddenly, a dream-detecting machine interrupts her vision and reminds her to take the mandatory dream suppressants. All the inhabitants of the Maitu community are indeed forbidden to even imagine alternative futures and forced to live in an eternally dystopian present. The authoritarian council reacts to the vision by destroying the museum and compelling Asha to produce energy on one of the community’s machines, suggesting that Maitu’s inhabitants are subjected to a form of biopolitical control; Asha, nonetheless, manages to escape the confinement and plants the soil sample outside. The film ends with Asha offering her own bodily fluids in order to moisture and nurture the seed’s growth. As the final shot pans out and Asha takes her last breath, we see a tree growing rapidly—perhaps spreading from Asha’s body—and we hear the sound of thunder and rainfall.

Choosing a Swahili name as a title and a Kikuyu word to name the community, Kahiu situates *Pumzi* in East Africa, and specifically in Kenya, a country that has been enduring a severe water crisis for decades; Kenya, moreover, is among the water-scarce countries across the world (Mulwa *et al.*). Additionally, other lived experiences such as climate change and neo-colonial resource exploitation are behind Kahiu’s imaginings (Mayer 2016). According to Sophie Mayer, *Pumzi* addresses the problem of water scarcity both locally and globally, and “shows its protagonist literally reclaiming a girlhood lost to waterlessness” (113).

Revolving around Asha’s refusal to give up her vision of a sustainable future, *Pumzi* highlights the importance of those creative dreams that are usually erased from the dominant discourse of the Anthropocene. To start with, it imagines a world where African-descendent peoples and their cultures play a central role in the interpretation of possible futures: as suggested by Mackay, the film “represents a

that has been used a lot for a long period of time—way before I was even born...If we think of science fiction as something that is fictitiously science or speculative fiction within a story then we’ve always used it. Because we’ve used Botany; we’ve used Etymology; the idea of the study of animals to tell stories or the idea of insects to tell stories or the idea of natural sciences using trees—that’s all science fiction” (2013).

⁴ The term ‘Maitu’ lends itself to several interpretations: the etymology of the Kikuyu (a Kenyan language) compound is shown in one of the first frames of the film: “Noun—Mother. Origin: Kikuyu language from MAA (Truth) and ITU (Ours). OUR TRUTH.”



specifically Afrocentric vision of post-climate crisis futurity” (2018: 537). Furthermore, in its critique of the harmful separation between nature and culture and in its futuristic representation of inter-species nurturing, *Pumzi*'s visionary dream is deeply influenced by ecofeminism, expanding Mark Dery's masculinist foundation of Afrofuturism. Due to its focus on the interconnections between gender, 'race', and environmentalism, Kahiu's short film can also be interpreted as an ecowomanist representation of climate change: with ecofeminist theory being dominated by the perspectives of white middle-class women, ecowomanism emerges to propose an intersectional methodology in the examination of environmental injustices around the world, lifting up the viewpoint of women of colour and specifically of women of African descent (Harris). The idea of ecowomanism also interconnects with the concept of African ecofeminist activism, epitomised, for example, by 2004 Nobel Peace Prize winner Wangari Maathai's Green Belt Movement, a grassroots and non-governmental organisation based in Nairobi, Kenya, that works to “promote environmental conservation; to build climate resilience and empower communities, especially women and girls; to foster democratic space and sustainable livelihoods,” as stated in the “Who We Are” section of the movement's website.⁵ Wangari Maathai, who founded the movement in 1977 to encourage rural Kenyan women to work together and grow seedlings and plant trees, has been championed for her reconceptualisation of ecofeminism from an African perspective (Muthuki). Besides directing *For Our Land*, a TV documentary on Wangari Maathai, Wanuri Kahiu admitted in an interview (*For our Land*) that Maathai's environmental activism inspired the production of *Pumzi*: drawing on the Green Belt Movement, the film seems indeed to suggest that the planting of trees could be a remedy for environmental degradation. In a fascinating comparison between Maathai's environmental Afrofuturist imaginary and Kahiu's *Pumzi*, James Wachira suggests that Maathai's 2004 Nobel Peace Prize Lecture contains the seeds of Asha's call to heal the Earth. In the Lecture, Maathai recalls, for instance, her childhood experience when she would visit a stream next to their home to fetch water for her mother: “today, over 50 years later, the stream has dried up, women walk long distances for water, which is not always clean, and children will never know what they have lost”. Most importantly, Maathai's invitation to dream (“I would like to call on young people to commit themselves to activities that contribute toward achieving their long-term dreams. They have the energy and creativity to shape a sustainable future”) resonates with Asha's continuous dreaming of a sustainable future despite the compulsory dream suppressants and the Council member's denial that life might be possible outside. I read Asha's invitation to keep dreaming, finally, as a powerful answer to the “crisis of imagination” (Ghosh) determined by climate change.⁶

⁵ See: <http://www.greenbeltmovement.org>. Accessed: May 25, 2023.

⁶ As suggested by Amitav Ghosh in *The Great Derangement: Climate Change and the Unthinkable* (2016), if the scale of climate change makes it difficult to grasp, it follows that global warming might be challenging to capture in literary language as well: “Let us make no mistake: the climate crisis is also a crisis of culture, and thus of the imagination,” he writes at the beginning of the book (19).



A NEW CONFIGURATION OF HUMAN/NON-HUMAN HYBRIDITY: NNEDI OKORAFOR'S LAGOON

The assemblage of woman-tree-water that emerges at the end of *Pumzi* seems to resonate with the visionary configuration of human and non-human hybridity represented in the novel *Lagoon*, published in 2014 by the award-winning author of African-based science fiction Nnedi Okorafor. Across three different acts, the novel revolves around an alien invasion in the city of Lagos. Over the course of 55 chapters, we follow the interactions of the alien ambassador Ayodele with three human characters: a marine biologist named Adaora, a hip-hop artist from Ghana named Anthony, and a Nigerian soldier named Agu. We soon learn that Ayodele has shape-shifting abilities that allow her to move between human, animal, and inanimate forms, and that Adaora, Anthony, and Agu have special capacities: Adaora can breathe underwater, Agu has superhuman strength, and Anthony has amazing communicating skills that allow him to send sound waves of great power. The novel, moreover, pullulates with non-human characters, such as a vengeful swordfish and a spider. The heterogeneous community that the novel puts together undertakes a race through Lagos and against time to save the city and possibly the entire planet from pollution and oil consumption. From its very beginning, the novel places Lagos as the most important focal point of the narrative, exploring the possibilities of an alien invasion in Nigeria's largest city and thus destabilising the genre of science fiction, where aliens are usually allowed to invade New York, Los Angeles, or London:

Welcome to Lagos, Nigeria. The city takes its name from the Portuguese word for "lagoon." The Portuguese first landed on Lagos Island in the year 1472. Apparently, they could not come up with a more creative name. Nor did they think to ask one of the natives for suggestions. And so the world turns, masked by millions of names, guises, and shifting stories. (Okorafor, *Lagoon* prologue)

What is also implied from this incipit is the postcolonial ambition of the novel, which immediately sheds light on European settlers' occupation and renaming of the city without consultation with the native population. After the aliens' landing, the narrative remains in Lagos for the whole development of the plot. As suggested by Hope Wabuke, unlike *Black Panther's* post-credits scene where King T-Challa addresses the United Nations in Vienna about opening up Wakanda's advancements in technology to the world—no longer wanting it to be an isolationist country—in *Lagoon* "there is no move to undercut the Africanfuturist gaze with a location change to a city such as New York or Los Angeles, or any other place in the United States and the West". *Lagoon*, indeed, can be read as an example of the Africanfuturist gaze, which is distinguished by Okorafor from the Afrofuturist one: while the former is freed from the white Western gaze, the latter, she claims, still privileges a Western perspective.

Lagoon, moreover, reverses science fiction's—and, particularly, first contact narratives'—long-standing obsession with colonialism, imperial adventure, and the slave trade, a trope that has been thoroughly explored by John Rieder in his ground-



breaking work *Colonialism and the Emergence of Science-Fiction* (2008).⁷ The alien arrival in *Lagoon* has indeed nothing to do with colonisation and violence: as the alien ambassador Ayodele underscores, they do not seek Nigerian oil or resources, but they have landed there to nurture a polluted world, and, specifically, a polluted ocean (107): “we do not want to rule, colonize, conquer or take. We just want a home” (214).

The alien arrival is therefore linked to a necessary process of renewal: the key to Lagos survival is the purification of the ocean from all the offshore drilling facilities. *Lagoon* is therefore set up as a “petrofiction,” a term that originated in Amitav Ghosh’s 1992 review essay of *Trench*, a novel published in 1991 by Abdelrahman Munif, best known for the oil novel *City of Salt* (1984). Since Ghosh’s coinage, the term has gained popularity among scholars of ecocriticism, indicating both literary texts with oil production as a subject matter, and novels in which the theme is tackled obliquely.⁸

Lagoon provides a harsh critique of Nigerian petroculture and attempts to imagine an alternative future where a post-petroleum Nigeria would be possible. The perspective adopted, though, is a peculiar one: from its very first chapter, the novel denounces the pollution of the water using the point of view of an enraged swordfish that aims to sabotage a seawater pipeline.⁹ Okorafor thus gives voice not only to the human victims of Nigerian petroculture, but also to the marine animals who might be even more vulnerable to the slow violence of human-induced environmental disaster.

The novel can be also interpreted within a climate fiction framework, due to its focus on the destruction of the marine ecosystem in the Lagos Bay, its celebration of interspecies connections, and its figuring of the ocean as a catalyst for the survival of Lagos. Seawater, in particular, is a central force of the novel, together with oil (Jue, “Intimate Objectivity” 176). One need only consider the epigraph (“The cure for everything is saltwater—sweat, tears, or the sea”) and the prologue, which is narrated by a swordfish and therefore endows marine creatures with a fundamental role in the rebellion against oil companies; throughout the novel, moreover, the ocean is represented as a space where new ecological imaginaries can proliferate. This coincides with an extensive and interdisciplinary turn to the ocean under the banner of the so-called blue humanities, with the undersea world deemed as a site for rethinking epistemological and methodological stances of sustainability. From archaeology’s offshore move to environmental history’s recent attention to species of fish and marine mammals, an increasing number of theoretical, literary, and artistic projects are now “thinking with water” (MacLeod *et al.*), expanding environmental imaginaries beyond forests and terrestrial spaces. Humanities’ attention to the aquatic Anthropocene, which requires the mediation of science and technology studies since “most aquatic zones, species, and topics exist beyond

⁷ On the relationship between science fiction, colonialism, and the Black Atlantic slave trade see also Bould, Grewell, Haywood Ferreira, Kerlake, Langer, and Lavander III.

⁸ The emerging field of study that aims at responding to growing concerns about fossil fuels and climate change using humanities methodologies is termed Energy Humanities. See Barrett and Worden, and Wilson *et al.*

⁹ There are several other excerpts in the novel which focus on Nigerian petroculture and the subsequent pollution of oceanic water, such as the moment in which Kola, Adaora’s daughter, reports to Ayodele that “the waters are dirty and dead because of oil companies’, as her mother says” (42).



human domains" (Alaimo, "Introduction" 429) has also been called "hydrocriticism" or the "oceanic turn" (Winkiel 1). As suggested by environmental humanities and material feminism scholar Stacy Alaimo, oceanic depths resist the flat mapping of the Earth through satellite images that favour a comfortable and disembodied perspective, to propose instead an immersed and never omniscient position on worldly entanglements. In other words, "the substance of the water itself insists on submersion, not separation" (Alaimo, *Exposed* 161). *Lagoon's* ocean, indeed, is not a space of absolute alterity, but rather a site that provokes a recognition of human life as always enmeshed with the more-than-human world, with seawater represented as a fluid that trans-corporeally traces the material interchanges between human beings and the local ecology of Lagos. Melody Jue, moreover, underscores that the ocean is a recurring element in Afrofuturism, a site where traditional cosmologies and diasporic imaginations come together after the Middle Passage (Jue, "Intimate Objectivity" 177): as such, she uses the term "Oceanic Afrofuturism" to describe Okorafor's novel, and, more generally, Afrofuturist novels where water becomes a fundamental element.

In order to analyse the novel's representation of human life as enmeshed with the more-than-human world in *Lagoon*, this article takes as a point of departure Ursula Heise's work of the posthuman turn in speculative fiction. In her chapter "The Posthuman Turn: Rewriting Species in Recent American Literature" (2011), Heise analyses three different modalities through which speculative fiction has questioned the status of human as a species and, more broadly, species boundaries: the alien, the cyborg, and the animal. She provides a diachronic view that suggests changing cultural concerns about the notion of the human as a species: the alien moment characterises science fiction of the 1950s, 1960s, and 1970s, the cyborg moment begins in the 1980s, and the animal moment in the mid-1990s.

What emerges from her study is that speculative fiction mirrors changing cultural concerns about conventional notions and limits of the human, even though most of the novels and films that she analyses seem to attribute nonetheless "a special status to humanness" (Heise 465). With regard to *Lagoon*, I suggest that Okorafor reinterprets all these three moments, but makes a step further as the alien, the cyborg, and the animal have the same purpose of decentring Anthropocentric values and interrogating human exceptionalism.

The figure of the alien, to start with, does not aim at uniting humans as a species, helping them to put aside internal differences in the face of an extraplanetary other, but rather at harmonising humankind and aliens through the negation of interspecies difference. When Ayodele is first introduced in the novel, her otherness is immediately underscored: "In the moonlight, he couldn't clearly see the creature, but as it walked out of the water even he knew it was not human. All his mind would register was the word 'smoke'" (Okorafor, *Lagoon* 7), thinks a young boy that witnesses the arrival scene together with Adaora, Agu, and Anthony. At the same time, she is not presented as the embodiment of radical difference: glancing at Ayodele, Adaora observes that "every time she looked at her, there was a disorienting moment where she was not sure what she was seeing. It lasted no more than a half-second, but it was there. Then she was seeing Ayodele the "woman" again" (17). Adaora, moreover, resists any kind of objectification of Ayodele:



not “it”, “her”. The woman looked like someone from Adaora’s family – dark-skinned, broad-nosed, with dark brown thick lips. Her bushy hair was as long as Adaora’s, except where Adaora had many, many neat shoulder-length dreadlocks, this one had many, many neat brown braids that crept down her back. (10)

Secondly, it is not difficult to read the embodiment of Haraway’s description of the cyborg in the characters of Adaora and Ayodele. *Lagoon*, indeed, abounds with several examples of transgressions of boundaries between humans and animals and between humans-animals and machines: Adaora, to start with, can transform into a fish and breath underwater, as already mentioned in the previous paragraphs. Regarding Ayodele, she is first described by a witness on the beach as “smoke” but at the same time a “shape-shifter” (8); throughout the novel, she explains that she is able to blur the boundaries between herself and other organisms, mutating her own body but also everything that surrounds her: “we change. With our bodies, and we change everything around us” (40). Over the course of the novel, she transforms into a black woman resembling the water spirit Mami Wata, into Adaora’s threatening husband Chris, a monkey, a “broad-shouldered, stocky white man in a blue uniform” (211), a lizard, Karl Marx, and a dolphin, and she transforms chaos into a plantain tree. The cyborg identity that emerges from this transgression of bodily boundaries complicates any comfortable construction of the human subject as the measure of all things, and defamiliarises the distinction between human and non-human. As suggested by Allison Mackey, *Lagoon* “exposes the modern fantasy of human ‘disembeddedness’ from nature for what it is: a dangerous illusion” (Mackey 535): using Haraway’s words, “we have never been human” (Haraway 1).

The non-human figure identified by Heise that we mostly encounter in *Lagoon*, however, is the animal. As observed in the previous paragraphs, in the opening chapter of part I the disaster of human’s oil drilling in the bay of Lagos is first observed from the perspective of a swordfish, which immediately becomes a defender of the polluted environment; similarly, acts II and III begin with chapters narrated by a tarantula and a bat, respectively. Both Adaora and Ayodele, moreover, cross the threshold between the human and the animal sphere: the former by accepting her ability to become “half fish and half human” (255), and the latter by transforming herself into several animals. What is implied by this interrogation of anthropocentric values is that animal nature, far from being identified as degenerate, is instead a moral and ecological conscious alternative to humankind’s destructive attitude towards the environment. At first glance it may seem that the animals who decide to fight back are characterised as monstrous others: as soon as the swordfish sabotages the pipeline, she claims that “now she is no longer a great swordfish. She is a monster” (6); after the aliens’ attack removes pollution from the ocean, the seawater outside Lagos is described as “teeming with aliens and monsters” (6); toward the end of the novel, the narrator states that “today, as the sun rises, there may as well be a sign on all Lagos beaches that reads: ‘Here There Be Monsters’. This has always been the truth, but today it is truer” (222). It soon becomes clear, however, that it is humans who are the monsters, to the point that Ayodele abandons her human appearance after having witnessed several scenes of human violent domination and exploitation over what is constituted as Otherness: “Ayodele



had changed herself into this creature an hour ago because she'd decided that she no longer wanted to be a human being" (146).

I therefore argue that the three moments of boundaries transgression identified by Heise (alien, cyborg, and animal), rather than signaling a progress from the Anthropocentric purpose of uniting humans as a species to the posthuman turn spurred by the environmental crisis, are all reinterpreted in Okorafor's *Lagoon* as a wide and thorough critique to Anthropocentric values and human exceptionalism. From the alien Ayodele to the vengeful swordfish, from alive and agentic oceanic waters to female cyborgs, all these figures of absolute alterity concur to celebrate interspecies connections in which the other is never precategorized.¹⁰

With regards to inter-species connections, I further suggest that it is possible to read a parallel between *Lagoon* and *Pumzi's* assemblage of woman-tree-water analysed in the previous section of this article: through the course of the novel, we learn that Ayodele is not only capable of transforming herself, but she can also mutate her surroundings. This becomes clear when she transforms the remnant of a fight outside Adaora's house into a plantain tree:

The wet piles of meat, the scattered clothes, even the spattered blood, were gone as though they had never been there. In their place was a plantain tree, heavy with unripe plantain. [...] Ayodele had taken the elements of oxygen, carbon, hydrogen, nitrogen, calcium, phosphorus, potassium, sulfur, sodium, chlorine and magnesium that had been Benson¹¹ and the other soldiers and rearranged them into a plant. (132)

With the help of the metal-like balls that make up her body, she creates a configuration of human and non-human hybridity that seems to respond to ecofeminist (or ecowomanist) theorisations of inter-species nurturing.

FINAL REMARKS: IMAGINING THE RUPTURE

Lagoon's subversion of value systems that place the humanistic subject as the measure of all things does not imply a simplistic reconciliation between the humans, the animals, and the surrounding environment. The aliens' merging with the ocean, indeed, creates powerful and huge sea creatures which subsequently take revenge on humans for the pollution of their aquatic homes: "The sea creatures. They wanted the water to be "clean". "Clean" for sea life . . . which meant toxic for modern, civilized, meat-eating, clean-water-drinking human beings" (242). The main target of this much-needed cleansing of the ocean is marine life, namely all the plants, animals, and other organisms that live in the salt water. Such transformation reveals a contrast between animals' ecological consciousness—towards the end of the novel,

¹⁰ The importance of connection and communication among all forms of life can also be observed in other works published by Okorafor, such as the graphic story *LaGuardia*, published in 2019. Its front cover is particularly relevant for the present discussion, as it shows humans, aliens, and animals attending a demonstration for the rights of non-human populations. The front of the cover, moreover, features a Nigerian pregnant woman, presenting an intersectional viewpoint and alluding to the importance of reproductive rights in the fight for equality and justice. See: <https://www.instagram.com/p/B-4j5OclEqW/>. Accessed May 25, 2023.

¹¹ A corporal involved in the fight.



Adaora speaks with a giant swordfish who “spoke like a member of that group Greenpeace!” (256)—and the subjugating nature of human enterprise: thanks to the intervention of the aliens, humans will no longer be able to “subsume nature as means to dominate both it and themselves” (O’Connell 305).

Allison Mackey points out, however, that Okorafor does not suggest that collective change can only be achieved through the intervention of an “alienus ex machina” (535): the rupture with a system based on Anthropocentric values, extractivism, and systemic violence, is helped by a joint action involving Adaora, Anthony and Agu, animals, and other beings of Nigerian folklore that have “always been there. Beneath the surface” (Okorafor, *Lagoon* 252), as stated by Adaora.

The post-petroleum society described towards the end of the novel, when the ambassador Ayodele finally manages to persuade Nigeria’s president that the oil could no longer be the country’s top commodity—“it could no longer be a commodity at all” (Okorafor, *Lagoon* 266)—allows readers to imagine the possibility of a rupture with oil consumption. This rupture, however, is not a realistic roadmap towards a more utopian society, nor a detailed description of the process that can lead to the end of capitalism. As pointed out by Jue, “imagining that this rupture has already occurred frees Okorafor from explaining how the rupture might occur, enabling her to venture into the important work of world-building and imagining new forms of postcolonial, feminist science in its foamy wake” (Jue, “Intimate Objectivity” 184). *Lagoon’s* rupture, spurred by the arrival of the alien but subsequently helped by a multi-species, queer, and African-futurist community, is yet another way to decentre and decolonise the imagination of climate change, and to imagine responses to climate crisis that diverge from those envisioned by the fossil fuel industry.

This collective rupture seems to resonate with Janet Fiskio’s claim that Afrofuturist (or, in Okorafor’s case, Africanfuturist) speculative fiction “imagine utopian societies built on histories of insurrection,” and that “speculative visions of Black utopias formed out of revolution are locations for agency and imagination of worlds within and beyond white supremacy” (6-7) – but also beyond human exceptionalism, as my article intends to suggest. One last example of an Afrofuturist rupture that makes possible “a new beginning anchored in the archaeology of past insurrections” (Fiskio 20) is provided by N. K. Jemisin’s *Broken Earth Trilogy* (*The Fifth Season* [2015], *The Obelisk Gate* [2016], and *The Stone Sky* [2017]). As stated by the American science fiction author during the 2018 Hugo Award ceremony, in writing *The Broken Earth Trilogy* (TBET) she was drawing on the long history of structural oppression. In particular, she was outspoken about the fact that the Trilogy was inspired by responses to oppression such as the Black Lives Matter Movement (Hanifin) as well as the Ferguson Unrest and the Ferguson Riots, a series of riots and protests triggered by the fatal shooting of teenager Michael Brown by a white police officer (Hurley, Flock): her Trilogy was initially shaped by her frustration and anger over this story.

That *The Broken Earth Trilogy* explores the methods and effects of structural oppression is made clear from its very beginning, as the dedication that opens the first novel of the Trilogy, *The Fifth Season* (TFS), is “for all those who have to fight for the respect that everyone else is given without question” (4). What is less obvious is the Trilogy’s exposure of the intersections between social justice and climate



change. Jemisin, indeed, has stated that she did not intend to create a metaphor for climate change in TBET, but at the same time she understands why people have analysed the three novels from this viewpoint: “I get that it works as a metaphor for same, especially given the revelations of the third book, but that just wasn’t the goal,” she states. She also points out, however, that “anyone who’s writing about the present or future of *this* world needs to include climate change, simply because otherwise it’s not going to be plausible, and even fantasy needs plausibility” (Anders 2019).

The world described in TBET is made of a single continent perpetually hit by destructive seismic events that cause Fifth Seasons: long winters that can last hundreds of years, when ash falls on the continent and life is put in peril. Despite the planet’s restlessness, its only supercontinent is known ironically as the Stillness: it is indeed “a land of quiet and bitter irony” (7). Quite surprisingly, moreover, the planet is known as Father Earth. Humanity is divided into three subspecies: stills, stone eaters, and orogenes. Stills, that bear no magical abilities, are what resemble humans the most; stone eaters are stone-alike people who can travel through the Earth; orogenes possess orogeny, that is “the ability to manipulate thermal, kinetic, and related types of energy to address seismic events” (Jemisin, *The Fifth Season* 462). Orogenes can therefore manipulate the Earth by absorbing or redirecting energy from elsewhere; because of their power, however, the orogenes are enslaved by the rest of the human race. They exist to serve the world, and do not matter beyond what they can do for the other races of the Stillness: their sacrifice “will make the world better” (46). In the novel, we follow the perspectives of three female orogene protagonists, Damaya, Syenite and Essun, as they try to navigate the destruction that shatters their world. Later in the novel, it is discovered that all three perspectives belong to the same woman and represent different stages in her life. It is also discovered, moreover, that the current Fifth Season has been caused by Alabaster, an extraordinarily powerful orogene who laments the oppression of his race.

Even though Jemisin did not intend to create a metaphor for climate change, the Trilogy parallels the progress of anthropogenic global warming in our world. It is indeed set in a human-created era, where the concept of humanity as a geological force—the very concept of the Anthropocene—is brought to its extreme consequences, as not only the fifth seasons have been initially caused by human tampering with nature, but orogenes can also manipulate and control the Earth, its plates, and the earthquakes. The planet, however, is just fine, and the main victims of the fifth season are its human (and less-than-human) inhabitants: “When we say ‘the world has ended’, it’s usually a lie, because the planet is just fine” (2015: 4). This means that apocalypse, too, is a relative thing, as explained in the third volume of the Trilogy: “When the earth shatters, it is a disaster to the life that depends on it—but nothing much to Father Earth” (Jemisin, *The Stony Sky* 5-6).

As the story unfolds, we get to know that the fifth seasons were first originated by an ancient society called Syl Anagist, metaphor for the exploitative nature of advanced capitalism: as explained in *The Stone Sky*, humans of Syl Anagist, whose dreams about progress had no limits, mastered the forces of matter, “shaped life itself to fit their whims” (21), and explored the mysteries of the ground and of the sky until they grew bored with them. At this point, the parallels with climate change in our real world become very clear: like advanced capitalist societies, “Syl Anagist is



ultimately unsustainable. It is parasitic,” and “The Earth’s core is not limitless. Eventually, if it takes fifty thousand years, that resource will be exhausted, too. Then everything dies” (481). It is human pursuit of power, control, and dominion of the planet that has destroyed the equilibrium of the continent, rendering it almost inhabitable. Father Earth simply “fought back”: “as one does, against those who seek to enslave” (Jemisin, *The Obelisk Gate* 492).

In her Trilogy, Jemisin imagines the possibility of violent rupture with a system that considers some people and the land as exploitable resources. Acknowledging that the suffering of the orogenes cannot be the only possible route to a sustainable future, Alabaster decides that breaking the Earth may be the only possible step toward decolonisation. Similarly, at the end of *The Stone Sky*, Essun and her daughter Nassun realise that “some things are too broken to be fixed” (Jemisin, *The Stone Sky* 496), and that “Alabaster was right, and some things really are too broken to fix. Nothing to do but destroy them entirely, for mercy’s sake” (537). Although they eventually decide that the Earth is worth saving, the subaltern, marginalised and dissenting voices of TBET suggest that deconstructing the world might not be enough: sometimes it requires to be broken—collectively. As Jemisin states in her 2018 Hugo Award acceptance speech: “even the most privileged and blindered of us have been forced to recognise that our world is broken. And that is a good thing [...] because acknowledging the problem is the first step towards fixing it” (online).

As in Okorafor’s novel, where the utopian conclusion regards animals only, at the expense of human beings, TBET does not end with a simplistic reconciliation between humans and the land: decolonisation from epistemologies of dominion happens through a violent and collective breaking of an unjust Earth. The most visionary contribution of these texts is indeed their attempt to shape alternative sustainable futures that diverge from dominant narratives of power and privilege and imagine ruptures from fossil capitalism and human exceptionalism. Rather than using the postapocalyptic genre merely to warn, look back, and mourn the lost past, these authors propose a relational counterapocalypse—or, in other words, a dissident archive of the future—that generates new possibilities for humans and non-humans alike, while warning of the potentially destructive consequences of neoliberal globalisation and indiscriminate exploitation of natural resources, and portraying the despair that will predominate in the future if the voices of sexualised, radicalised, and naturalised minorities keep going unheard.

WORKS CITED

Adejunmobi, Moradewun. “Introduction: African Science Fiction.” *Cambridge Journal of Postcolonial Literary Inquiry, Special Issue: African Science Fiction*, vol. 3, no. 3, 2016, pp. 265-272.

Alaimo, Stacy. *Undomesticated Ground. Recasting Nature as a Feminist Space*. Cornell University Press, 2000.

---. *Exposed. Environmental Politics and Pleasures in Posthuman Times*. University of Minnesota Press, 2016.

---. “Introduction: Science Studies and the Blue Humanities.” *Configurations* vol. 27, 2019, pp. 429-32.



Anders, Charlie Jane. "Why Science Fiction Authors Need to be Writing About Climate Change Right Now." Tor.com: Science fiction. Fantasy. The universe. And related subjects, January 22, 2019. <https://reactormag.com/why-science-fiction-authors-need-to-be-writing-about-climate-change-right-now/>. Accessed: March 10, 2024.

Andersen, Gregers. *Climate Fiction and Cultural Analysis. A New Perspective on Life in the Anthropocene*. Routledge, 2020.

Barr, Marleen S., editor. *Afro-Future Females. Black Writers Chart Science Fiction's Newest New-Wave Trajectory*. The Ohio State University Press, 2008.

Barrett, Ross, and Daniel Worden. *Oil Culture*. University of Minnesota Press, 2014.

Bergthaller, Hannes. "Cli-Fi and Petrofiction: Questioning Genre in the Anthropocene." *Amerikastudien / American Studies* vol. 62, no. 1, 2017, pp. 120-125.

Bigoni, Clara. "Afrofuturism: liberation and inclusion beyond literature with N.K. Jemisin." *Roots&Routes*, 2019. <https://www.roots-routes.org/afrofuturism-liberation-and-inclusion-beyond-literature-with-n-k-jemisin-by-clara-bigoni/>. Accessed 25 May 2023.

Bould, Mark. "African Science Fiction 101." *SFRA Review* vol. 311, 2015, pp.11-18.

Coogler, Ryan. *Black Panther*. Marvel Studios, 2018.

Davis, Jonita. "How Black Women Are Reshaping Afrofuturism." *Yes! Magazine*, 24 Apr. 2020. <https://www.yesmagazine.org/social-justice/2020/04/24/how-black-women-are-reshaping-afrofuturism/>. Accessed 25 May 2023.

Dery, Mark. "Black to the Future: Interviews with Samuel R. Delany, Greg Tate, and Tricia Rose." *Flame Wars: The Discourse of Cyberculture*, edited by Mark Dery, Duke University Press, 1994, pp. 179-222.

Dubey, Madhu "Becoming Animal in Black Women's Science Fiction." *Afro-Future Females. Black Writers Chart Science Fiction's Newest New-Wave Trajectory*, edited by Marleen S. Baar, The Ohio State University Press, 2008, pp. 31-51.

Eshun, Kodwo. "Further Considerations on Afrofuturism." *The New Centennial Review*, vol. 3, no.2, 2003, pp. 287-302.

Fiskio, Janet. *Climate Change, Literature, and Environmental Justice*. Cambridge University Press, 2021.

Flock, Elizabeth. "How the protests in Ferguson helped inspire this fantasy novel." *PBS News Hour*, 12 June 2019. <https://www.pbs.org/newshour/arts/how-the-protests-in-ferguson-helped-inspire-this-fantasy-novel>. Accessed 25 May 2023.

Gaard, Greta. *Critical Ecofeminism*, Lexington Books, 2017.

Ghosh, Amitav. "Petrofiction: The Oil Encounter and the Novel." *The New Republic*, 2 March 1992, pp. 29-34.

---. *The Great Derangement. Climate Change and the Unthinkable*. Chicago University Press, 2016.

Gillis, John R. "The Blue Humanities." *HUMANITIES* vol. 34 no. 3, 2013) <https://www.neh.gov/humanities/2013/mayjune/feature/the-blue-humanities>. Accessed 25 May 2023.

Grewell, Greg. "Colonizing the Universe: Science Fictions Then, Now, and in the (Imagined) Future." *Rocky Mountain Review of Language and Literature*, vol. 55, no. 2, 2001, pp. 25-47.



Gueye, Oulimata. "Africa and Science Fiction: Wanuri Kahiu's *Pumzi* 2009." 2013. <https://www.youtube.com/watch?v=SWMtgD9O6PU>. Accessed 25 May 2023.

Hanifin, Laura. "Black Lives Matter Inspired This Chilling Fantasy Novel." *Wired Magazine*, 29 August 2015. <https://www.wired.com/2015/08/geeks-guide-nk-jemisin/>. Accessed 25 May 2023.

Haraway, Donna. "A Cyborg Manifesto: Science, Technology, and Socialist-Feminism in the Late Twentieth Century." *Simians, Cyborgs and Women: The Reinvention of Nature*. Routledge, 1991, pp.149-181.

Harris, Melanie L. "Ecowomanism." *Worldviews Special Issue: Ecowomanism: Earth Honoring Faiths*, vol. 20, no. 1, 2016, pp. 5-14.

---. *Ecowomanism. African American Women and Earth-Honoring Faiths*. Orbis Books, 2017.

Haywood Ferreira, Rachel. "The First Contact Story in Latin American Science Fiction." *Parabolas of Science Fiction*, edited by Brian Atterbery and Veronica Hollinger, Wesleyan University Press, 2013, pp. 70-88.

Heaven, Dan. "'The Future Starts with An Image': Wanuri Kahiu's *Pumzi* (2009)." *Alluvium*, 4 June 2021. <https://www.alluvium-journal.org/2021/06/04/the-future-starts-with-an-image-wanuri-kahiu-pumzi-2009/>. Accessed 25 May 2023.

Heise, Ursula K. "The Posthuman Turn: Rewriting Species in Recent American Literature." *A Companion to American Literary Studies*, edited by Caroline F. Levander and Robert S. Levine, Wiley Blackwell, 2011, pp. 454-468

Hurley, Jessica, and Nora K. Jemisin. "An Apocalypse is a Relative Thing: An Interview with NK Jemisin." *ASAP/Journal* vol. 3, no. 3, 2018, pp. 467-477.

Iles, Alastair. "Repairing the Broken Earth: N.K. Jemisin on race and environment in transitions." *Elementa Science of the Anthropocene*, vol. 7, no. 26, 2019, pp.1-25.

Jemisin, Nora K. *Hugo Award Best Novel acceptance speech*, 2018. <https://www.youtube.com/watch?v=8lFybhRxoVM>. Accessed 25 May 2023.

---. 2015. *The Fifth Season*. Orbit, 2015.

---. 2016. *The Obelisk Gate*. Orbit, 2016.

---. 2017. *The Stone Sky*. Orbit, 2017.

Jue, Melody. "Intimate Objectivity: On Nnedi Okorafor's Oceanic Afrofuturism." *Women's Studies Quarterly*, vol. 45, no. 1-2, 2017, pp. 171-188.

Kahiu, Wanuri, director. *Pumzi*. Inspired Minority Pictures. 2009.

---, director. *For our land*. M-Net, 2009.

---. "I want Maathai to see my sci-fi." *Hot Secrets*, November 12 2009c <http://hotsecretz.blogspot.com/2009/11/wanuri-i-want-maathai-to-see-my-sci-fi.html>. Accessed 25 May 2023.

Kerslake, Patricia. *Science Fiction and Empire*. Liverpool University Press, 2007.

Langer, Jessica. *Post-colonialism and Science Fiction*. Palgrave, 2011.

Lavender III, Isaiah. *Race in American Science Fiction*. Indiana University Press, 2011.

Lavender III, Isaiah, and Lisa Yaszek, editors. *Literary Afrofuturism in the Twenty-First Century*. Ohio University Press, 2020.

Maathai, Wangari. "Wangari Maathai – Nobel Lecture." *The Nobel Prize*., December 10 2004.



<https://www.nobelprize.org/prizes/peace/2004/maathai/26050-wangari-maathai-nobel-lecture-2004/>. Accessed 25 May 2023.

Mackey, Allison. "Guilty Speculations: The Affective Climate of Global Anthropocene Fictions Author(s)." *Science Fiction Studies* Special Issue: SF and the Climate Crisis, vol. 45, no. 3, 2018, pp. 530-544.

MacLeod, Janine, et al. *Thinking with Water*. McGill-Queen's University Press, 2013.

Murphey, Kathleen. "Science Fiction/Fantasy Takes on Slavery: NK Jemisin and Tomi Adeyemi." *Pennsylvania Literary Journal*, vol. 10, no. 3, 2018, pp. 106-15.

Muthuki, Janet. "Challenging Patriarchal Structures Kenya." *Agenda: Empowering Women for Gender Equity*, vol. 69, 2006, pp. 82-91.

Ncube, Gibson. "'Human Beings Have a Hard Time Relating to That Which Does Not Resemble Them': Queering Normativity in Nnedi Okorafor's Lagoon." *Scrutiny2*, 2020, pp. 1-13.

Nixon, Rob. "Environmentalism and Postcolonialism." *Postcolonial Studies and Beyond*, edited by Ania Loomba et al., Duke University Press, 2005, pp. 233-251.

---. "Pipedreams. Ken Saro-Wiwa, Environmental Justice, and Micro-minority Rights." *Slow Violence and the Environmentalism of the Poor*, Harvard University Press, 2011, pp. 103-127.

---. *Slow Violence and the Environmentalism of the Poor*. Harvard UP, 2011.

O'Connell, Hugh Charles. "'We are change': The Novum as Event in Nnedi Okorafor's Lagoon." *Cambridge Journal of Postcolonial Literary Inquiry*, vol. 3, no. 3, 2016, pp. 291-312.

Okorafor, Nnedi. *Who Fears Death*. Daw, 2010.

---. *Lagoon*. Hodder & Stoughton, 2014.

---. "Sci-fi stories that imagine a future Africa." Filmed August 2017 at TEDGlobal. <https://www.youtube.com/watch?v=Mt0PiXLvYIU>. Accessed 25 May 2023.

---. "Africanfuturism defined." *Nnedi's Wahala Zone Blog*, October 2019. <https://nnedi.blogspot.com>. Accessed 25 May 2023.

Rico, Amanda Renee. "Gendered ecologies and Black feminist futures in Wanuri Kahiu's Pumzi, Wangechi Mutu's *The end of eating everything*, and Ibi Zoboi's *The farming of Gods*." *Wagadu: A Journal of Transnational Women's and Gender Studies*, vol. 18, 2017, pp. 81-99.

Rieder, John. "Science fiction, colonialism, and the plot of invasion." *Extrapolation*, vol. 46, no. 3, 2005, pp. 379-394.

Schneider-Mayerson, Matthew. "Whose Odds? The Absence of Climate Justice in American Climate Fiction Novels." *ISLE: Interdisciplinary Studies in Literature and Environment*, 2019, pp. 1-24.

Stenberg, Felicia. *Cooperative Apocalypse: Hostile Geological Forces in N.K. b's The Broken Earth Trilogy* (Master's Thesis). Linneaus University, Sweden, 2020.

Streeby, Shelley. *Imagining the Future of Climate Change: World Making through Science Fiction and Activism*. University of California Press, 2018.

Szeman, Imre. "Introduction to Focus: Petrofictions." *American Book Review* vol. 2, no. 3, 2012, p. 3.

---. "How to Know About Oil: Energy Epistemologies and Political Futures." *Journal of Canadian Studies*, vol. 47, no 3, 2013, pp. 145-168.



Veracini, Lorenzo. "District 9 and Avatar: science fiction and settler colonialism." *Journal of Intercultural Studies*, vol. 32, no. 4, 2011, pp. 355-367.

Wabuke, Hope. "Afrofuturism, Africanfuturism, and the Language of Black Speculative Literature." *Los Angeles Review of Books*, 27 Aug. 2020 <https://www.lareviewofbooks.org/article/afrofuturism-africanfuturism-and-the-language-of-black-speculative-literature/>. Accessed 25 May 2023.

Wachira, James. "Wangari Maathai's environmental Afrofuturist imaginary in Wanuri Kahiu's Pumzi." *Critical Studies in Media Communication*, vol. 37, no. 4, 2020, pp. 1-13.

Wilson Sheena, et al. *Petrocultures: Oil, Politics, Culture*. McGill-Queen's University Press, 2017.

Womack, Ytasha. *Afrofuturism: The World of Black Sci-Fi and Fantasy Culture*. Chicago Review Press, 2013.

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