

Digital Deep Mapping •

Tracing Hyperobjects: Digital Deep Mapping in the Anthropocene

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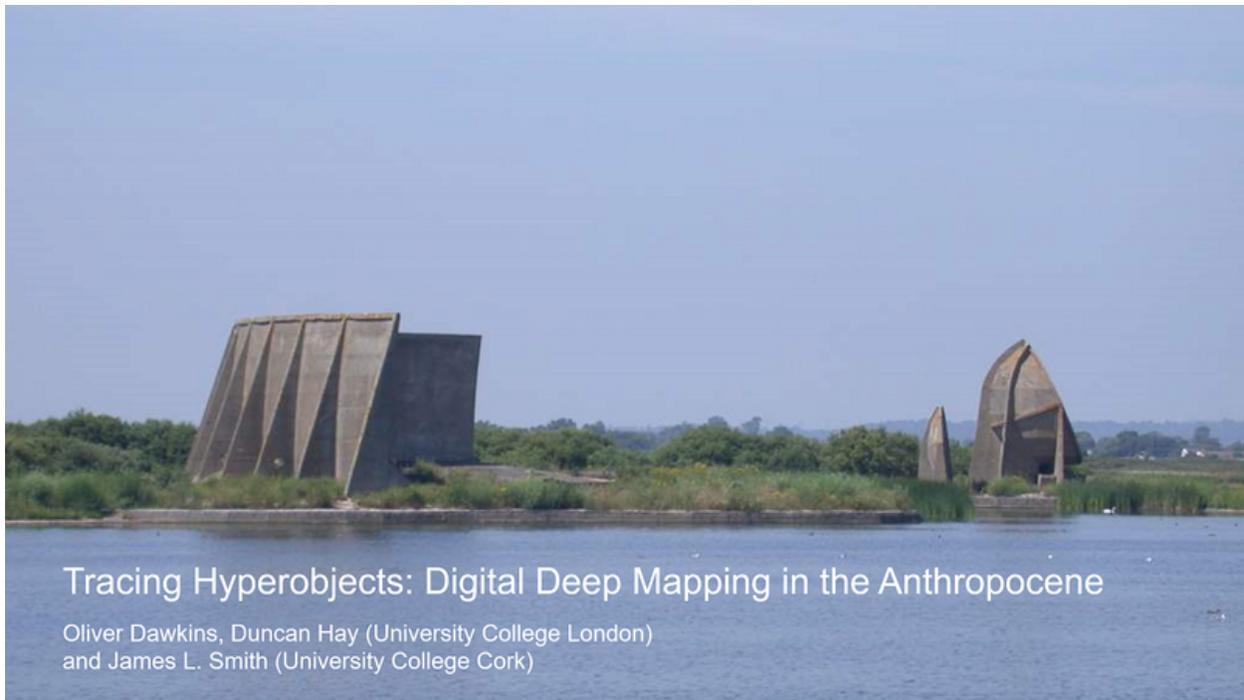
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Abstract

Agency in the Anthropocene is premised on knowledge of a situation which challenges human comprehension through its complexity and exceeds the spatio-temporal limits of individual, human-scale experience. It hints at a scale and entanglement of factors that likewise defy conventional mapping and spatial methods. Timothy Morton offers the hyperobject as a description of such objects, and proposed new speculative and phenomenological strategies for their exploration. This raises a complex and daunting question: how can challenges of perceiving—and mapping—the forces at work at more-than-human scale be effectively addressed?

In this paper, we propose a digitally-expanded notion of 'Deep Mapping' as a potential methodology for sensing the contours of the hyperobject: a tracing or palpation of objects of knowledge which exceed the individual. In previous cultural moments, strategies such as Fredric Jameson's 'cognitive mapping' have offered pathways for agency through spatial exploration and ordering of complex situations, though often at the expense of temporality. Deep mapping, conversely, temporalises the act of mapping through narrativisation, but is typically localised and deliberately limited in scale.

We argue that the use of digital strategies to augment the deep map can transcend individual and local experience, and provides access to an understanding of the object by opening cognition to its many hidden dimensions, at spatial and temporal scales both above and below those available to human perception. If narrative can be used to reveal the psychological and cultural depths hidden in geographical space, then digital methods such as GIS and data visualisation can be used to demonstrate the way these depths are themselves part of higher-order temporal and spatial patterns. By combining the two, it is possible to ameliorate the deficiencies of other approaches to mapping the multiplicity of agencies at play in environmental perception while simultaneously accepting the finitude of knowledge possible of a hyperobject.



Acoustic Mirrors, Dungeness, Kent, UK. Wikimedia Commons [CC BY-SA 3.0](https://commons.wikimedia.org/wiki/File:Acoustic_Mirrors_Dungeness_Kent_UK.jpg)

Presentation

Agency in the Anthropocene is premised on knowledge of complex situations and phenomena which exceed the limits of individual human experience due to their interdependencies and wide-ranging spatial and temporal scales. Social and political disputes over issues like climate change and the COVID-19 pandemic indicate the entanglement of human and non-human factors, operative at multiple scales from the cellular to the global, and exceeding the capabilities of any particular method of mapping or analysis to fully elaborate them. Increasingly we find ourselves in a situation where the scientific facts of ‘more-than-human’ matters fail to speak for themselves, instead competing with the claims of different identities, practices, knowledges and affects (Whatmore, 2006). This raises a complex and daunting question: how can the challenge of perceiving and communicating the forces at work in such large-scale and complex more-than-human concerns be addressed?

Timothy Morton (2013) offers the hyperobject as a description of such phenomena and, together with fellow object-oriented ontologists (Bogost, 2012), proposes a range of new phenomenological and speculative strategies for their exploration. A hyperobject is a thing which is ‘massively distributed in time and space relative to humans’ (Morton 2013, p. 1): something so temporally and spatially vast that it defies common-

sense understandings of it. Climate change is a thing: it has an empirically verifiable existence which can be detected and measured. But unlike things such as your desk, a pencil, or the keys to your house, it cannot be apprehended as a totality. Whilst you can demonstrate through experimentation, statistical analysis and observation that the Earth's climate is getting warmer, and that this is a consequence of human action, you can't see or touch climate change. When you experience an unseasonably hot day, a storm, or a flood, these are the effects or symptoms of it, not the thing in itself.

With respect to the hyperobject, human agency is rendered opaque. There is a direct connection, for example, between the individual decision to take a long-haul flight and increasing incidence of storms in the Caribbean, but unpicking the complex chain of cause and effect between the individual action and the whole is only possible inferentially. Yet these statistical inferences of the existence of climate change do something to the distinction between subject and object, as they reveal the way in which humans are part of hyperobjects in counterintuitive, non-localised ways.

Morton considers a metaphor of scientific knowledge as a screen through which we observe reality, or a mirror which reflects it. As Morton puts it, mirrors "are what they are no matter what they reflect", but "the mirror of science melts and sticks to our hand". Likewise global warming is not something we observe "behind a glass screen", rather "it is that glass screen, but it's as if the glass screen starts to extrude itself toward you in a highly uncanny, scary way" that defies any sense of critical distance. When we seek to objectify and empirically study the world, to glimpse its reflection, we disturb it, alter it by measuring it. We change the mirror. When we try and observe a hyperobject objectively, its 'viscosity' ensures that we do not see its reflection, but rather find ourselves immersed and entangled within it.

At the same time these objects, indeed all objects for Morton, are 'withdrawn': they possess properties and dimensions that are only perceptible to other entities as 'local manifestations'. We propose that deep mapping offers the opportunity for a slower pre-hermeneutic induction into the entangled hyperobject of climate change. Deep mapping is a practice which is founded on sustained attention to the change of place over time, to gathering and measuring observations of the local manifestations of a phenomena within and beyond the lifespan of an individual human being.

As [Clifford McLucas](#) has aptly said of deep mapping, it should be big, slow, sumptuous, engaging to the insider and outsider while linking them, not dependent on the authority of conventional cartography as well as fragile, temporary and unstable. Most importantly, they are only possible or imaginable now. A deep map is inherently a

response to its time and place, and the challenges presented to scholarly and creative expression that cannot be expressed in other modes. David Bodenhamer describes deep maps as a ‘way to engage evidence within its spatiotemporal context and to trace paths of discovery that lead to a spatial narrative and ultimately a spatial argument’. As a result, a deep map goes where the thickness of description takes it, often with extreme focus on a small or even tiny place or space with diverse multi-media and multi-disciplinary data. This contrasts with a ‘shallow’ map which seeks to capture a totality, but through a limited dataset.



Clifford McLucas, *Three Landscapes*, Stanford Humanities Center, 2001. This piece forms part of original research into the three sites (Monte Polizzo— an archaeological site in Sicily, the —an eighteenth century estate in Wales, and the San Andreas Fault of California), lectures, a large graphic work (a map on a wall), an artist’s journal (a book in a room), three essays on Hafod, place and identity, twenty five taped discussions with guests, and a report on the project in the form of a visual primer.

At a time when engagement of insider and outsider alike is crucial for a wide range of wicked problems, a narrative from a privileged and putatively objective perspective can only achieve so much. The deep map offers the opportunity for its interlocutor to fall into its content, soak it up, and emerge with their own sense of the contours of its subject matter. Furthermore, a deep map is always now and always necessary: it must speak to a traumatic present and surface it. It must be as nebulous and unstable as its subject matter, open to flux and change with the situation it depicts. It must be as

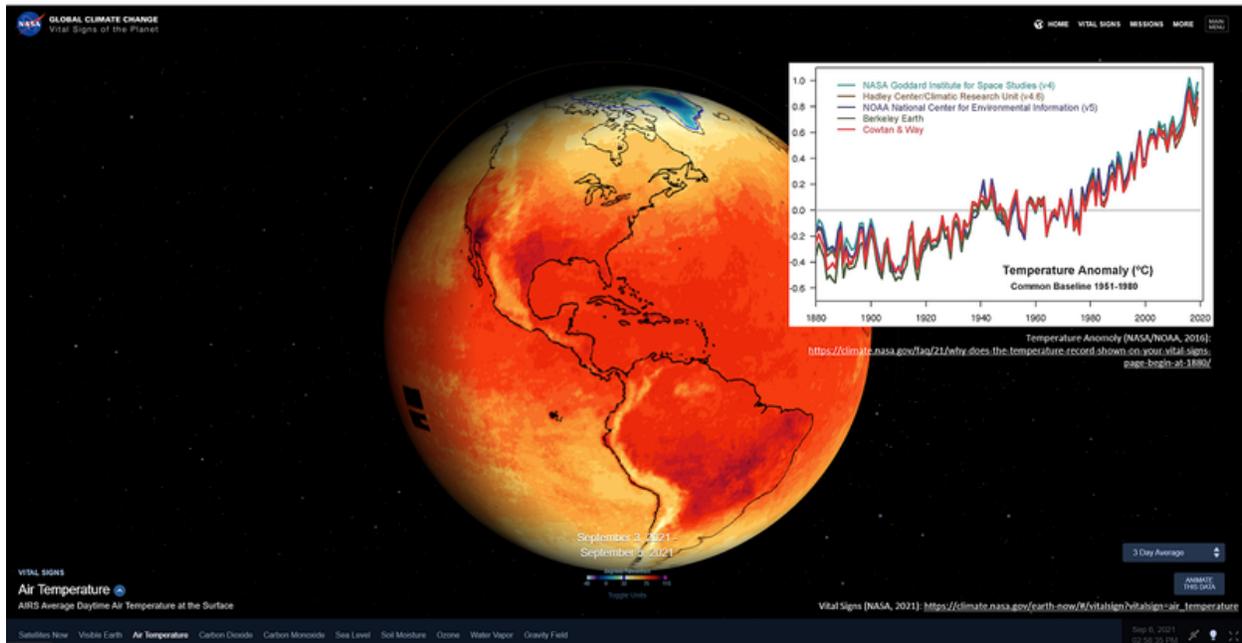
chaotic as the perspectives surrounding its subject matter, challenging the viewer with a hubbub of voices. When these voices are a chorus of debate struggling to apprehend the role of a barely conceivable entity, there is already a critical and creative role for deep mapping.



Runit Dome (or Cactus Dome), Runit Island, [Enewetak Atoll](#). Aerial view. In 1977-1980 the crater created by the Cactus shot of [Operation Hardtack I](#) was used as a burial pit to inter 84,000 cubic meters of radioactive soil scraped from the various contaminated Enewetak Atoll islands. The image demonstrates the intersection of hyperobjects - nuclear waste and climate crisis: the dome is cracking, and increased storm surges threaten to break it open. Wikimedia Commons, Public Domain

We argue that the use of digital strategies to augment the deep map can transcend individual and local experience and shapes an indirect understanding of the object by exploring the edges of its many hidden dimensions. If narrative can be used to reveal the psychological and cultural depths hidden in geographical space, then digital methods such as GIS and data visualisation can be used to demonstrate the way these depths are themselves part of higher-order temporal and spatial patterns. By combining the two, it is possible to ameliorate the deficiencies of other approaches to mapping the multiplicity of agencies at play in environmental perception while simultaneously accepting the finitude of knowledge possible of something that exceeds comprehension. Since hyperobjects are non-local, no single localised manifestation is itself the whole. As a result, it is only possible to sketch out the depth of the sum total of local manifestations, and argue for the emergent properties of this assemblage as a hyperobject seen at scale. A deep map of a hyperobject is not complete--a collection of or assemblage of sub-objects is not itself the hyperobject--but it captures the stakes of the object's scale. Hyperobjects are an exercise in, or a figment of, human imagination, and a deep map is an expression of this imagination in the same way that a painting is the vision of an artist.

Visualising Hyperobjects: Climate Change



Main Image: [Earth Now: Vital Signs of the Planet \(NASA, 2020\)](#) is an animated online visualisation of the planet, its satellites and their measurements for a range of global climate change indicators including air temperature, and levels of greenhouse gases. Inset Image (top right): An updated version of a plot referenced by Timothy Morton in *Hyperobjects* which shows [global surface temperature anomaly from 1880 to 2020](#) (NASA/NOAA). The term ‘temperature anomaly’ refers to a departure from an established reference value or long-term average such that a positive anomaly indicates that the observed temperature was warmer than the reference value. As such this plot demonstrates a clear trend of increased warming of global surface temperature over time.

For Morton hyperobjects like climate change are higher-dimensional entities with emergent properties. These properties appear to us as ‘local manifestations’ (Bryant, 2011) of processes that reveal themselves through change over time and spatial variation. By selecting properties to observe and capturing data over time we are able to plot them as you can see in NASA’s plot of global temperature anomaly from 1880 to date (top right of slide). Referring to the example Morton argues that while ‘Global warming cannot be directly seen, but it can be thought and computed’ (p. 3). We can even animate the temporal sequence of change over time in different locations as with the NASA Vital Signs visualisation depicting the whole globe. At the same time there is a limitation here in the way that we tend to defer to the software and let it see for us: ‘The trouble is that we cannot help but fail to see such high-dimensional entities when they are plotted in this way. Software “sees” them for us, then we see data or slices of that phase space, rendered in some way to make it usable’ (p. 73). There is a limitation

here, not solely due to the technical limitations limitation of the software, but rather because it is in the nature of objects to withdraw according to object-oriented ontologies. Hence, 'The more data we have about hyperobjects the less we know about them—the more we realize we can never truly know them' and yet 'As we've seen, hyperobjects are viscous: we can't shake them off; they are stickier than oil and as heavy as grief' (p. 180). It is as if the object's withdrawal is an index of our entanglement in our data and understanding of that object's local manifestation. These are claims that many outside the sphere of the arts and humanities, and particularly the sphere of object-oriented ontology will find contentious. What Morton does demonstrate is the power of data visualisation as a means for tracing the behaviour and properties of hyperobjects like climate change, and this is so whether we subscribe to the implications of object's withdrawal in object-oriented ontology or not. These visualisations do not exhaust the object they represent, but they do enable us to trace otherwise invisible phenomena that exceed the human-scale. In themselves however they are not sufficient to motivate individual action or the sense of collective responsibility that global issues demand. How do we go beyond this seeming impasse?

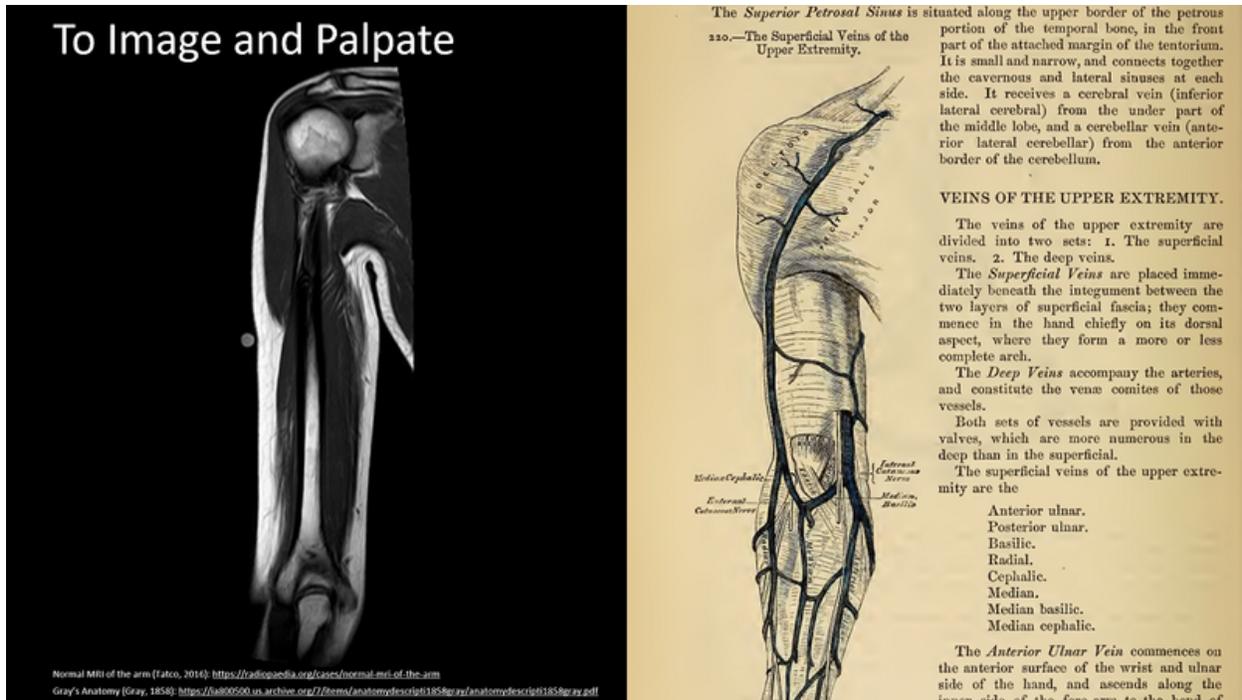


Image (left): [Normal MRI of the arm](https://radiopaedia.org/cases/normal-mri-of-the-arm) (Tatco, 2016) forms part of a case study demonstrating the results of magnetic resonance imaging, one of a range of medical imaging techniques which can be used to non-invasively visualise the internal structures of the living human human body such as bones and muscle tissue. Image (right): A visualisation of typical course of veins in the human arm as depicted in Gray's classic medical text [Anatomy](https://ia800500.us.archive.org/7/items/anatomical-descripti01858gr/71/anatomical-descripti01858gr_71.pdf) (Gray, 1858). Text available via the Internet Archive. The precise position and condition of the veins beneath the skin will differ between patients, motivating the use of techniques like palpation to identify their precise location.

For Morton 'Hyperobjects force us to acknowledge the immanence of thinking to the physical' (p. 2). Object-oriented ontologists typically recommend oblique strategies, often focusing on the search and exploration of analogies and analogues. Remembering a short time working as a phlebotomist during the 2010s, I have been struck by a likeness between deep mapping and the act of palpation. Phlebotomy involves the use of a needle to extract blood from a patient so that it can be tested in various ways to assess the condition of the patient. A common difficulty can be finding a suitable vein. The veins may not be visible on the surface of the patient's skin, and their precise position and condition will differ from patient to patient. Palpation is the process of carefully touching and applying pressure to the patient's skin with one's own hands and fingers to identify the course of deeper veins which are not detectable by the eye but can be felt by touch, helped by the application of a tourniquet which restricts blood flow to temporarily engorge the veins. Palpation has many applications in clinical practice as it can also be used to identify and diagnose a wider range of

issues like dislocated joints, bone fractures, hernias and tumours. As deep mapping enables participants to identify the local manifestations of large-scale structures and long-term processes of change that otherwise remain invisible or imperceptible, palpation is a general technique that enables a localised mapping of the hidden structures of the body through touch. Medical practice has developed powerful medical imaging techniques such as X-Rays, Ultrasound and MRI scans, each with their own particular affordances, but tactile palpation remains a fundamental diagnostic procedure for nurses, doctors and emergency responders. At the same time we can legitimately query the implicit distinction between palpation and more technical imaging procedures. Mightn't we also consider these an extension, augmentation or analogue for the human sense of touch?

Palpation like deep mapping is a practice which can provide a first understanding for wider matters of care and concern. It complements other means of sensing and imaging that allow us to investigate other dimensions of complex phenomena such as climate change. While narrative approaches of deep mapping provide a humanistic sense of depth which communicates issues of care and can provided a personal motivation for action, digital practice also enable us to explore the many dimensions and complex interrelations at work with hyperobjects in the anthropocene. As our practice develops we seek to explore tools and design principals that can help us examine both the depth and many dimensions of he problems we now face.



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Image: Reproduction of the Ebstorf Mappa Mundi, with East at the top. Wikimedia Commons, Public Domain.

Biographies

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