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We Are Tectonic!
A Queer Geophysics for Intra-Solidarities and Resisting the Cloud Regime

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Abstract This paper analyses how Big Tech and global consultancy firms are asserting control over carbon removal certification and governance through infrastructure solutions and technical standards. We argue that defining gaps in the underground constitutes a global takeover of material sovereignty, encompassing both knowledge and geological formations. We unearth Big Tech's strategies of infra-solutionism to demonstrate, drawing on the work of inhuman geographer Kathryn Yusoff, how this takeover reinforces geological grammars and essentialises racialised and sexualised categories that disconnect us from the Earth. Drawing on queer poetry together with work of Marxist agronomist Amílcal Cabral we advocate for resistance to dominant geopower and form transnational solidarities against the cloud regime.

Keywords Infra-solutionism. Carbon Removal. Queer Geophysics. Material Sovereignty. Big Tech. Racial Capitalism.

Summary 1 Introduction: Filling the Gaps. – 2 Queer Grammars of the Gap. – 3 The Financial Frontier of Carbon Removal: Making and Filling the "Gap". – 4 Legacies of Damage. – 5 Whose Futures are Given? – 6 Conclusion.

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1 Introduction: Filling the Gaps

This paper analyses how Big Tech and global consultancy firms are asserting control over carbon removal certification and governance by constructing infrastructural solutions and technical standards. This takeover aims to secure financial gain and energy security through naturalising their control of geological resources and subsurface space, potentially displacing existing ecologies and local claims. We argue that defining gaps in the underground constitutes a global takeover of material sovereignty, encompassing both knowledge and geological formations. The paper has three main objectives: firstly, to reveal Big Tech's strategies of what we have termed 'infra-solutionism' in geology, geoengineering, climate governance, and climate science to ensure their longevity and spatial energy needs; secondly, through engaging with the work of inhuman geographer Kathryn Yusoff demonstrate how this takeover reinforces what Yusoff terms "geological grammars" that essentialise racialised and sexualised categories and disconnect us from the Earth (Yusoff 2024, 5); and thirdly, to advocate for the development of "other geophysics of sense" (53) as a form of resistance and to assert material sovereignty above and below the surface, drawing on queer poetry, the work of Yusoff and the work of Marxist agronomist Amílcal Cabral.

Our research emerges from a series of disobedient action research practices (Pritchard, Rocha, Snelting 2020) which aim to foster material resistance against the financial and technological exploitation generated by subsurface computation. It is based in our work as The Institute for Technology in the Public Interest (TITiPI), a transnational gathering of activists, artists, engineers and theorists who follow a public interest perspective to reject what we refer to as the infra-solutionism of Big Tech. Inquiring into the underlying power structures in scenes of extraction; desiring to dismantle harmful infrastructures and their political economies. We seek to offer a counter grammar of the underground through these disobedient action research approaches and speculate through animation, poetry, queer stories and bug reporting below and above the surface to consider forms of solidarity and vulnerable porosities of these scenes. In the face of what we see as the narrative takeover by McKinsey, Stripe, Google and Meta, we propose counter consultancies to resist their greenwashing tales which seek to continue fossil fuel extraction by developing so-called 'green' and 'net zero' infrastructure through carbon dioxide removal.

We argue that Big Tech infrastructures – what we refer to as the cloud regime – attempt to obliterate life and shatter earthly relations with such force that materially requires cracking the earth's core and flushing out everything in its path, grabbing

land, draining groundwater and diverting renewable energy away from local communities. We discuss how currently the dominant imaginaries of the 'twin green and digital transition' in the EU and UK together with concepts like 'net zero', 'urban regeneration' and 'climate neutral (AI) Artificial Intelligence' are deeply tied to an extractive understanding of the underground and dependent on racial capitalism.

In the first part of the paper, we gather queer imaginaries of 'below the surface'. Aiming to counter the narratives that below the surface is absent of life and ahistorical to move beyond a purely ontological understanding of the underground to an epistemological and affective one. This shift to epistemology focuses on how we come to know and feel the underground, including subsurface feelings. We outline how this is crucial for countering and rising-up against the economic rationales often used to justify infra-solutionism of the cloud regime. We want to bring our collective energies to what literary scholar Lara Cohen outlines as Sylvia Wynter's calls for unfolding the nascent modes of sociality of the underlife and the counterstruggle (Wynter 1979 in Cohen 2022, 48). As "not just a resistant force but a wholly different concept of life […] both lived experience and as-yet-unrealized modes of existence" (Cohen 2022, 48).

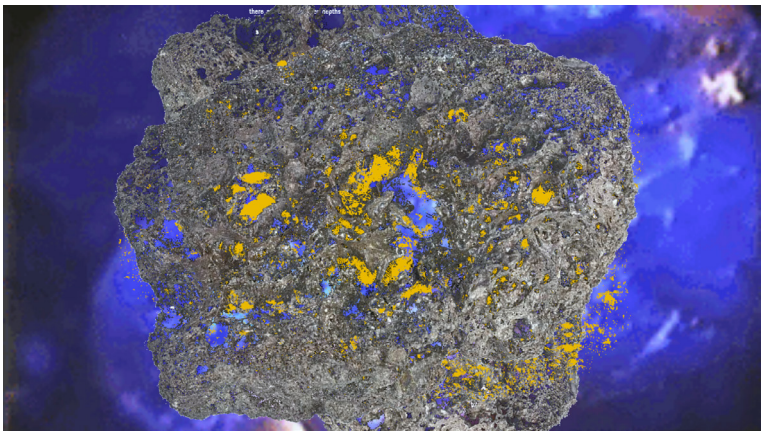

Figure 1 The Underground Division, *Crystal Mutual Aid: Deplacement*. 2025. Cascading animation, screenshot. https://ddivision.xyz/rockrepo/crystals, cc4r

This story begins in an 'airtable' filled with carbon dioxide removal gaps. Entries in this online hybrid spreadsheet-database list technological and financial interventions for reducing carbon levels above the earth's surface, what we term infra-solutions. The 'gap fillers' for carbon dioxide removal include proposals for; legislation and regulations, for skillset acquisition and for technologies that

build, scale, and reduce the cost of carbon removal pathways.[1] The table is hosted by the privately owned 'Frontier Climate'. Frontier Climate is a for-profit company owned by fintech giant Stripe Inc. founded with global Big Tech corporations, Google, Meta, Shopify and global consultancy firm McKinsey.[2] The aim of the airtable is to invite collaborations on identifying the knowledge, technical and governance gaps in carbon removal economies. The 'carbon dioxide removal gaps table' poses as a resource to provide 'quicker' ways for research labs to orient their research, or 'faster' processes for policy makers to understand what's missing. Gaps can be filtered by policy or technical view. The team at Stripe Climate, Frauke Kracke, Joanna Klitzke, Nan Ransohoff, write "to make the initial list of 100+ gaps navigable, each one is tagged with attributes to help orient a user to the gap, how impactful it would be if filled, and who might be best positioned to fill it" (Kracke, Klitzke, Ransohoff 2022).[3] At Stripe Climate they use the description of a gap to demarcate what they see as both an absence of knowledge, governance, or technical skills on carbon dioxide removal. Such as a knowledge gap on the impacts of carbon dioxide removal – "the effects of pore clogging and cracking, during circulation of carbon dioxide rich fluids through subsurface mafic and ultramafic rocks" or "assessing the feasibility for geological storage of carbon dioxide in so far unexplored locations and rock formations" or a governance gap such as "resolving legal challenges and developing frameworks for geochemical carbon dioxide removal at scale (contamination)" (Kracke, Klitzke, Ransohoff 2022).[4] Despite the seeming openness around who might be positioned to fill these projected gaps there are designated categories of which organisations should be doing the work, primarily government and academia, together with a secondary layer listed as start-ups, philanthropists, and established industries. We argue that the institutions Frontier Climate aims to pull into these processes form an experimenting-with both academic and governance spaces. Research and advocacy institute TNI (Transnational Institute) has described these types of processes as part of the global takeover by "multistakeholder initiatives MSIs" (Manahan, Kumar 2021). Indeed, in their investigative mapping of MSI's power in global governance, Mary Ann Manahan and Madhuresh Kumar identify that many of these consortiums are focused on "gaps, 'burning' issues of the day or un-governed tasks in global governance" (Manahan, Madhuresh

1 See the full airtable at: https://gaps.frontierclimate.com/.

2 To read the full description see: https://frontierclimate.com/who-we-are.

3 For more on the CDR gap database see: https://frontierclimate.com/writing/cdr-gap-database.

4 See the full description here: https://gaps.frontierclimate.com/.

2021, 31). Often using planetary crisis as an entry point these "gaps" refer to areas where existing governance is seen as insufficient or absent (Manahan, Madhuresh 2021, 31). The gaps that Frontier Climate want to enrol institutions and academics into – through their research, design and engineering proposals – are not just conceptual gaps but are material power grabs. Seeking to gain control over both the discourse on climate crisis and the earth's subsurface in ways that cross the boundaries of nation-states and involve a deep rendering of corporate, international, and even geological forces. This intensified greenwashing and exploitation of the subsurface for the extension of Big Tech and carbon dioxide removal potentially challenges the geopolitical imaginations of territorial and resource sovereignty. The drive by corporations such as Stripe together with McKinsey, directly raises the question of control over the underground in sites where these companies are proposing developments, but also the influence of both the US and EU in these spaces.

This paper focuses on the infrastructure (including software) of Frontier Climate and its expansion in both the EU regulation space and the 'Carbon Valley', Nairobi, Kenya, a proposed industrial hub which aims to turn carbon emissions into financial opportunities and renewable energy offtake agreements for artificial intelligence, cloud computing, cloud storage, crypto-mining and others. We trace how Frontier Climate and it founders, Big Tech corporations, Google, Meta, Shopify and global consultancy firm McKinsey, attempt to re-crack the sub/surface in Carbon Valley to 'permanently store' carbon in the deep basalt strata in the Kenyan Rift Valley through an extension of financial payment infrastructure and cloud regimes.

Carbon Valley is close to the Kenyan rift valley which is "characterized by diverse geology, including crystalline, volcanic, and metamorphic rocks, shaped by tectonic activity leading to complex faulting and fractured zones" (Khan, Nakayama, Nakaya 2024). These fractured zones in hard rock serve as crucial groundwater reservoirs in an area in which climate shocks, and droughts are magnifying local tensions and conflict. It is also an area in which the violences and harms of carbon offsetting projects[5] have been extensively documented. In the Kenyan territory there has been resistance and campaigning against many carbon offsetting regimes, regimes that advocacy group Survival International have termed 'blood carbon'. In the north of the territory activists recently delivered a huge blow to a flagship carbon offset project run by Northern Rangelands Trust (NRT) used by Meta, Netflix, British Airways and other multinational corporations. The NRT's carbon offset project is reportedly the

5 Carbon offsetting is related but differs from CDR in that it doesn't claim to remove carbon from the atmosphere.

largest soil carbon capture project in the world.[6] However, in 2023, after a report by Survival International accused the company of overestimating its carbon offsetting and violating Indigenous rights, the certifying body Verra suspended credit issuance from it before later reversing course.[7]

Despite the legacies of harm from carbon capture, Frontier Climate and Carbon Valley seek to offer yet another route for carbon removal credit certification, led by McKinsey. This points to carbon removal being part of an ongoing cookie-cutter urban replication of temporal and anticipatory infrastructure promoted by McKinsey consultants in Nairobi (Smith 2017, 38). Urban fantasises, and future vistas that have been proliferating in Kenya for the last two decades schemes and through the specific corporate practice of McKinsey consultancy (Smith 2017, 32).

Through a discussion of Frontier Climate's infrastructure and the Carbon Valley proposal we anticipate future struggle and question whose bodies are touched by the violence of infra-solutionism. Tracing how these infrastructures force displacements. Whilst also expanding the ongoing extractive violences between above and below the earth's surface, to meet the huge demands of energy use by AI and the cloud regime. We conclude by drawing on queer poetry in conversation with Cabral's environmental politics (see Carreira da Silva, Vieira 2025), proposing ways to come to a practice of resistance which counters the language of extraction – and the extraction of language – with expressive practices to inaugurate transnational and porous solidarities above and below the surface.

2 Queer Grammars of the Gap

Although queer theory might not seem like the most obvious choice to intervene in this space, we see it as one of the important approaches in our work, because it works to denaturalize and politicise nature, natural resource and undergrounds. Queer theory also brings sensibilities that help to reject monoculture approaches to life and to the interlinked ecocidal and epistemicidal violences. In this section we bring this into contact with Cabral's writings and practices. Particularly his framing of resistance and the care for soil ecosystems – what he referred to as in-submission (Carreira da Silva,

6 See the full article at: https://www.business-humanrights.org/en/latest-news/kenya-court-halts-flagship-carbon-offset-project-used-by-meta-netflix-british-airways-over-unlawfully-acquiring-public-land-without-community-consent/.

7 https://news.mongabay.com/2023/03/carbon-credits-from-award-winning-kenyan-offset-suspended-by-verra/.

Vieira 2025). In-submission was a core part of Cabral's critical theory to generate better conditions for living through reimagining our relationship to nature and the environment. In-submission creates a very different geometry than gaps, whether in basalt or epistemically. Like the deep time water that is inseparable from basalt in porous undergrounds, in-submission is "rather than either or, inside or outside, in-submission is both, and it is both at the same time. Put another way, for Cabral, 'Man' is both part, and *not* part, of nature; both nature, and its antithesis" (Carreira da Silva, Vieira 2025, 20). For Cabral it is through this in-submission as a practice of caring for soil, that practices of insubmission to colonialism might be nurtured.

Figure 2 The Underground Division, *Crystal Mutual Aid: We Are*. 2025. Cascading animation, screenshot. https://ddivision.xyz/rockrepo/crystals, cc4r

Approaching transitions, climate crisis and dispossession through in-submission and queerness might resource our intersectional and transnational resistances and solidarities. It might also provide some pleasure and radical kinship (Aouragh 2023) with each other for continuing in our struggles. Through radical kinship, queer geochemistry, queer poetry and Black expressive culture we can find the practices that work on the importance of valuing life and living. As digital anthropologist Miriyam Aouragh writes to keep close that the "[b]asic principles of respect, and acknowledging race, class, gender, ability as socially reproduced and intersectional, are values to fight for" (Aouragh 2023).

Seeking to work on how queer theories help build an analytical repertoire of intra-solidarity between above and below the surface, we focus on the grounded scene of gap opening and filling by Frontier Climate, in the basalt crystal underground of the Kenyan Rift. As

artist, media theory and Black studies scholar Romi Ron Morrison writes allowing us to develop infrastructural practices that

> refuse imaginations of the world by which calculable measurement is the only relationship between things and pushes us to meaningfully engage difference as a relationship that we are entangled within. (Morrison 2022)

This intra-solidarity builds on the disobedient action research practice of TITiPI in developing the Frontier Bugreport (2024),[8] a collective research report written over three months of online writing workshops and a series of semi-structured conversations with activists, climate scientists, engineers, agroecologists and economists on the infrastructure of Frontier Climate and including discussions with the Programmable Infrastructures Group led by Seda Gürses and their ongoing work on computational infrastructures and their political economies.[9] In addition, it involves an infrastructural study that draws on queer theory for geophysics speculations that unearth the material and affective infrastructures of Frontier Climate, through analysis of contracts, policy expert group minutes, software repositories, corporate reports and industry literature. Our problematising of 'gap-filling', and greenwashing by Big Tech and financial actors directly addresses our concerns for more just presents, including the abolition of environmentally damaging cloud regimes. To glimpse what Morrison describes as "radical reimagining and visceral reconnection" to our surrounds (2022).

> *we won't say love because it is*
> a difference between vertex and vertices –
> the number of surfaces we break
> enough or many to make the lake
> *loosened from the rock*
> one body's dearth is another body's ache
> *lay it to the earth*
> (extract from "Lake-Loop" by Natalie Diaz, 2020)

Loosened from the rock and laid to the earth, transversally attending to gaps, verticality and volumetrics has given rise to many queer interpretations of the mineralised underground. Getting to know, protect and release the political possibilities of the flows above and

8 https://titipi.org/pub/Frontier.pdf and updated version forthcoming with Logi(c)s, 2025.

9 https://www.tudelft.nl/tbm/onze-faculteit/afdelingen/multi-actor-systems/onderzoek/projects/programmable-infrastructures-project#c938671.

below ground have included textured touching (Ballestero 2019); carboniferous love and insensible cusps (Yusoff 2013); rock crushes and stone butches (Chen 2012); necessary fracturing (Diaz 2020); leather vest granite dykes in *Dyke (Geology)* (Imbler 2020); and stories of fugitive porosity (Morrison 2022) to name just a few. A resistance both to the violence of extraction and racial capitalism *and* as a way to imagine other ways of relating to the earth's mineralised depths as a form of poetic in-submission.

More of an epistemology than an ontology, queer theories engagements with subsurface feelings, have been less about filling the ontological gap of the underground as lively and dynamic and more about building an analytical repertoire of intra-solidarity between above and below the surface. As Kai Bosworth writes "ascription of liveliness to *all* subsurface relations risks flattening the multiplicity of rhythms or temporalities at work, which still include some materials which *resist* liveliness" (Bosworth 2024). Instead, these queer theories generate a collective grammar that work towards countering what Kara Keeling calls the "quotidian violence" of extraction and financial capitalism (Keeling 2020). *Crystal Mutual Aid*, the cascading animation that accompanies this paper in the form of seven screenshots, is part of the work of creating other glittering visions and grammars, an approach we have been developing in the transfeminist visual research and queer poetry *Rock Repo*.[10] Queer theorist Lauren Berlant wrote "it matters to fight for better normative representations of the social, not just because they provide the affective satisfaction of being-in-common but because they affect the very infrastructure that organizes time, health, care, intimacy" (Berlant in McCabe 2011). This is what we aim to do in the *Rock Repo*. The thick animated descriptions of carbon injections, aquifers, ewaste fossils, carbon endings that form the *Rock Repo* are more unruly representations or thick stories, and their computational modelling both articulates and disarticulates the social and the material – fossil fuel racial capitalism and infrastructures of empire (Aouragh, Chakravartty 2016).

10 To learn more about this approach see `https://ddivision.xyz/rockrepo/`.

Figure 3 The Underground Division, *Crystal Mutual Aid: Ready*. 2025. Cascading animation, screenshot. https://ddivision.xyz/rockrepo/crystals, cc4r

Much like Jose Muñoz's description of queerness we work to keep the connection between the material and the social in these queer scenes. To deal with geochemical matter as unknown, untouchable, porous, fugitive and felt as a warm illumination imbued with potential (Muñoz 2019, 1).[11] As Nathalie Diaz (2020) writes;

> what it means to be made
> to be ruined before becoming – rift
> glacial, ablation and breaking
> lake-hip sloping, fluvial, then spilled
> (extract from "Lake-Loop" by Natalie Diaz, 2020)

Geophysical porosity, permeability and chemistry provoke the imagination of queer life thriving in the historical waters of rocks, a queer geophysical dis/inheritance (Nguyen 2020; Lehman 2024). These queer geochemical scenes create quite a different imaginary of the underground and imagine the porosity of undergrounds to shelter marginalised life and make possible life and living. In their discussion of Networked Intimate Publics T.L. Cowan and Jas Rault write about science fiction writer N.K Jemisin's crystal city. The subterranean community called Castrima is "a hidden place that is built and sustained by the energies and skills of the most powerful, rare, reviled, and endangered specimens of humanity: the orogenes"

11 "Queerness is not yet here. Queerness is an ideality. Put another way, we are not yet queer. We may never touch queerness, but we can feel it as the warm illumination of a horizon imbued with potentiality" (Muñoz 2019, 1).

(Cowan, Rault 2025, 129). Interpreting it as a place of glittering mutual aid which "conjures the feeling of being welcomed into the secret inner world that sparks this place into life, of seeing what has been and is being built by the people who make it, protect it, and keep it running" (Cowan, Rault 2025, 131). These are all processes that can also be understood as remaking our relationship with mineralised life and forms of holding the constant construction/deconstruction of earths materials at the heart of Cabral's concept of in-submission. Within this framework, "crystal mutual aid" (Cowan, Rault 2025) emerges as a speculative figure of queer existence, glittering technologies of survival, mineralised solidarity and of potential deep time alterities that lie above and below the surface. Like the acts of imagination in nineteenth century theories of the underground, queer theories of the sub/surface make up a queer geophysics which seems to insist "there are always further depths to go" (Cohen 2022, 16).

3 The Financial Frontier of Carbon Removal: Making and Filling the "Gap"

> The world is awful. The word is better. The world could be better. […] For an orientation to the type of questions we need to collectively address, explore the categories below […] Find relevant gaps using the filters, add/edit/upvote gaps, and take action to fill them/Please liberally edit existing gaps, or let us know about gaps that are missing altogether. Questions? Interested in collaborating on these problems?[12]

This exert might sound like a community organising session or a university research workshop, but instead these orientations are the words of Frontier Climate in their bid to create a dynamic database on the technical and governance gaps for carbon removal economies, framed as a negation of the current state of research. It poses as a resource providing quicker ways for research labs to orient their research, or faster ways for policy makers to understand what's missing. Gaps can be filtered by policy or technical view. This is not simply the case of crowd sourcing the gap in the market, or making the market in the gap, but instead is part of a continuous growth model of these infrastructures to transform the conditions of academic research and climate action. The database works to craft a specific gap in service of their growth.

12 Remix of the Frontier Climate annual letter and the Frontier gaps database manual.

In the section that follows below we show how Big Tech corporations like Stripe are actively "making research gaps" to create markets and opportunities for profit, specifically in carbon dioxide removal and within the fossil fuel industry. This concept of the "gap" as something to be identified, modelled, bridged, governed, and profited from might be understood as a volumetric understanding of what TNI describes as 'the great takeover' of global governance by MSI's. Frontier Climate provides the possibility for corporations to takeover "gaps" in global governance or inadequate responses to global problems to promote their own agendas and solutions (Manahan, Kumar 2021).

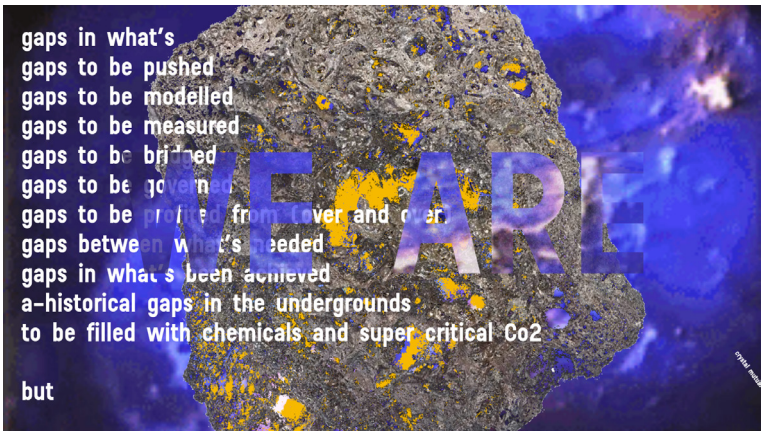

Figure 4 The Underground Division, *Crystal Mutual Aid: Gaps*. 2025. Cascading animation, screenshot. https://ddivision.xyz/rockrepo/crystals, cc4r

Convening stakeholders and producing knowledge, MSI's effectively frame the problems and the ways to address them in line with their interests (Manahan, Kumar 2021). Queer geophysics provides a set of resources to argue that the type of gaps Frontier Climate and their consortiums are attempting to force are not just a neutral ahistorical absence, but a discourse employed by corporate and financial actors to frame problems, identifying opportunities for intervention and profit, and justifying the development of new technologies, policies, and infrastructures, often with significant implications for the environment and existing ecological systems, including above and below the surface.

Frontier Climate is not simply another case of crowd sourcing the financial gap in the market, or making the market in the gap, but instead is part of what Gürses has described as a continuous growth model to transform the conditions of production and research. In this case Stripe and Frontier Climate seek to transform the conditions of production in fossil fuel industry, environmental science and

climate mitigation governance. The head of research at Stripe, Kracke describes the database as a "demand 'pull' – a technology-neutral signal to entrepreneurs and researchers that there is a market for what they're building" (Kracke, Klitzke, and Ransohoff 2022).[13] Their database works to force specific gaps to extend the horizon of extraction. From the perspective of corporate actors like Frontier Climate a "gap" is framed as a technical or governance deficiency in areas like carbon removal. Frontier Climate aims to create a "dynamic database on the technical and governance gaps for carbon removal economies" suggesting that "gaps" are seen as areas needing research, development, and policy frameworks (Kracke, Klitzke, Ransohoff 2022).[14] Specifically Stripe's operations can be understood in terms of gaps to be pushed, gaps to be modelled, gaps to be measured, gaps to bridge, gaps to be governed, and gaps to be profited from (over and over), gaps between what's needed and what's been achieved and most of all ahistorical gaps in the undergrounds to be filled with chemicals and super critical carbon dioxide. These 'gaps' are viewed as opportunities for economic activity and the expansion of infrastructure, even into the Earth's subsurface. The 'finance gap' representing a lack of financial resources perceived as needing to be addressed to further corporate goals.

In the proposed industrial park just outside of Nairobi, the consortium of technology, energy, operating and finance partners and green industry projects are investing in Carbon Valley to fill and make these gaps. The proposal of this so-called green technology hub is to seed, plan and execute carbon removal. Many of the companies constructing facilities for direct air capture or carbon dioxide fracking reach above and below the surface in the Kenyan Rift. These companies are financed by 'Frontier Climate' dreamt up by global consultancy agency McKinsey. The aggressive business model brings them together with Google, Meta and J.P. Morgan claiming to provide the infrastructure for carbon removal and its markets by "filling the gap".

13 For further articulation by Frontier see: https://frontierclimate.com/writing/cdr-gap-database.

14 For more on the building of the database see: https://frontierclimate.com/writing/cdr-gap-database.

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Figure 5 The Underground Division, *Crystal Mutual Aid: Tectonic*. 2025. Cascading animation, screenshot. https://ddivision.xyz/rockrepo/crystals, cc4r

The Carbon Valley industrial 'hub' has been proposed as the green Silicon Savannah.[15] Carbon Valley also plans to offer direct carbon capture and storage and so-called green clouds – and is home to the newly proposed One Gigawatt (1GW) Data Centre a joint venture from Microsoft, Eco-Cloud and G42 Investment Group. Nearby new infrastructures for carbon removal and storage are being proposed to exploit the conditions of the area's basalt fields for carbon removal. Leading Carbon Valleys' founders to devastatingly claim that the region is one of the largest, most accessible (for companies from the US and EU) and most ideally suited sites for carbon storage in the world.[16] However, despite the promotional narratives McKinsey's influence has been met with resistance from climate groups and activists all across the Kenyan territory calling out the firms return to the region and its move into shaping their climate imaginaries specifically in the Carbon Valley proposal.[17] Next to this decarbonisation site Swiss Climeworks and Cella an American owned start-up who also feature in our bugreport, are both investing in large scale facilities in the region funded by pre-purchased carbon removal tonnes purchased by Stripe on behalf of global finance companies operating in the US and EU. Stripe pre-purchased over 333,000 dollars worth of carbon

15 Ready to get started! How Carbon Valley describe projects: https://www.greatcarbonvalley.com/projects/green-data.

16 For more on the development see: https://www.greatcarbonvalley.com/.

17 For more on fury at McKinsey see: https://nation.africa/kenya/business/why-fury-has-met-mckinsey-s-return-in-nairobi-summit-4335336 and https://www.realafricaclimatesummit.org/.

removal tonnes from Cella alone for in-situ carbon mineralisation. In Cella's own words:

> Carbon mineralization involves the formation of solid carbonate minerals through reaction of captured atmospheric CO2 with rocks rich in calcium or magnesium. We inject CO2 deep into volcano rock formations underground (like basalt), where CO2 reacts with water and minerals within the rocks and turns into stone. Our novel in-situ mineralization technology enhances these natural geologic process by speeding up chemical reactions with subsurface minerals to permanently lock away atmospheric CO2 and mitigate the worst impacts of climate change.[18]

In other words, as collaborator and participant in the Frontier Bug Report Elodie Mugrefya wrote Cella proposes "technologies that are basically drilling the f*ck out of volcano formations to lock something 'bad' in them, and then wait to see if it's okay. Normalising techno-solutionism and innovation as the only way out" (TITiPI 2024).[19]

4 Legacies of Damage

Despite the legacy of environmental damage, states and institutions are still relying on the expansion of digital infrastructure to address the increasing risk of large-scale abrupt or irreversible change (World Economic Forum, PwC 2021). The concept of net zero, which has been dominated by fossil fuel industries and Big Tech industries,[20] has surged to the centre of the climate conversation defining framing for long-term ambitions in both national and corporate climate governance (Lund et al. 2023). National and transnational governing bodies in UK, US and the EU have introduced new policies and regulatory frameworks and part of their remit is to address fossil fuel emissions and the rising planetary temperatures. Across Europe, the EU (European Green Deal), and the UK (Recovery Plan and Digital Strategy) are investing in what they describe as "the twin digital and green transition" between increased digitization and decreased carbon emissions. As part of this governance space the EU have set up the "Carbon Removals Expert Group" who meet to regulate and standardise carbon removal (through technologies such as direct air capture and the reverse fracking the captured carbon dioxide into

18 For a description of the process see: https://www.cellamineralstorage.com/.

19 To read our bugreport see: https://titipi.org/pub/Frontier.pdf.

20 https://www.motherjones.com/environment/2022/01/fossil-fuel-firms-google-ads-snippets-sponsored-search-results-study/.

the sub surface).[21] Although the group discusses the processes of long-term storage much of the discourse focuses on the "removal" of carbon dioxide from the atmosphere to capture public imagination. The group has a specific geopolitical focus with the EU aiming to "remake the carbon border policies to include the purchase of future carbon removal".[22] When Global consultancy agency McKinsey and fintech company Stripe did indeed come to the underground[23] for Krauke as a member of the EU's Carbon Removals Expert Group, the infrastructural problem was simple. As lead scientist for Stripe Krauke noted the solution for carbon emissions was the urgent filling of the technical and financial gap for Carbon Removal which would need to include the scaling up of removals and state investment in financial infrastructures for selling and buying carbon removal.[24] A potentially very profitable outcome for Stripe, McKinsey and Frontier Climate. As Laleh Khalili writes about McKinsey:

> their own material makes clear [...] that all the services often spoken of as merely helping businesses and government departments run more efficiently – management consulting, audit, software development – are in fact focused on enabling capitalists to enrich themselves further without the inconvenient interference of workers, taxpayers or regulation. (2022)

As they had earlier proposed to the fossil fuel and Big Tech industry, Stripe and McKinsey outlined to the EU to recrack the sub/surface to 'permanently store' carbon in porous rocks and abandoned wells (amongst other methods) and sell it in future tonnes. They also proposed carbon dioxide fracking in sites of severe environmental damage such as Dimock in Pennsylvania where we have previously researched the impacts of pollution (Pritchard, Gabrys 2016), and to fund a consortium of startups – from capture to storage – in the site of water scarcity in the new Carbon Valley park outside the town Naivasha in the East African Rift Valley.[25]

As discussed in the TITiPI bugreport, Frontier Climate is a planetary infrastructure engineered to transform carbon certification

21 https://ec.europa.eu/transparency/expert-groups-register/screen/expert-groups/consult?lang=en&groupID=3861.

22 https://taxation-customs.ec.europa.eu/carbon-border-adjustment-mechanism_en.

23 For more on Mckinsey see Bogdanich, Forsythe 2022.

24 For the full expert group transcript see: https://climate.ec.europa.eu/news-your-voice/events/4th-eu-carbon-removals-expert-group-meeting-2024-04-15_en.

25 In this article the proposed Carbon Valley is discussed: https://www.reuters.com/sustainability/climate-energy/kenya-gears-up-direct-air-capture-push-great-carbon-valley-2023-11-13/.

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and standardisation, climate science, environmental justice and academia itself through software production under the project of carbon removal (TITiPI 2024). It is part of what Seda Gürses and Joris Hoboken (2017) have described as the tectonic agile turn in which the production and consumption of software has collapsed.[26] These shifts transform the regulation of past and future fossil fuel emissions in which "services bind users into a long-term transaction with software companies" (Gürses, van Hoboken 2017). Tectonic in that the transformations of material conditions and the accumulation from new financial frontiers are so significant that 'computational infrastructures' (Gürses) now demand more energy and water than most European countries and their financial wealth give them more power than them too. These transformations collapse the production and consumption loops of energy and carbon, energy security, carbon borders, and the production of research. When Gürses and van Hoboken made the tectonic metaphor work, for describing these shifts they were witnessing, they hadn't quite imagined software production would literally be cracking the earth's surface, creating geological gaps through fracturing the deep underground, and generating tectonic movements through pushing interventions such as carbon dioxide fracking. Mantle rock is ductile – solid rock which slowly deforms under high stress causing earth quakes and cracks – and the injection of carbon into volatile volcanic rock in Carbon Valley may have already caused a number of earthquakes, causing huge new gaps in the earth's surface to emerge in the Kenyan Rift.

Frontier Climate have materialised their agile tectonics to a deep time-space through building financial infrastructures for the buying and selling of carbon removal. Reshaping and making increasingly volatile – and depleting – the earth on which we stand. Frontier Climate is an example of how these tectonic shifts, create material and symbolic anticipatory infrastructure that is anti-earth and anti-life.

What drives this specific anti-earth and anti-life infrastructure can also be understood as a "financial frontier" (Ballestero, Muehlebach, Pérez-Rivera 2023). The urgency of addressing the rising planetary temperatures; the increasing need for energy by Big Tech companies; and the introduction of financial benefits for reductions in emissions creates a negative infrastructural frontier for capital accumulation and exploitation. Whilst intentfully denying any pre-colonial financial imaginaries (Ballestero, Muehlebach, Pérez-Rivera 2023). Key to these tectonic shifts is that Frontier Climate's work in the making of

26 As Gürses and van Hoboken write the "agile turn is so tectonic […] the production and consumption of software is collapsed".

this frontier is the making of the gap, of naturalising the absence of life, and it is this emptying out of the underground of life itself which becomes profitable. This making of gaps as financial frontiers can be understood as the making of conditions for displacement, trapping and death. We ask with such grief what if these deaths, thefts and displacements of life and memory are of the unknown potential of political disruption and material resistance?

This denial of history and the exploitation of basalt to fulfil digital shopping carts of carbon dioxide removal curtails the lives of the undergrounds. As Yusoff reminds us this obliteration of life before our technologies of presence even have the possibility to register them is an aesthetics of loss (Yusoff 2012, 58). A curtailment of life "[t]oo small, too obscure, too reticent to have graced our archives, these beings blink out of existence without ever making their presence felt" (Clark, Hird 2014, 45). A curtailment that Myra Hird has described as passed down to become our inherited life-worlds. This forced displacement is also similar to what Ballestero outlines in her work on financial frontiers. That often for those on the ground, the frontier pairs theft and dispossession with the excesses of accumulation; holding together exhausted worlds and new hopes for autonomy and even freedom (Ballestero, Muehlebach, Pérez-Rivera 2023). The holding together of exhausted worlds with new hopes of autonomy can be seen at work in Frontier Climate – forcing anticipatory material and symbolic infrastructures to create new opportunities for financial expansion above and below the ground. In their "Cave Canon" architects Kabage Karanja and Stella Mutegi, founders of cave_bureau, outline the historical importance of the caves and rocky masses of the Kenyan Rift:

> through the movement of rocky masses around the endless number of suns that tectonic shifts within planets of rock-melting lava flows afforded the formation of spaces of shelter for living things to thrive […] From civilization's oral and recorded histories of religious revelations, to philosophical metaphors and narratives, and as a surface to embed our cultural thoughts and values, caves have formed an intrinsic part of our past, present, and soon-to-be future. (Karanja, Mutegi 2021, 3)

By making and filling all the gaps (that they can) above and below the earth's mantle, Frontier Climate and Stripe are obliterating the shelter of the caves for life and creating a deathly "negative infrastructure" (Barnard, Cohen 2022).

Partly this negative infrastructure is an affective one. The incredible myth making that Frontier Climate and McKinsey have invented is that basalt has any gaps at all. The pores of basalt are saturated with deep time fossil water and microbial life, which

becomes displaced by the foamy injected carbon dioxide. These connate waters are literally named as "made at the same time" as the basalt strata, some over 25 billion years ago. Poet Sabrina Imbler in *Dyke (Geology)* describes these deep time rocks and waters as

> a record of history that exists outside of human modes of remembering and therefore could never be recorded in human modes of remembering. A common acronym that geologists use is Mya, which stands for millions of years ago, and when I first heard it in an interview, I thought it was the singer – M.I.A. But it's just this whole different kind of lexicon. (Imbler 2020)

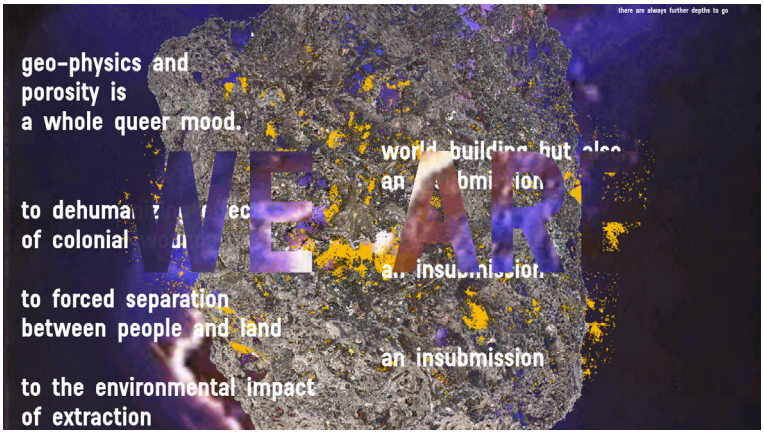

Figure 6 The Underground Division, *Crystal Mutual Aid: An Insubmission*. 2025. Cascading animation, screenshot. https://ddivision.xyz/rockrepo/crystals, cc4r

5 Whose Futures are Given?

To be given a future by McKinsey and Stripe Climate in the words of Ly Thuy Nguyen, is to "inherit white supremacy, hetero-patriarchy, private property […] structures which also limit how we can imagine the dispossessed's biopolitical survival" (2020, 220-1). Frontier Climate's project is to make profitable the inherited 'debt' of carbon emissions to become consumed and reproduced by their financial infrastructures. Reinforcing and reshaping what Yusoff calls the operational zones and inheritances of geopower:

> These operational zones are the material (land, value, property, discourses, epistemes); the psychic (relation); the bodily (race, labor, gender, sexuality); the geophysical (chemical, thermal, permeable, porous, gravitational, dynamics of force); and the

> valence of geology's grammar to organize modes of experience and sediment forms of geopower as naturalized forms of power. (Yusoff 2024, 197)

So how might we unsettle and resist these new and existing forms of geopower that are sustained by consortiums like Frontier Climate? How can we maintain a queer tectonic intimacy and make grammars for in-submission? This is what we ask here. What are the futures from the vantage point of radical queer politics and insurgent intersectionality.

In recognising the constant transformation of rocks as life itself Diaz in response to the poem "Lake-Loop" writes of seeing and feeling the San Andreas fault that runs along the Mojave Desert, of existing with it – "the idea that this country tried to give us no space to exist, yet we made that space, and make it still – in stress, in friction, glide and flow, slip and heave. We are tectonic, and ready" (Diaz 2020). A resistant call. In M-Archive, Alexis Pauline Gumbs also writes of those who are part of the lands actions who "develop the capacity to live underground, as close to the core of the earth as necessary [and…] learn to move above ground and return undetected" (Gumbs 2020, 95). Referencing Cheryl Clarke's queer trouble making in the poem *Living as a Lesbian Underground* (1986) in which she writes: "Leave signs of struggle. Leave signs of triumph. Leave signs".

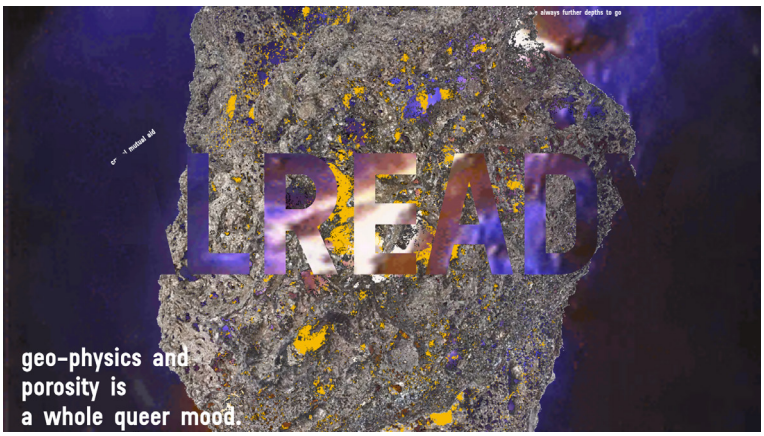

Figure 7 The Underground Division, *Crystal Mutual Aid: Already*. 2025. Cascading animation, screenshot. https://ddivision.xyz/rockrepo/crystals, cc4r

Cabral might describe these references as providing a material and social resistance to the rendering of the underground as an absence or a gap. But also, as a space to gather to build physical forms of resistance as felt in M. Jacqui Alexander's *Pedagogies of Crossing*

"[s]he had to feel what it was like to survive above ground, while really living underground by fire" (2006).

These 'geo porosities in action' described by Diaz, Alexander, and Imbler are a recognition of what Yusoff describes as a "queer geochemistry that moves through bodies: human bodies, bodies of earth, bodies of water, space bodies, bodies that begin and end in the earth" (Yusoff 2024, 478). These queer intimacies and geologic roots queer notions of materiality and inhuman materiality as inseparable from racialised, gendered and sexed accounts of the body (Yusoff 2024, 45). A queer intimacy with soils, rocks and minerals, which is both world-building and an in-submission to the forcing of gaps, to the dehumanizing effects of colonialism, the forced separation between people and land and the environmental impact of extractivism (see Carreira da Silva et al. 2024 on Cabral).

Geophysics and porosity is a whole queer mood. As Imbler writes of the orienting magnetic firey energy of the underground for queer life

> as the fire dies into the hardness of basalt, it preserves the exact magnetic forces working on Earth at the time of its cooling. This is how Kohala learned of the changing of the poles. She felt it in her lava. (Imbler 2020)

6 Conclusion

The activities of companies like Stripe, Google, Meta, J.P. Morgan and McKinsey in forming Frontier Climate and investing in sites like the Great Carbon Valley exemplify a form of global takeover that focuses on naturalising the obliteration of life, in the quest of extreme experimentation for new horizons of accumulation, resource grabbing and profit. We hope that this thickening of the story also helps to make palpable the more generalisable story of these ecocidal and genocidal tendencies of Big Tech infrastructures. Their initiatives to re/crack the sub/surface and to establish financial infrastructures for carbon removal demonstrate an ability to exert control over geological resources in specific countries driven by economic and security imperatives operating on a global scale. Frontier Climate transcends national borders, as these corporations, based in the US and working with EU bodies, seek to utilise the subsurface of other countries for financial gain, effectively asserting forms of resource sovereignty. Rather than attempting to 'fill the gap' through detailing the ways in which subsurface might become lifted above the surface in these financial frontiers, we have turned to queer poetry as a practice which reconfigures the underground into a space to gather, providing a material and social resistance. We extended our bugreport into the specific scene of Carbon Valley to encounter the stories of how the

promise of carbon removal is facilitated by Big Tech infrastructuring, which has entered into a new era of (MSIs) Multi Scalar Initiatives. Consuming and reproducing the inheritances of fossil fuel racial capitalism through extensions of financial infrastructures, enrolling institutions, the state and researchers into their power grab and naturalisation of emptiness until they come to the underground. This global governance takeover shows how financial actors, including mega-philanthropies and investment funds, play significant roles in various MSIs, including those related to the environment. Creating negative infrastructures that undermine the ecological integrity and the rights of those who live in relation to these environments. Whilst also creating new forms of quotidian violence, that appear in distance sites such as shopping baskets, institutional goals for net zero or the greenwashing of Big Tech. We call for a queer geophysical campaign between above and below the surface rooted in Cabralian insubmission to come to new practices of caring for the soil, halting all fossil fuel extraction and resisting these new forms of dominant geopower. This resistance is grounded in a radical queer politics and insurgent intersectionality that aims to defend against the violent conquests for net zero and form transnational solidarities to resist the cloud regime. We are tectonic!

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