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DATA TERRITORIES: CHANGING ARCHITECTURES OF ASSOCIATION IN INTERNATIONAL LAW

Fleur Johns*

ABSTRACT: Territoriality is a powerful architecture of association in international law, performing significant bounding, distributive and placement functions. Yet it has always interacted with other global legal architectures of affiliation and disaffiliation, among them informational geographies. So what becomes of territoriality amid the turn to data analytics – the automated analysis of massive, distributed data sets – as a basis for international legal and policy decision, action, thinking, and prediction? This article recounts processes and practices already underway on the global plane that are effecting, on one hand, the "datafication" of territory (and the related rise of a logic of association) and, on the other, the "territorialisation" of data (and the emergence or recurrence of "data territories") in international legal order. Through these kinds of processes, and in its variable configurations, data might yet parallel physical territory (landed and maritime) as a primary medium for the conduct of juridical global life and conflict, a prospect that raises important questions for international law and lawyers.

KEYWORDS: Territory, international law, data analytics, law and technology

* Professor of Law, UNSW Australia. Email: fleur.johns@unsw.edu.au. The author is

Writing of the inability of the ancient Greeks or Romans "to establish, or even conceive of, any other social organization than the city", the 19th century French historian Fustel de Coulanges listed some of the near-unthinkable questions that this would have posed for the Ancients, among them: "What would become of the inviolable limits which had from the beginning marked out the territory of the city, and which separated it forever from the rest of the earth's surface?"[1] It seems, at times, as if international lawyers are similarly challenged by the inconceivability of displacing territory and territorial sovereignty as the primary basis for marking out the earth's surface and organizing its inhabitants in law, even as many announce its declining salience.[2] Yet this is more or less the prospect that the editors of this volume have invited me, alongside others, to contemplate. If not territoriality's wholesale displacement, then we have been asked to consider the prospect of its reconfiguration in profound ways.

Territoriality remains a powerful – probably still the predominant – architecture of association in international legal practice and thinking. Yet it has always interacted with other global legal architectures of affiliation and disaffiliation with which it has often been in tension: the architecture of national and regional currencies, for instance, and of constitutional and international human rights regimes, among others. Premised on continuing interaction between the politico-legal technology of

[1] Fustel de Coulanges 2006, at 202-203.

[2] See, e.g., Handl 2012, at 4 ("[I]n a seemingly borderless world social, economic or environmental problems and their solutions tend to be transnational in nature, or "de-territorialised", thus calling into question territorial sovereignty as a fundamental organising principle of the global legal architecture").

territoriality and other architectures of association on the global plane, this article examines shifts and challenges that may be identified with the deployment of technologies of automated data collection, representation and analysis in international law and policy.

The turn to data analytics – and to the analysis of massive, distributed data sets – as a basis for legal and policy decision, action, thinking, and prediction on the global plane is, to a significant extent, already underway, as well as being widely and keenly anticipated to a further degree. This is evidenced, for instance, by the United Nations' inauguration of the UN Global Pulse initiative aimed at harnessing big data for development and humanitarian action; by the championing of "data for development" in influential settings such as the World Economic Forum; and by the proliferation of literature on so-called "digital humanitarianism", the "digitized battlefield" and on the automated assessment or remote detection of environmental and health risks.[3] Additional examples of this "turn" are given throughout this article. Among the ramifications of this shift in practice and aspiration are changes – incipient yet nonetheless discernible – in how those who work in and with international law visualize or map distributions of authority and resources, and configure relationships for juridical purposes: changes that amount, actually and prospectively, to a reconfiguration of territoriality in international law.

Contending with the prospect of a reconfiguration of territoriality in international law – and its implications for the field – demands some investigation of what work

[3] Johns 2013; Johns 2016; Frater and Ryan 2001;.Yam 2008; Meier 2015.

territoriality has been doing in the international legal field to date. This article will begin in Section 1 by elucidating three key effects that territoriality has had in this context, or three key ways in which territoriality has traditionally operated in international legal work. First, territoriality erects and maintains boundary marks and invests them with some hallowedness; second, territoriality effects a presumptive division of resources, including a distribution of lawful authority; and third, territoriality engenders a sense of relational placement and, in many instances, evokes fealty to that placement, or a sense of its relative obduracy. International legal work may, however, be becoming somewhat less dependent on or guided by territoriality for these purposes, or so this article contends. Sections 2 and 3 of this article put forward an argument to that effect. That is, conventional operations of territoriality in the international legal field now operate in parallel to, and may be in the course of being incipiently displaced by, processes that may be grasped, on one hand, in terms of the "datafication" of territory (and the related rise of a logic of association) and, on the other hand, the "territorialisation" of data (and the recurrence of patterns that might be thought of as assembling data territories). Sections 2 and 3 of this article describe these concurrent processes of transformation and explain how particular configurations and analyses of data may be transforming or replacing conventional understandings of territoriality as a medium for juridical boundary-marking, distribution, and placement on the global plane. Section 4 of this article identifies some questions raised for international law and lawyers by the prospect of data displacing or remaking territoriality in the ways described.

1. TERRITORIALITY IN INTERNATIONAL LAW

In his magisterial study of the emergence of the concept of territory in Western political thought, from ancient Greece to the seventeenth century, Stuart Elden reminds us of the following: "Territory is a word, concept, and practice, and the complicated relation between these three terms can only be grasped with historical, geographical, and conceptual specificity".[4] The same may be said, with equal cogency, of territoriality, a term denoting the condition or status of territory, as much as a protective, proprietary or similar mode of conduct towards territory.[5] Far from positing a general ontology of territory in and for the field of international law, then, this section highlights three types of practice that both constitute territoriality for governmental, administrative and other juridical purposes on the global plane, and attest to its efficacy and significance for international law in particular. The first of these practices, as noted above, is that of bounding or boundary making.

1.1. Territoriality as a Practice of Bounding

To say that territoriality is significant as a boundary-making mechanism in international law evokes a large body of legal doctrine concerning the delimitation of land, maritime and aerial boundaries among states and the territorial determination of jurisdiction.[6] It also calls to mind a long history of such boundaries' disputation before international courts, tribunals, commissions and arbitrators and in legally informed diplomatic exchanges.[7] Legal delimitation of territorial boundaries and

[4] Elden 2013, at 328.

[5] Elden 2013, at 4; OED Online 2016, at "territoriality, n.".

[6] See generally Prescott and Triggs 2008; Ryngaert 2015.

[7] Prescott and Triggs 2008; Brunet-Jailly 2015.

oversight of their modification and disputation have long been regarded as axiomatic to the maintenance of peace among states (or at least the maintenance of those global conditions commonly characterized as peaceful, ongoing violence notwithstanding). In 1758, the Swiss diplomat considered one of international law's progenitors, Emmerich (Emer) de Vattell, observed that "[t]o remove every subject of discord, every occasion for quarrel, one should mark with clarity and precision the limits of territories".[8] Indeed for some, the modern international legal system is effectively founded on, and sustained by, a "territorial covenant" ensuring the stability of state boundaries and discouraging their revision.[9]

Beyond its significance in delimiting states' respective politico-legal reach, and tempering (ideally, or perhaps inflaming) their propensities for over-reach, territoriality also bounds the disciplinary terrain of international law in other ways; it does so, for example, by conditioning particular entities' standing on the international legal plane. Territorial attachment and control feature as criteria for statehood according to the Montevideo Convention on Rights and Duties of States 1933 and the customary law it is said to enshrine.[10] Accordingly, territoriality is a *precondition* for the assertion of sovereign authority (and associated rights and capacities) on the international legal plane, and a basis for *sidelining or disregarding* some actors on that plane, as well as being an *outcome* of international legal rules on title to territory and boundary delimitation alluded to above. A want of territory or want of territorial

[8] Vattell 1760, at 137.

[9] Jackson and Zacher 1997.

[10] Grant 1999.

control on the part of any would-be state may translate into a condition of relative impotence for that entity within the international legal order.

At a smaller scale, territorial locations of people and things similarly affect natural and legal persons' access to rights and exposure to liabilities under international law. On one side of a territorial boundary between states – the 'home' side – an individual might enjoy a range of international legal rights that the state in question owes its citizens, while on the other side of the same border she might possess the more tenuous international legal status of an immigrant, an alien or a refugee vis-à-vis the state in whose territory she is located. Territoriality thus serves as a basis for switching on a particular international legal status or switching it off, for non-state as well as state actors. The arrangement and operation of such territorial switches (that is, those territorial boundaries and distinctions by reference to which particular international legal status may be turned on and off) establish a litany of nested and intersecting boundaries in law.[11] Territoriality thus mediates international legal practices of inclusion and exclusion – or boundary making – in a wide range of ways. Material, symbolic, and psychic investments made in, or by reference to, boundaries that result from these practices help to explain the durability of territoriality as a mainstay of international legal order.

1.2. Territoriality as a Practice of Distribution

[11] Kesby 2007.

In addition to and through its boundary-making operations, territoriality also has important distributive effects in international law. For individuals and groups, territoriality introduces an organized randomness – and thereby, a valence of deservedness (and undeservedness) – to the lawful distribution of resources worldwide, conditioned as that distribution is by place of birth and resulting citizenship or immigration status.[12] In determining the life chances of any one individual or group, much is decided by the natural resources and economic, social and political infrastructure that happen to be located in their immediate territorial vicinity at crucial times; that this is the case – and that this is regarded, for the most part, as fitting – is in large part a consequence of international law having entrenched territorial understandings of vicinity, jurisdiction and politico-legal allegiance. In these ways, the territoriality of international law distributes agency and potential, along with resources.

Among the resources so territorially distributed are those of ready or legitimate access to, and cognisability by, one or more national legal system(s). Territoriality structures the distribution of lawful authority and amenability to its purview on the global plane and thereby distributes entitlement (and disentitlement). Robert Wai's analysis of legal principles that permit or elicit territorial "touchdown" by state and non-state actors makes apparent this distribution of regulatory capacity (as well as of regulatory-evasive capacity) in the international legal order.[13] By envisaging and analyzing agglomerations of beings, things and jurisdictions largely in territorial

[12] See, e.g., Moore, Amey and Bessa 2009; Gagnon, Zimbeck and Zeitlin 2009.

[13] Wai 2002.

terms, those working with international law acquire a default rubric for judgment, or a way of ruling some interests and claims in and others out of consideration; Wai's work makes this clear.

From territoriality, international lawyers and others informed by international legal thought also draw a primary unit of analysis for purposes of drawing connections and assembling larger scale heuristics or aggregations of interest. In this sense, territoriality effects a global distribution of concern. Many of those arenas of international legal making that purport to lie between or above territorial nation states are nonetheless proprietary in conception, retaining or evoking key instincts of territoriality. Consider, for example, the notion of "common heritage of mankind" which, although it is conceived in opposition to territorial sovereignty, retains a sense of proprietary inheritance and defensiveness characteristic of territoriality.[14] Consider, also, as a more explicit example of territoriality's generalization on a global plane, instances of "internationalized territory".[15] Territoriality thus plays a critical role in shaping distributions of agency, entitlement and interest, as well as resources, on the global plane.

1.3. Territoriality as a Practice of Placement

Alongside its boundary-making and distributive effects in international law, a further role of territoriality in this context merits highlighting: namely its effect as a mode of

[14] Noyes 2011; Pahuja 2012.

[15] Wilde 2008.

placement in international legal order, that is, with regard to the fact or situation of being placed, arranged or positioned in relation to other elements of that order.[16] The operations of territorial bounding and distribution just described are, of course, practices of placement as well. Nonetheless, territoriality effects placement in and for international law in another sense as well: by making international law livable and understandable under certain relational conditions.

Some subset of international legal norms – including those concerning the nature and structure of the international legal "system" or "order" (and the very idea that there is such a thing) – attract fealty through the investment of those norms with an infrastructural necessity; a sense that they are "hard-wired" into the conditions of global life. Territorial placement plays an important role in this investiture and, in turn, in the reproduction of territoriality as infrastructural necessity.

International law acquires and retains inevitability and compulsiveness in part by constituting places to inhabit and build careers, to flee or reform, and placing them in systemic relationship to one another, or binding them into a common order. The former places (for living and working), and the rituals and lives conducted there, become markers of what is pivotal to that international legal order. One might think of places such as the Peace Palace and the International Criminal Court in The Hague, the UN headquarters in New York, and the headquarters of the World Trade Organization in Geneva. Those who travel to such places from afar become embodiments of convergence; their traversal of territory and gathering at particular

[16] OED Online 2016.

locales tends to be characterized in terms of normative growth, education, socialization or progress. The latter places (for leaving and changing), and the ways of life with which they are identified, become signposts for all that international law seeks to transcend or temper: deprivation, scarcity, violence, ignorance, fundamentalism. One might think of a village in Nabarangpur district in the Indian state of Orissa, or in the Sekong province of the Lao People's Democratic Republic, for instance.

The movement of those who work in and with international law to and from such central and peripheral places has been vital to international law's expansion and entrenchment and the prevalence of a sense that it comprises a system, and one yet to be completed. It is through such territorial placement and movement – and through related technologies of mapping and measurement, and narratives of distinction – that international law has become a *lingua franca* of global economic and political life.

The practices of territorial bounding, distribution and placement just described remain ongoing in and around the international legal order; there is no evidence of their diminishing prevalence. One could seek to diagnose this persistence of territoriality by reference some other phenomenon: as a manifestation of ideology, for instance.[17] For purposes of this paper, however, territoriality is taken to describe a set of practices and investments that sustain themselves irreducibly as practices of international legal work (even as any such description reveals the insufficiency of those practices as underpinnings for territoriality's axiomatism). Territorial

[17] See generally, for example, Sugarman 1983; Zizek 1989.

commitments are not taken here to be masks for, or symptoms of, something else; rather, they are studied on their own terms.

Nonetheless, there are indications that the normative purchase of international law – its hold on experience, knowledge and action – could yet become somewhat less contingent on or guided by these conventional territorial practices. Instead, particular configurations of data – flows, pathways, and assemblages in and of data – may yet come to do at least some of the work that territoriality was just recounted doing in and for the international legal order. And it remains to be seen whether this reconfiguration will occasion a redoubling of the commitments of territoriality, or their calling into question. Perhaps the most obvious indication of this shift may be gleaned from the increasing "datafication" of territory.

2. THE DATAFICATION OF TERRITORY AND THE RISE OF ASSOCIATION

To say that territory has been or is being "datafied" is to highlight the rendering of territory as information, as distinct from its sometime rendering as or in connection with landscape, spirit, resource, repository, national or common heritage or otherwise. The practice of rendering territory as information for international legal purposes is not a recent phenomenon. The division of a spherical world into evenly spaced meridians utilizing a lattice of latitude and longitude, for example, is of ancient provenance, although it was not until the eighteenth century that a reliable way of

measuring longitude at sea and on land was devised.[18] Furthermore, it would take until the late nineteenth century, and an international conference, to establish one such meridian as a common, international point of reference for locational and time-keeping purposes, including for the lawful fixing of time.[19] With the universalization of this system of geographical information, a sense of one's placement north or south of the Equator, and east or west of the Prime Meridian, became at least potentially an experience common to all, as did the resulting capacity to measure, survey and describe parcels of territory with accuracy. Datafication in this mode has long been vital to the projects and potency of international law, including to its territoriality.

The representation of territory in and as data has, however, intensified to a very significant degree with the advent of orbital satellites, the satellite-based radio navigation system know as the global positioning system (GPS), and technologies of automatic sensing, Google mapping and the like.[20] A profusion of sensor networks, and advances in their sophistication, have fostered aspirations to "seed the planet" with continuously operating data-collection and data-generation nodes – to create a "central nervous system for the Earth", in the words of Hewlett Packard's landmark CeNSE project, to serve as a basis for legal and policy decisions.[21] In regulating nuclear testing, for example, the Comprehensive Test-Ban-Treaty Organisation (CTBTO) is said to operate "170 seismic stations worldwide, 11 under hydroacoustic centres detecting sound waves in the oceans, 60 listening stations for atmospheric

[18] Evans 1998; Samama 2008.

[19] Perrin 1927; Higgitt and Dolan 2010.

[20] Leszczynski 2012.

[21] Hardy 2009; Hewlett Packard 2016.

infrasound (low-frequency acoustic waves that can travel long distances) and 96 labs and radionuclide-sampling facilities".[22] The CTBTO is, moreover, committed to installing an even more comprehensive network of 337 seismic, hydroacoustic, infrasound and radionuclide detecting stations through which to determine when and where a nuclear device of any size is detonated and, thereafter, evaluate its lawfulness.[23]

Territory so "datafied", and thereby made actionable for law and policy decisions, still performs bounding, distributive and placement functions for international legal purposes, but does so in quite a different mode to that earlier described. Territoriality becomes a matter of managing and maintaining a dynamic, vital, information-rich, would-be seamless "planetary skin" available for navigation by those with access to the real time data of which it is comprised. (The term "planetary skin" here references a program illustrative of the emergent territoriality in question: the ALERTS system is a decision support system for remote change evaluation, reporting and tracking, in near real-time, of global land use, land cover change, and land use disturbance released in 2010 by the Planetary Skin Institute: a non-profit organization co-founded by Cisco and NASA).[24] Territory so activated for analysis seems less predisposed to parceling and fencing, in the manner conventionally required to evidence and sustain property rights for example. Rather, it seems constituted more with a view to its curation (that is, sifting and organizing for presentation) and personalization (that is,

[22] Economist 2015.

[23] Oleson 2015.

[24] Stanley and Liao 2011.

being tailored to a particular audience's needs or preferences, however unreliably).[25] Amid such a diffuse and dynamic territoriality, the sense of security, wellbeing and agency that any one individual or group enjoys may depend less on their location within politico-legal boundaries, access to juridical infrastructure or proximity to natural resources than on their access *to* data concerning the conditions and risks that they must confront, on any number of concurrent scales, at any one moment, and their recording *in* datasets assembled for such purposes. Boundaries of international juridical concern in this context may just as likely be those of data access and technical proficiency than traditional territorial boundaries.

This "datafication" of territory carries with it also changing expectations of what law can and should accomplish on the international plane. Projections of a globalism that waxes and wanes, pools and eddies with the flow, accumulation or blockage of data imply similarly altered understandings of international legality, as compared to legality premised on the territorial sovereignty of nation states. Accounts of a "self-aware" globe imply that international legal norms and practices will or should be capable of effecting "interoperability" among the various combinations of legal rights, routes, liabilities and undertakings surrounding data, wherever that data may be located.[26] Expectations of laws' global "interoperability" – and a presumptive antipathy to either data or laws' territorial sequestration – seem implicit in the piecemeal, endlessly fluid, information-oriented assemblages of global territory alluded to above. The collapse of the EU-US Safe Harbor Arrangement permitting

[25] On "corrupt" personalization, see Sandvig 2014.

[26] Hardy 2009 (on a self-aware globe); Johns 2013, at 12-14 and 34 (on legal interoperability).

transfer of EU citizens' data to the US, and its replacement with a conditionally permeable EU-US Privacy Shield, may be representative of the ongoing re-casting of the territorial in international legal order along these lines; law and policy thinking framed around harbors, islands and other territorial strongholds appears increasingly ill-attuned to the prevailing data "ecosystem".[27]

One way in which shifts in the modes of bounding, distribution and placement newly encouraged through the "datafication" of territory might best be captured or explained is by reference to the growing prevalence of a logic of association in international law and policy work. Notions of international legality deemed fit for "datafied" global territory evoke the ideal of a global "information economy" regulated less through planning, mapping or strategic oversight than through a series of associations, inferences, and correlations.[28] And association rules are, indeed, one form of rule with which those engaged in the technicalities of data mining and data analytics – for global juridical and other purposes – are frequently concerned.[29] Such rules are features of a particular kind of automated data-mining technique; one way of mining large collections of data is to discover certain rules by which that data may be usefully represented. Such rules are not equivalent to legal rules, but they nonetheless play a role, in a range of contexts, in generating, delimiting, distributing and placing lawful authority, when that authority depends on certain events or conditions becoming discernible in data. Because of this role, and in order to present a sharpened sense of the shift in logic that they may encapsulate, this section will proceed from this point

[27] European Commission 2016; Boyd and Crawford 2012.

[28] Benkler 2003; Benkler 2006.

[29] Rauch 2005.

onwards *as if* association rules could be regarded as new formulations of international legal rule, without attempting any parsing of their lawful from their non-lawful force in particular instances.

An association rule is "a simple probabilistic statement about the co-occurrence of certain events in a database".[30] Association rules "concern whether a group of variables… is more significantly associated than we would normally expect" and they look something like this: "X→Y with support A% and confidence B%, where X and Y are sets of items".[31] Rules, in this context, are not understood to direct conduct. Rather, data analysis algorithms designed to find associations (statistical correlations meeting certain predetermined thresholds) between sets of items in a database proceed according to IF-THEN logic, without generating any causal explanations for those associations or any theorization of how they came about. The so-called democratic peace phenomenon – the theoretical "rule" that democracies less frequently engage in armed conflict with other identified democracies than they do with non-democracies, or than non-democracies do with either democracies or non-democracies – is an example of an association rule generated from the mining of historical datasets.[32]

As a mechanism for generating, delimiting, distributing and placing lawful authority (such as the presumptive authority of democratic polities, with which the example above is concerned), the association rule exhibits a number of characteristics that distinguish it from other forms of rule with which international lawyers may be more

[30] Hand et al 2001, at 158.

[31] Lee and Lee 2011, at 483 and 488; Agrawal, Imielinski and Swami 1993.

[32] Aragones et al 2005.

familiar. First among these is association rules' embedded and often inscrutable origination. Association rules are not parameters or coordinates set for a certain inquiry, survey or task from the outset comparable to the earth's meridians; rather, they are the *outcomes* of automated, iterated inquiry. They emerge in ways that may not always be explicable even to those well versed in relevant data-mining techniques. This is especially the case when unsupervised or semi-supervised machine learning is employed in their generation. Unlike supervised learning (which starts with a training set of "properly labeled" data and organises unlabelled data according to that signature), unsupervised learning commences without an initial model, hypothesis, or norm from which deviation must be sought. Its aim is to generate and explore regularities and anomalies or to locate "densities" of probability within a dataset and then, independently and by recourse to other methods, determine which of those patterns may merit interest or further investigation.[33] Research in this area tends to make far more of search efficiencies realised than the features, components and criteria of different data-mining algorithms: "In many papers, the descriptions of the model structure [that is, the high level way that a data set is represented], the score function [a way of numerically expressing the preferability of one model over another according to specified aims], and the search method [computational methods used for model- and pattern-fitting in data-mining algorithms] are abstrusely intertwined".[34] For these and other reasons, it is often "hard to explain how the system reached a decision" with respect to any one association revealed.[35] To the extent that the mining of data by recourse to association rules gives rise to certain placements or

[33] Hastie, Tibshirani, and Friedman 2009.

[34] Hand et al 2001, at 163 and 235.

[35] Loh et al 2003, at 358.

distributions within those data, it may not be possible to grasp the predicates for that placement or distribution from outside the process in question.

A second, related consideration, with regard to the boundary-making implications of association rules, is that the scope of what might be "potentially useful" in this context need not be determined a priori; data mining itself frequently generates a sense of what merits interest.[36] This will depend upon measurements of "interestingness" that "will inevitably be application-dependent and subjective". What may be deemed useful and usable from a mass of association rules will depend, to a significant degree, upon the happenstance of various design features' confluence and interaction with a data set or data sets.[37] Furthermore, the "actionable decision" formulated on the basis of associations meeting such "interestingness" or "usefulness" thresholds may itself be realised through or by data handling in a way that serves to confirm the usefulness it was initially presumed to hold.[38] For instance, the action in question may entail the automated screening, selection and targeting of material in a way responsive to the probable association represented in the rule – thereby conditioning the target to demonstrate, and confirming the significance of, the association inferred from the dataset. In other words, by way of example, people may develop preferences based on the tailored material to which they are exposed in an online environment, the tailoring of which is premised on preferences that they were already supposed to hold according as a matter of associational inference.[39] In both

[36] Azzalini and Scarpa 2012, at 5.

[37] Hand et al 2001, at 295 and 440-1.

[38] Wang et al 2005; Hand et al 2001, at 295

[39] Wang et al 2005.

respects, the force of the expectation to which an association rule gives rise may, at least in part, result from the ongoing, iterative generation of the association and the taking of action on that basis.

A third feature of association rules – and the logic of association – noteworthy for international legal purposes is their tendency towards superfluity. In the course of mining data, there are often many meaningless association rules discovered.[40] Algorithms designed to generate association rules "find all rules satisfying the frequency and accuracy thresholds" prescribed for them and only some portion of the "mass of discovered rules" may turn out to be "potentially interesting" or meaningful.[41] Accordingly, association rules are not designed to be "right" or reliable at the outset; rather, there is an expectation that most of them will be discarded. The cartographic equivalent would be to define every territorial boundary using a litany of dotted lines in the hope that one or a small number of these would attract loyalists. This lessens the gravity and dispenses with the ceremony of rule making, or boundary setting and subordinates the practice to an expectation of continual, ubiquitous tinkering.[42] Contrasted to other modes of international legal rule, this predisposition towards tinkering suggests prospects for a different mode of claim-making and contestation surrounding territoriality. Perhaps in place of stability and durability as international law's driving concerns with respect to territory, more contingent assemblages of the territorial might be advanced in this mode, justified on particular grounds.

[40] Li 2005.

[41] Hand et al 2001, at 431.

[42] Ciborra 2002.

A further characteristic of association rules – and the associative logic they foster – is that patterns in data represented by such rules need not feature subjects, objects or places as such, nor stories of the relations among them. The unit of analysis with which an association rule is concerned may not be recognisable as a place, person, field, or thing that registers as familiar.[43] The democracy-peace association referred to above is atypical in this respect; association rules often do not work with or around anything as coherent as a territorial nation state. They are often formulated at a much lower, or cross-cutting level of analysis, on the basis of correlations between bits of data and piecemeal records drawn from widely dispersed and dissimilar sources, such that a change in the value or expected incidence of one datum is mathematically associated with a change in the value or expected incidence of other data. Consider, for example, the use of mobile phone call detail records to generate inferences about human mobility patterns and socioeconomic welfare and the use of satellite data to provide early warning of epidemics, uprisings and other crowd states.[44] In such cases, the data in question tends to be "remarkably unwieldy", "unstructured", and drawn from a wide range of sites and sources, and may not yield a compelling representation of any individual or group.[45]

Moreover, in order for such unstructured data to be made useful and actionable for legal or policy purposes – or potentially so – no legal jurisdiction as such need be configured. That is, there is no need, as part of such processes, to recruit some groups,

[43] Amoore 2009.

[44] Vaitla 2014.

[45] World Bank 2014, at 23.

entities or beings to experience themselves and others as legal persons, identified with a distinct territory, with all that that implies (usually, possession of a relatively stable identity and physical location). Similarly, there is no need for an actionable insight represented by an association rule to elicit concrete things, locations or objects. One might generate a prediction of crop yield based on a mathematical correlation "found" in satellite imaging data indicative of vegetation density, and evaluate the risk of impending food insecurity on that basis, as some international organizations seek to do through data mining, without ever calling forth an image or understanding of a plant or a paddock as such, or determining the location or legal status of nearby territorial boundaries.[46]

The sorts of relationships and imperatives generated through association are, accordingly, founded in momentary, mathematically recorded co-occurrence between discernible properties or records, the significance and extent of which will often be unclear. An association rule along the lines of "if X then Y" does not operate on the basis of presumptions of cause and effect, common purpose or normative commitment, proximity in time or space, similarity of identity, or affective or communicative connection as between set X and set Y or the elements of those sets. The association of X and Y in the aforementioned rule is based only on analysis of a large data set having generated, for the time being, a greater probabilistic affinity of co-occurrence or overlap between set X and set Y, or particular subsets of the same, than between X and all other sets that may be assembled from the database at the relevant time. As additions and eliminations are made to and from the dataset(s) being

[46] Quinn et al 2010.

analyzed, that association may diminish in importance as stronger correlations emerge. New association rules may yet be formulated that are capable of overcoming the relevant interestingness threshold. The association of X to Y is not, therefore, equivalent to an assumption that all persons properly attributable to territory W shall presumptively enjoy status Z for international legal purposes. Taking an example alluded to above, the observation that there is a strong correlation between a particular mobile phone use pattern and the principal phone user's state of economic development, for example, says nothing about what may have brought about the latter. It simply describes a probability that certain data will co-occur in relevant datasets.[47]

Because of their contingency upon endlessly revisable probabilistic calculations, placements in data of the kind that association rules bring about are, it seems, only fleetingly discernible and may often elude analysis altogether. This makes any abiding normative force on the part of international law, guided by such associations, difficult to sustain and subordinates that law to demands for "usefulness" that may be generated largely from outside the discipline of law. It is, however, important not to overstate the fleetingness of data associations or their immunity to, or non-translatability for, normative influence. Many databases from which association rules are derived have historical content – "memories" as it were. A database's historical content might generate, for instance, a rule along the lines of the following: people who performed action A over the past three years were more likely to combine this with action B than they were likely to combine it with any other form of action represented in the dataset(s). The analysis of such historical content towards one or

[47] Eagle et al 2010.

more association rule(s) is not concerned with charting historical patterns or broad historical narratives as such. Yet it is premised on the historic possibility of action A and B both being open for people to take – a possibility for which legal measures and institutions may quite plausibly be relevant. Even so, the relationship between action A and action B – and the respective places and conditions of their performance – in the aforementioned example will only hold for so long as no stronger association can be detected between some other combination of recorded actions, as noted above. Likewise, a database's historical content will only survive culling to the extent that it is capable of generating associations strong enough, according to specified criteria, to serve as a basis for action or prediction.

Associations of the sort just described are not, of course, wholly unknown to international law otherwise. One could, perhaps, read international human rights law instruments and efforts concerned with particular institutional features (or their absence) as operating with something like an association rule. A set of institutional characteristics that excludes certain stipulated features (that lacks, for instance, any mechanism designed to ensure that those who are arrested are promptly informed of the reasons for their arrest) is probabilistically associated, in international human rights law, with a particular set of human experiences (oppression, domination, vulnerability to abuse of power, lack of freedom, access to limited or no avenues of recourse or appeal, etc.).[48] Their relation could perhaps be imagined in terms of

[48] ICCPR 1966, Art. 9(2)).

diverse data points drawn together in association – through the analysis of correlations – to produce an actionable forecast of events to come.[49]

It seems, however, a distortion to characterise the relationship between people who have experienced (or been responsible for) unexplained arrest, and those who have experienced (or been responsible for) officially sanctioned abuse or oppression, in terms of an association rule. The relationship seems more amenable to characterisation in terms of the narration and communication of histories, the active cultivation of political allegiances and the pursuit of strategies of reform or redress. International law worries about arrest practices because people in a range of jurisdictions have mobilised around the public regularisation of this and other aspects of criminal procedure, on the basis of a range of experiences and commitments, some of them shared and some not. To cite another, not entirely unrelated example (given the historical record of indigenous deaths in custody across a number of jurisdictions) international law addresses indigenous people globally as a group not on the basis of any association rule probabilistically aligning properties of indigeneity with which they are attributed. Rather, they are treated as a group because of their political mobilisation as such and because of the commonalities of experience and practice identified with colonialism.

The sorts of ephemeral, presentist associations and assemblages foregrounded in data-mining and analysis, including in the actual or prospective analysis of "datafied" territories, and the relationships of place, people and things that they draw together,

[49] Amoore 2009.

are not configurations to which conventional international legal thought and practice are well-attuned. International legal work continues to be conducted largely on the basis of global associations presumed much thicker, stickier and more durable than those instantiated in data by association rules: above all, those framed by territorial arrangements and allegiances. It is for this reason that the growing "datafication" of territory, related reliance on data mining for juridical and policy decision-making, and the ensuing rise of a logic of association together signal such a momentous shift in and for international legal order. That shift is not, however, synonymous with the demise of territoriality all together. As the succeeding section will show, the accretion, navigation, and deployment of data globally continues to follow certain juridical pathways, patterns and divisions; these give rise to what one might think of as data territories.

3. THE TERRITORIALISATION OF DATA AND THE PERSISTENCE OF JURIDICAL PATTERNS AND PRECINCTS

Global data flows may have fostered new architectures of association, as the preceding section has suggested, but these are not a-territorial. Global data flows remain guided by the acquisitive, distinctive, defensive and mimetic impulses characteristic of territoriality, and marked by pathways, patterns and arrangements in which territorial sovereigns continue to loom large. And data are so territorialized in part through the operations of international law.

International law has long been concerned with arranging the world into domains of visibility and invisibility, allegiance and non-allegiance, civilization and barbarism;

data flow has always played a significant role in sustaining such global geographies.[50] The juridical map of global data sharing for intelligence purposes, established and maintained by treaty, is illustrative in this regard; it reveals an informational geography that is both territorial in its routings and routines, and designed to transcend or overlay territorial boundaries. One could point to a number of other examples of data's territorialisation: Linnet Taylor and Dennis Broeders have described, for instance, how low- and middle-income countries are increasingly shepherded, in their international legal, political and economic affairs, by "data doubles" and "shadow-maps": "new forms of visibility separate from state mapping efforts". These are generated as varying configurations of inter-governmental, non-governmental and corporate actors make use of new remote sensing and data analytics capabilities to produce "alternative, dynamic and highly detailed account[s] of the spatial dynamics of even very remote places where accurate mapping has previously been limited or nonexistent".[51] For purposes of this short article, however, let us consider only one example of territoriality expressed in data through the operations of law – an example drawn from the domain of intelligence-gathering and -sharing.

The 1947 UKUSA Agreement between the US National Security Agency and the British Government Communications Headquarters, to which Canada, Australia, New Zealand became "second parties" (with Norway, Denmark, West Germany and Turkey as "third" parties), famously established the so-called "5 Eyes" arrangement for the sharing of signals intelligence and the division of associated labor among five

[50] Anghie 2007.

[51] Taylor and Broeders 2015, at 230-235.

governments and nation state territories.[52] That post-war arrangement has since been cross-cut by a range of international arrangements for which data access (and its denial) serve as pivot and fuel, even as longstanding international legal alliances such as UKUSA and NATO remain crucial.[53] These cross-cutting arrangements include those in place among the cohort of governments granted access to the US' Secret Internet Protocol Router Network (SIPRNet), for instance.[54] They include, too, a veritable thicket of international agreements, both formal and informal, providing for bilateral and regional cooperation around intelligence data.[55]

International legal norms operate as part of the engineering of these arrangements – and of the geographies that they produce – rather than just operating before-the-fact or after-the-fact of data assemblage. Regulations around the classification of intelligence data, for instance – around, say, deployment and interpretation of the classifiers "NOFORN" (not releasable to foreign nationals) and "ORCON" (originator controlled) when affixed to a document or datum – may have explicit provenance in US national law.[56] Yet the international agreements to which we have referred will have a direct bearing on the use and interpretation of classifiers such as "NOFORN" and "ORCON" along the length of global data circuits. Such classifiers will also be operationalised in view of a domain of intelligence "tradecraft" or "best practice" often perceived as global in scale, albeit not all-inclusively so. As was the case with

[52] Reveron 2006, at 460; NSA 2010.

[53] Rudner 2004, at 209-10; Lefebvre 2003, at 531-2

[54] Reveron 2006, at 460; BBC 2010.

[55] Svendsen 2008; Sepper 2010, at 154-9; Svendsen 2012.

[56] Church 2011-12: Reveron 2006, at 457; Fenster 2011-2012, at 492, note 189; DOD 2012.

respect to data mining association rules, categorizations such as the "NOFORN" and "ORCON" classifiers will be treated here *as if* they were legal categorizations (although they might plausibly be described otherwise), for purposes of sharpening focus on the territorialisation of data that they mark, and help to effect, for international law and policy purposes.

Law-data combinations such as the "NOFORN" classifier produce quite concrete (albeit thin) geographies: the range of people, machines and places to which a datum classified "NOFORN" may be distributed (both within and beyond US territory) are connected to one another by this mechanism, and may be distinguished from those to which "NOFORN" data may not lawfully be distributed. Material marked "NOFORN" "may not be provided in any form to foreign governments (including coalition partners), international organizations, foreign nationals, or immigrant aliens without the originator's approval", even when those parties are located in US territory.[57] With the requisite security clearance, one could map those sites (tracking infrastructural as well as human storage or reception points) to and within which data classified "NOFORN" might lawfully move; one might call this the "territory" of NOFORN-classified data. Yet that territory will clearly not equate to US territory; what is treated as "FORN" for "NOFORN" purposes does not correspond to, nor does it demand explicit comparison to, territorial boundaries demarcated elsewhere or otherwise. As such, there does not appear to be any institutionally mandated point of encounter between these geographic instantiations – between, say, the data territory lawfully unreachable by data marked "NOFORN" for US legal purposes (and related

[57] DOD 2012, at 63.

treaty-governed distribution), and territory deemed to lie outside US jurisdiction for other, international legal purposes.

Data are, of course, not the only media for this virtual cross-hatching, carving and tunneling of global space, any more than public international law comprises the primary rubric or vehicle for data's movement or obstruction in this context. These configurations have institutional, embodied, and material dimensions as well as resting upon significant private law architecture (comprised of contract law, tort law – norms surrounding breach of confidence for instance – and intellectual property law). The FBI maintains personnel in fifty-eight countries through its legal attaché or "legat" program; this program positions and provides for a set of bodies and employment relationships around the world through which data may be generated and transmitted.[58] The global distribution of language competence is important, as is apparent from the fact of the seers of the 5 Eyes all being Anglophone nations. The location and direction of infrastructure is also critical to these arrangements' maintenance and routing. Martin Rudner has highlighted, for instance, the importance of satellites' orbital position, targeting and control in intelligence operations[59] Surprisingly obtuse or thin attributions of group identity, allegiance or political motivation also play a significant role in the distribution of data. Recently, for example, two researchers, proposing a framework for detecting "agro-terrorism intentions" using overt or public data sources, identified "environmental activists" as

[58] FBI 2016. See also Sepper 2010, at 159-166 (emphasising the importance of professional community, professional reputation, professional 'ethos' and peer relationships in intelligence networks).

[59] Rudner 2004: 2000.

one "cluster" with "a history of sabotage" on which global data search and analysis efforts should focus.[60]

Nevertheless data are increasingly viewed – more or less independently of the loci of their storage or provenance – as the lifeblood of global intelligence-gathering and -sharing endeavours and of the domains of relative safety and danger that they demarcate. Global intelligence cooperation has conventionally taken government agencies – certain governments and certain agencies in particular – as its central switching points, with their interaction typically cloaked in secrecy.[61] In contrast, global intelligence cooperation is often now framed as a decentralised, collective, data-centric endeavour, in a way that corresponds to broader, contemporary preoccupations and framings in international legal thought (preoccupations with the power and potential of non-state actors, for instance). Robert Steele is among a range of intelligence specialists who have championed "non-secret, nongovernmental, and nonintelligence liaison and information sharing arrangements", and an orientation towards the "smart" mining of publicly available information or "Open Source Intelligence" (OSINT).[62] It is in this sense that data flows – intelligence data flows, as merely one example – are shaping the global landscape into a shifting yet durable arrangement of "data territories". These territories are "open" to the extent that they are assembled, in part, from OSINT flows. Yet they cleave, nonetheless, very closely to the installations and allegiances of territorial sovereigns. Such data territories

[60] Rohn & Erez 2013

[61] Rudner 2004, at 222; Sepper 2010, at 156-7

[62] Steele 2007.

comprise one among a number of forms of re-territorialization currently underway on the global plane.[63]

4. THE CHALLENGE OF DATA TERRITORIES

The foregoing sections have recounted changing practices of bounding, distribution, and placement in international law associated with a turn to data analytics on the global plane. They have described an emergent logic of association within international legal order that diverges in significant ways from the conventional logic of territoriality, and the emergence of new "territories", pathways and patterns constituted by the global movement (and non-movement) of data. These changes pose challenges to those "inviolable limits which had from [international law's] beginning marked out the territory…of the earth's surface", to paraphrase Fustel de Coulanges, although they by no means dispense with those limits all together.[64]

Among those challenges is precisely the difficulty of conception, or reconception, to which Fustel de Coulanges alluded in the quote with which this article opened. International legal thought, practice, and doctrine have seen so much invested in the conventional territorial organization of global affairs that it is extraordinarily difficult to think of arranging and governing the world otherwise. Absent territoriality, or in the face of its transformation, it is tempting to envision only chaos and cacophony, much as the International Court of Justice foresaw a descent into "fratricidal struggles provoked by the challenging of frontiers" if it were to "disregard the principle of *uti*

[63] See, e.g., Bach 2011.

[64] Fustel de Coulanges 2006, at 202-203.

possidetis juris, the application of which gives rise to…respect for intangibility of [territorial] frontiers".[65]

Yet the territorial sovereign state – and an international legal order premised largely on the sanctity and "intangibility" of its frontiers – are, it must be remembered, relatively recent innovations when viewed over the long term of social organization among humans. Recalling this, it cannot be the case that the only two options facing international lawyers are, on one hand, to reinstate, affirm, stabilize and defend those frontiers – and the modes of territoriality with which they come loaded – wherever possible or, on the other hand, to relinquish any aspiration for non-violent, fair and equitable conduct being fostered through law on the global plane.

International law already accommodates and engenders a multiplicity of ways of associating. It configures a world of right-bearers and those accountable for their protection; a world of co-consumers and generators of energy; a world linked and delinked by narratives of progress and decline, community and faith; a world of story-tellers and listeners, the rulers and the ruled, the entitled and the disentitled, the human and the nonhuman, the gendered, the racialized and those who embody "neutral" norms from which such differences are drawn, all arranged slightly differently in different substantive areas of international law. Territoriality is, as noted at the outset, but one of the global architectures of affiliation and disaffiliation in which international law trades, even if it sometimes seems the most important of these.

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[65] Case Concerning the Frontier Dispute (Burkina Faso/Mali), Judgment, I.C.J. Reports 1986, p. 554-650, 565.

Data territories, and the architecture of association that accretes in and around them, put up new frontiers, while undermining others. Territoriality does not wash away in a "world of flows" and big data as many have observed before me.[66] Indeed, a world of data flows is no more borderless than a world in which trade is relatively free and capital unfettered; just ask any migrant without economic means who has an Arabic-language surname. Yet it is equally the case that all is not continuously and necessarily reconcilable with what has come before when it comes to territoriality in international law. Contemporary data practices (practices, that is, of collection, dissemination and analysis) in international law and policy do encourage a logic of association in data that is distinguishable from that which prevailed before the burgeoning of these practices. It is by no means clear that we can and should try to fit that mode of association into one of the aforementioned international legal frames: to think of data practices, for example, through the lens of rights, natural resources, property, communication or community. Much is distorted, elided or missed in the course of so doing, as recent debates surrounding privacy rights make plain. To approach the global practices of bounding, distribution and placement associated with contemporary data flows equipped mainly with a discourse of privacy seems a bit like trying to grapple with global financial affairs by recourse to plant breeders rights.[67] So too, it would likely prove paradoxical, if not impossible, to try to analyse the "data territories" of this article's description using doctrinal rubrics and principles adapted from the traditional corpus of international law.

[66] E.g., Paasi 1998.

[67] Johns 2013; Johns and Joyce 2014.

Far more difficult, yet potentially far more promising, it is to try to grasp the logic of association and the characteristics of data territories described here more or less on their own terms, both in their specifics and in the aggregate: to think, that is, of an international legal order made of and in data. How might such an order yet be crafted or envisioned? What are, or should be, its operative units for purposes of analysis and action? In what shapes, arrangements and patterns might we envision that order's elements co-placed, if not primarily in territorial terms? What would it take to try to make such an order just, fair, livable? These are the kinds of questions that the datafication of territory and the territorialisation of data on the global plane open up for international legal thought and argument, if international lawyers dare to take them on.

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