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AMERICA: TOWARDS A TERRESTRIAL INTERNET

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Towards a Terrestrial Internet: re-imagining digital networks from the ground up

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1. Introduction

The expansion of digital infrastructure is having material and concrete impacts on society and the environment. This phenomenon is rendering obsolete binary distinctions between the "physical" and the "virtual" worlds. Giving a step further in this discussion, the articles comprising this Cluster trace the emergence of an imaginary that approaches territory as an actor actively shaping the development and governance of the internet. What we call the Terrestrial Internet is emerging from Indigenous, Afrodescendant, feminist and worker groups in Abya Yala (Latin America) envisioning alternative imaginaries as digital infrastructures expand in their contexts. In dialogue with science and technology studies (STS) and Latin American critical thought, we argue that this imaginary conceives of the internet as an earthly development whose material expansion is spurring novel human and non-human alliances and frictions, as well as colonial forms of territorial occupation. The articles that make up the Cluster were invited to respond key questions in times of terricide: What are the power dynamics of the disputed spaces that support the internet? What are the effects of such dynamics on territories and their various ways of life in Abya Yala? What imaginaries are put in motion as a response?

The emergence of the internet was accompanied by claims on its alleged "cyber" or "virtual" character, as if it would be a realm different from the "physical" world. However, phenomena such as the increasing extraction of lithium to build so-called "green" technologies (Peña 2020) and disputes over the vast volumes of water required to cool off data centers (Hogan 2015; Hu 2015) are rendering such deterritorialized imaginaries obsolete. The concrete and material character of the aforementioned phenomena were overlooked in initial accounts of the impact of the internet, but are becoming now increasingly relevant for understanding the range of inequalities and politics associated with the development and expansion of the so-called network of networks.

Looking at the materialization of these trends in Abya Yala,[1] this Cluster develops the Terrestrial Internet imaginary by drawing on a series of articles chronicling varied

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[1]Abya Yala is the name that the Kuna-Tule people living in what is currently Panama and Colombia gave to the Americas before the Spanish invasion. It means "land in full maturity" (Muyolema 2001).

encounters of Indigenous, Afrodescendant, feminist, and worker groups with digital technologies. Unlike dominant imaginaries, the Terrestrial Internet draws attention to the ways in which the territory can become an active agent shaping the development and governance of the internet. For example, the territory can provide material components, such as fruit shells for the development of alternative networks (Zhang, Porto Araujo, and de Assis Nunes 2022), as well as favor forms of tactical practices employed to resist algorithmic control that attend to the particularities of the local context (Tironi and Albornoz 2022). Certainly, the specific types of relations that are emerging between the internet and the territory are not determined but rather open to empirical investigation. However, what is clear from the articles comprising this Cluster is that imaginaries ignoring the terrestrial character of the internet run the risk of becoming impervious to relevant sources of social injustices and ignore alternatives ways of conceiving the internet.

Compared to previous imaginaries highlighting the total or relative "virtual" character of the internet, we suggest that the Terrestrial Internet has four particularities. First, this imaginary is emerging from groups who historically have been deemed as backwards and not legitimate sources of technological innovation, such as women, Indigenous, Afrodescendant, and working-class groups. Second, the Terrestrial Internet puts a special emphasis on the politics that emerge from the multiple forms of interaction between the territory and the material infrastructure that makes up the internet. Third, the Terrestrial Internet highlights that territory–infrastructure interactions can generate novel forms of human and non-human alliances and resistance. Finally, this imaginary foregrounds the intrinsic connection between the internet and dynamics of material extraction and territorial occupation taking place in Abya Yala since the Spanish and Portuguese invasion more than five centuries ago.

While the Terrestrial Internet is stemming in a bottom-up fashion, we also connect its emergence with discussions held in science and technology studies (STS) and Latin American critical thought. On the one hand, this imaginary echoes Bruno Latour's call for acknowledging the terrestrial as an active agent, rather than as the mere background of history and politics (Latour 2018). At the same time, the Terrestrial Internet can be seen as a new stage in the struggle for balanced forms of coexistence that have crisscrossed Abya Yala since the invasion by the Spanish and Portuguese empires (Escobar 2018). While not absent of conflicts and tensions, we argue that these two lines of thought can help understand the context and characteristics of the internet imaginary emerging from the contexts explored in this Cluster.

As a whole, this Cluster accounts for the impact on the territories and diverse forms of life from our growing digital society. Along those lines, we have welcomed papers that contribute with interdisciplinary perspectives by critically exploring, connecting, testing, and putting into dialogue the terrestrial politics with other theoretical contributions in Abya Yala. These articles offer an account in their own way of the creation of the territoriality of the internet but also of the conflicts that such a process can engender. The articles go beyond the internet as an abstract and neutral space and, rather, politicize it by tracing its connections with multiple spatialities in the disputed territories, rendering visible social frictions and new spaces for agency and resilience. As this Cluster shows, the Terrestrial Internet makes it possible to give a wider and more inclusive account of the politics of data and digital technology in Abya Yala, and potentially other contexts as well.

In the following sections, we introduce the Terrestrial Internet and describe the contributions to this Cluster. First, we review how different imaginaries have conceived of the relationship between the internet and territory. After that, we unpack the notions of terrestrial politics and territory as developed in STS and Latin American critical thought respectively. In Section 4, we pinpoint the Terrestrial Internet and characterize it as a material, rough, and colonial imaginary. The article closes with a summary of each of the contributions to this Cluster.

2. Territorializing the internet

The articles of this Cluster delve into a particular but nonetheless urgent aspect surrounding the internet – how is that different actors imagine the relationship between the earthly, material, and concrete territories and the internet, including the latter's data, cables, algorithms, and other components. Merely posing this question already constitutes a significant move. In the sixties, the group of technologists from the West Coast of the United States who envisaged the internet imagined it as belonging to a "cyber" or "virtual" realm detached from the rules governing the physical world. As John Perry Barlow's famous Declaration of the Independence of Cyberspace states: "Cyberspace consists of transactions, relationships, and thought itself … Ours is a world that is both everywhere and nowhere, but it is not where bodies live" (Barlow 1996, para 6a). Such a vision still informs internet imaginaries up to this day. While "the cloud" suggests a sublime space of data storage and processing (Mosco 2014), "Artificial Intelligence" directs the discussion to abstract questions about humane and robotic ways of thinking (Ricaurte 2022).

Yet, the above deterritorialized internet imaginaries have started to recede as the impact of digital technologies and their infrastructure become clearer to different groups worldwide. A new imaginary highlighting the intertwined character of the internet and territory has started to gain traction in this context. As Latour (2011) points out, the greater the digitality, the greater the materiality. The maritime space where underground cables pass (Starosielski 2015); the aerial space of the signals from satellites and antennas (Sánchez Miguel 2016), as well as those spaces rich in the raw materials and natural and human resources have all become relevant actors shaping the sustainment and growth of the internet (Ia_jes 2018; Peña 2020). Furthermore, data centers will continue to multiply in the coming years in Abya Yala, requiring great amounts of resources such as energy and water, materials and metals for devices, cables, and antennas. Human resources are also intensively needed, such as Facebook moderators or workers without social benefits for various platforms such as Uber or Deliveroo (Grohmann 2020). Likewise, electronic waste is more and more a problem in the region (Fernández, Vicente-Mariño, and García de Madriaga 2017; Gil 2015). Such infrastructure projects and forms of resource extraction are likely to result in arduous social conflicts between private companies, governments, and social collectives, and call for taking seriously the question of the relationship between the internet and land.

Deterritorialized imaginaries also fall short on acknowledging how disputes over data control can turn to conflicts over bodies and territories (Busconi 2018; Trevilla Espinal and Peña Azcona 2020). For example, the deployment of surveillance technologies and algorithmic forms of governance in the COVID-19 pandemic in Abya Yala brought about forms of bodily control that did not respect human rights and challenged informational self-

determination (Hernández Rivera 2021). The materiality of the politics of data can render visible on the one hand the surveillance and control of bodies and, on the other, the impacts of such disputes on social collectives. Certainly, technologies have helped to articulate social collectives for political transformation with a common objective, for example, to defend territories (Erpel 2018). However, these same systems have been used to monitor, trace, and intimidate activists leading to a process of transformation in Abya Yala.

Contributing to the debate on the relationship between the internet and territory, this article pinpoints an imaginary that we call the Terrestrial Internet that is emerging in light of the concrete effects of the frenetic expansion of digital infrastructure in Abya Yala. As we describe in Section 4, this imaginary not only rejects binary distinctions between the "virtual" and the "physical" world, but also goes further than observations over the intertwined character of the internet and territory. Based on the experience of Abya Yala, the Terrestrial Internet affirms that the internet relies upon, and is constantly shaped by, the territories in which it gets deployed. As we unpack in section four, this imaginary highlights the material dimension of digital infrastructure, the new alliances, and frictions that emerge as such an infrastructure expands across the region following a "colonial impulse" (Dourish and Mainwaring 2012).

It is important to note that the Terrestrial Internet does not necessarily depict an emergent or alternative internet, i.e. a new network of networks that can replace the one that expanded in the eighties and the nineties. Instead, we call the Terrestrial Internet an *imaginary* because we want to identify the evolving ways in which different groups conceive of this global network and how such contested conceptions enable or foreclose design and governance choices (Kee 2017; Mansell 2012). For example, while for some the internet can represent a set of protocols (Mueller, Mathiason, and Klein 2007, 244), others might see it as an opportunity for capturing global markets (Zuazo 2018). Such imaginaries are far from abstract: they are based on concrete experiences, generate resistance, and can orient the development of hardware, software, and policies. In fact, and as we discuss in this article, imaginaries can draw attention to, or obscure, the physical-material infrastructure underpinning the internet and its concrete effects on the environment and communities.

3. The terrestrial, territory, and body-territory

The Terrestrial Internet is informed by the empirical cases analyzed in this Cluster, but it also obtains inspiration from conversations taking place in the field of science and technology studies (STS) and critical thinkers and social movements in Abya Yala.

On the one hand, Latour (2014, 2018; Latour and Weibel 2020) has argued for a terrestrial politics that transgresses the idea of Earth as a planetary unit comprised of two kinds of spaces: the global and the local. For Latour, "terrestrial politics" has the task of breaking with this unifying perspective to explore the dispersion between the various sites and possibilities. Hence, geopolitics is re-signified by transcending the focus on the activity of humans in an apparently passive and unitary earth that is outside or below and over which dominion is exercised (Latour 2014). In Latourian language, such a move would imply shifting from a human-centered to a terrestrial politics. This movement connects the two territories that according to Latour are commonly disconnected: the one in

which we live and the one on which we depend to subsist, but which normally remains invisible and not politicized. In this Cluster, we refer to terrestrial politics to connect the internet to the territories that it depends on to subsist. Along these lines, we claim that a terrestrial approach to the internet can help explore some of the struggles brought about by the expansion of digital technologies in the territories that make up Abya Yala.

Yet, there are reasons to think that Latour's terrestrial politics do not speak to Abya Yala's historical experience and struggles. To begin with, Latour's emphasis on the unprecedented character of the climate crisis can serve to obscure how different actors, such as Indigenous and Afrodescendant groups, have resisted the terricidal practices of states and companies for centuries. Furthermore, Latour's work has been criticized for ignoring Indigenous voices sustaining alternative ontologies of the world and the planet (Todd 2016).

In line with Lehuedé (2022) and Tait Lima, dos Reis Peron, and Suárez Estrada (2022) in this volume, the Terrestrial Internet also connects to the concept of territory circulating among Indigenous, Afrodescendant, feminists, peasant, and other groups in struggle, as well as critical thinkers in Abya Yala. For these groups, territory holds multiple meanings. Broadly speaking, territory constitutes "a shorthand for the system of relations whose continuous reenactment recreates the community in question" (Escobar 2018), but also a form of grouping and resistance against extractive capitalist modernity (Svampa 2015). Under this vision, territory is made up by an entanglement of humans, plants, animals, and inorganic elements whose coexistence and interdependency enable particular environments and ways of living (Blaser and de la Cadena 2018). For feminist mobilized groups, the effects of territorial occupation are also felt on the body, which depends on, and is also part of the territory itself; hence the use of body-territory (Gabón 2018). Such a complex and multi-layered understanding of territory contrasts with the one that emerged in European modernity and colonialism, where it came to be seen as a bounded space subject to the sovereignty of the nation-state (Elden 2010). In fact, alternative ways of referring to digital sovereignty emerging in Abya Yala are not linked to the nation-state but to the social resilience to the continuity of colonial structures of power through digital technologies (Guerra, Suárez, and Cerratto-Pargman 2022).

One of the first conclusions that come to the fore when looking at the internet from the perspective of the terrestrial and territory, is that territory has not been a primary concern of internet designers and developers. Had it been so, the internet would have incorporated an attentiveness to how ecologically threatening activities such as large-scale mineral extraction can affect nature and the communities that are part of it. More profoundly, though, these two concepts call for a significant shift in the emphases of internet studies by focusing on the areas that the internet depends on and the struggles taking place in those contexts.

It is important to note that the combination of the Terrestrial and territory is not absent of contradictions. While the Terrestrial emerges vis-à-vis the unprecedented character of the climate crisis, territory privileges a longer time frame in which the erosion of the Earth connects with centuries-old history of territorial occupation. These concepts also entail different political projects in the context of terricide, i.e. the systemic destruction of Indigenous worlds and ways of living in harmony with the environment (Millán 2020). While the terrestrial calls for imagining new ways of living, territory sees the preservation of

Indigenous ways of living as a necessary step to re-establish a world in which many worlds can coexist (Zapatista Army of National Liberation 1997).

Based on the contributions to this article, we consider that the contradictions arising from the employment of the terrestrial and territory reflect some of the tensions that mark the current times of critical digital research and practice in Abya Yala. For example, in their resistance against the construction and expansion of a data-intensive astronomical observatory in Chile, Lickan Antay activists mobilize arguments pointing to both ancestral and sustainable development discourses about the relationship between local communities and the environment. Rather than an essential contrast between the terrestrial and territory, we advocate for the consideration of both concepts as relevant in Latin America; however, and following Aymara/Bolivian Rivera Cusicanqui's ideas (2018), such a combination should not simply dissolve these concepts into a "hybrid" notion that erases their differences and underlying histories and geographies.

4. Material, rough, and colonial: pinpointing the Terrestrial Internet

As a whole, the articles of this Cluster chronicle the emergence of an imaginary that we call the Terrestrial Internet in which the territory becomes an active agent shaping the development and governance of the internet. In this section, we delineate this imaginary by focusing on the actors formulating it and spelling out its material, rough, and colonial character.

One of the first things that stand out when it comes to the Terrestrial Internet concerns the *actors* formulating it. The dominant imaginaries of the internet, such as the deterritorialized one we introduced earlier, have historically been envisaged by actors based in the Global North, and more specifically the West Coast of the US, which is where most protocols and devices have been designed (Turner 2006). However, research conducted in Abya Yala has also highlighted the role of computer scientists, policy-makers, and hackers in majority world regions whose work has reproduced and challenged existing imaginaries (Chan 2013; Medina, Marques, and Holmes 2014). The articles of this Cluster expand the actors at stake in the imagination of the internet by turning to groups that modernity has presented as backwards and therefore not able to imagine viable technological futures, i.e. women (Haraway 1991; Light 1999), Indigenous (Escobar 2018) and Afrodescendant (Mavhunga 2017) groups. In the case of this Cluster, Lickan Antay communities in the Atacama (Lehuedé 2022), Afrodescendant communities in Brazil (Zhang, Porto Araujo, and de Assis Nunes 2022), women defending their land and communities vis-à-vis extractive operations (Tait Lima, dos Reis Peron, and Suárez Estrada 2022) and platform delivery workers (Tironi and Albornoz 2022) become fruitful sources for re-imagining an internet that nurtures rather than depletes the territory.

A first relevant point sustained by the Terrestrial Internet is the *material* character of the infrastructure that makes possible the production and transmission of data across the planet. Instead of abstract and virtual, this imaginary emphasizes the multiple ways in which the internet relies on the territory, which include the extraction of metals and minerals to build digital devices, water that cools increasingly powerful data centers, and the deployment of physical components such as subsea cables. In this way, the internet becomes an active participant in the geophysical phenomena that sustain the planet (Parikka 2015). Importantly, though, such a material dimension is also intimately

integrated with human and social processes since it is understood that the land both enables and depends on these ways of living. Looking at an example within the articles of this Cluster, materiality can point to the connection between territory and body when extractive operations, of which technology companies are reliant, come to affect both the environment and the health of women resisting in Abya Yala (Tait Lima, dos Reis Peron, and Suárez Estrada 2022). As Velho and Ureta's co-edited Cluster in this same journal indicates, the Terrestrial Internet unearths the "dark side" (2019, 429) of infrastructure in Abya Yala with a focus on the material impact of the construction and growth of digital components.

A second tenet of the Terrestrial Internet concerns the alliances and disputes that emerge as the internet and its infrastructure get deployed in the territory – in short, the internet's and territory's rough rather than frictionless character. In this regard, the Terrestrial Internet rejects deterministic accounts and considers that the frictions underpinning the expansion of internet infrastructure can encompass the establishment of alliances but also spur resistance. On the one hand, an example of collaboration – or of *comraderies* – is the way Afrodescendant communities have relied on baobab trees' fruit, the *mucuas*, as a device for transporting the hardware components of the Baobáxia network (Zhang, Porto Araujo, and de Assis Nunes 2022). For Zhang, Porto Araujo, and de Assis Nunes, such collaborations "brings humans and non-humans (baobab) together as agents responsible for the collective survival and well-being of the networked communities" (Zhang, Porto Araujo, and de Assis Nunes 2022, 13). On the other hand, other contributions highlight cases of resistance emerging with the deployment of technology. Such resistances can comprise attempts at manipulating digital data so as to put forth a particular trending topic on Twitter for a political campaign (Piña-García and Espinoza 2022) or tactics carried out by platforms workers in order to game gig economy platforms such as Uber (Tironi and Albornoz 2022). In some cases, resistance can also get directed at undemocratic forms of infrastructure expansion, as it is the case of Lickan Antay activists in the Atacama Desert carrying out protests and relying on the memory of the elder to oppose the expansion of data-intensive scientific machinery (Lehuedé 2022).

A final point foregrounded by the Terrestrial Internet is that the disputes surrounding the internet, which revolve around both narratives and material-physical components, are tightly connected with the global structures of power brought about by European colonialism. The cases discussed in these articles reveal some of the multiple forms of *coloniality*, or the continuity of colonialism through other means (Lugones 2007; Quijano 2007), underpinning the internet. Abya Yala's colonial experience is tightly tied with the formation of a capitalist world economy based on the extraction of raw resources in the periphery that are processed in the core. This dynamic, present in the mining and agriculture industries to this day, has relied on a territorial occupation that imposes a single world and keeps spurring forms of resistance by communities preserving their beliefs and economic systems vis-à-vis the pressure posed by states and private companies. As Lehuedé asserts, data infrastructure can reproduce coloniality through "the reduction of a pluriverse, where different worlds coexist, to a universe, where only a single world of capitalist and modern contours is allowed to thrive" (Lehuedé 2022, 14). The Terrestrial Internet shows how such forms of extractive approaches to territory reproduce in times of digital connection and ignite the development of alternative technologies based on the genealogy of resistance of oppressed groups.

Because of the above, our formulation of the Terrestrial Internet can help expand the range of politics depicted by the recent decolonial turn in the study of data and technology (Couldry and Mejias 2019). So far, aspects such as the expansionist ethos of ubiquitous computing (Dourish and Mainwaring 2012), the mass-scale extraction of data (Couldry and Mejias 2019) and the deployment of "tech for good" projects in majority world regions (Oyedemi 2021) have been studied as reinforcing colonial hierarchies. On this front, the Terrestrial Internet incorporates a new set of actors since this imaginary is not emerging from academia, hacker communities or digital rights advocates but rather from dissenting groups in Abya Yala facing the effects of the expansion of digital infrastructure and engaged in the development of alternative forms of connectivity. In addition, the Terrestrial Internet implies a particular attentiveness over the physical and material practices and infrastructures that make up the internet. No account of the coloniality of digital technologies would be complete if it ignores the bottom-up formulation of internet imaginaries and the material character and impact of technical infrastructure.

In sum, the Terrestrial Internet constitutes an imaginary that, unlike dominant ones, is emerging from dissenting groups in Abya Yala concerned with the physical-material consequences of the expansion of the internet. This imaginary depicts new forms of alliances and resistance emerging in the territory and that cannot be disassociated from the power dynamics imposed during European colonialism. Such an imaginary is a generative one in the sense that it not only describes a form of domination but also enables alternative futures. In times of the terricide, the Terrestrial Internet offers an opportunity to design and develop global networks that peacefully coexist with the diverse sets of actors that make up the territory, that are not based on extraction but on collaboration and that nuture rather than erode the shared Earth. This Cluster also includes a piece reviewing two books that are particularly relevant to think about the materiality of internet infrastructure.

5. Contributions

The contributions to this Cluster can be split into two main groups. In the first group, we find articles looking at the way the internet's material infrastructure connects with long-standing forms of domination and resistance in Abya Yala.

In "The Terrestrial Internet from the Quilombos: The Transatlantic Evolution of Baobab from Colonial to Digital Capitalism," Shaozeng Zhang, Mariana Ribeiro Porto and Carolina de Assis Nunes analyze the development of Baobáxia, a digital network for sharing community-produced content. The emphasis on the materiality of this network, which is expressed in the relevant role of baobab trees, gives an account of viable forms of resistance to the predatory exploitation of resources in digital capitalism.

In the same line, Sebastian Lehuedé's article "Territories of Data: Ontological Divergences in the Growth of Data Infrastructure" critically examines data infrastructure initiatives in Chile, which span from the dry Atacama Desert to the cold Patagonia. These initiatives are analyzed in relation to broader histories of territorial struggle involving Indigenous communities in Abya Yala. In particular, Lehuedé argues that the design of digital infrastructure tends to rely on the territory as an asset, which contrasts with relational views held by Lickan Antay communities affected by the deployment of a data-intensive observatory.

The article "Terrestrial Politics and Body-Territory: Two Concepts to Make Sense of Digital Colonialism in Latin America" by Márcia M. Tait, Alcides Eduardo dos Reis Peron, and Marcela Suárez Estrada contends that the materiality of exploitation in the data society is not limited to bodies but also includes territories. Seeking to make sense of digital-fuelled colonialism in Abya Yala, the authors conclude that the concept of body-territories can contribute to Latour's proposal for a terrestrial politics by rendering visible the power relationships on territories that sustain digital society.

A second group of articles examines more closely the role that control over the data and algorithms underpinning social media and gig economy platforms has in giving rise to novel power dynamics. Histories of attempts by the state to dominate the public sphere and worker resistance emerge as relevant phenomena of the Terrestrial Internet. Furthermore, both studies contribute with robust empirical evidence that challenge the apparent division between the online and offline politics of data.

The article "Coordinated Campaigns on Twitter During the Coronavirus Health Crisis in Mexico" by Carlos Piña and Armando Espinoza lay bare that governments are also part of the politics of data by sponsoring campaigns of manipulation of public opinion to serve their political agenda in the middle of the coronavirus pandemic. This article describes how *astroturfing* works on Twitter and develops a framework for its identification in other contexts.

The article "Surveillance and the Ecology of Frictions in Platform Urbanism: The Case of Delivery Workers in Santiago de Chile" by Martin Tironi and Camila Albornoz gives evidence of spaces of resistance and friction to platform capitalism by Uber workers. Through an ethnographic depiction, the authors contrast universalistic claims of algorithmic control formulated on the basis of the Global North with vernacular and friction-producing practices such as multimapping and account rentals carried out by exploited workers.

Finally, "Finding One's Way in Media and AI: Metallurgy and Mapping" by Héctor Hernández closes this Cluster. In this manuscript, Hernandez reviews two books: *A Geology of Media* by Jussi Parikka (Parikka 2015) and *The Atlas of AI* by Crawford (2021), that contribute with concepts and theoretical frameworks to explore the materiality of technology and thus with their politics linked to specific territories. As he writes: "The tactile screen, the sleek casing of a smartphone or even the governance of artificial intelligence renders visible the complex materiality of that technology."

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