**Everybody Knows This Is Nowhere**

**Data Visualisation and Ecocriticism**

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“Who are you going to believe, me or your own eyes?”

Groucho Marx

The challenge for ecocriticism is not simply to identify and resolve a genre of ecological film; or to analyse explicit ecological themes as they arise in film culture. We need to understand the functioning of ecocriticism beyond the obviously eco-themed: to use its power to explain the *absence* of environmental issues, much as feminist critique did the structuring absence of women in certain films. We need too to earn the formal properties which ecocriticism especially latches onto, as feminism latched onto the gaze. And like feminism, ecocriticism has to get beyond the stage of special pleading for a single cause, and to consider what, uniquely, it can offer as *the* holistic mode of critical thought in the 21st century[[1]](#endnote-1). An environmentalism that ignores class, poverty, inequality, pestilence, war and injustice is not a political platform anyone would care to follow. Scientific ecology is the study of the mutual implication of action in every phylum, and of the complex unity of the local in its binds with the global. That “ecology” has become a favoured metaphor for the neo-liberal free market makes it even more important to unpack the values implicit in scientific ecology and in environmental politics of various hues; and to understand the formal and physical properties of different media in their environmental implications. To test whether there is truth in the thesis that eco-politics is the necessary basis for a 21st century critique of culture, and whether cultural critique has anything to offer the political life of the 21st century, ecocriticism, especially suggests a need to address the physical and aesthetic properties of the media which constitute human socialisation; that shape experience; that form economies and materialise polities.

In 2011 United Visual Artists produced for London's National Maritime Museum a large-scale installation called *High Arctic*. Three thousand white rectangular blocks between a few inches and several metres high fill much of a vast darkened room, where up to 70 visitors can roam. The installation triggers floor-projected abstract patterns – some like snowflakes, some like weather map isobars – with interactive flashlights, while their motion sets off audio snatches of Arctic experiences through the ages. One of the striking things about this meteorological artwork is that moving images – of glacial melt and pollutants – form only a small part of its visual repertoire, signalling that while ecocinema studies has developed a close affinity with the photographic and animated *image*, this area of study needs to pay closer attention to all the visual media, not just the pictorial, if we are to evolve its capacity to the fullest extent. After all, the language of science is mathematics, numbers, and diagrams; the language of economics is spreadsheets, and the languages of power are maps and databases.

Data visualisation, embracing cartography, numbers, graphics and simulations, is integral to the discourse of climate change: its use in *An Inconvenient Truth* (Davis Guggenheim, 2006) is emblematic. Global events like climate change do not occur in humanly perceptible scales or time-frames. They demand forms of representation that can capture massive but slow change. Godfrey Reggio, for example, pioneered the use of time-lapse photography in his trilogy *Koyaanisqatsi* (1982), *Powaqqatsi* (1988), and *Nagoyqatsi* (2002). *An Inconvenient Truth* primarily relies on the technique of photographic stills taken from the same vantage separated by years, for example, of Kilimanjaro’s vanishing snows and the retreating glaciers in Glacier National Park – in effect an extreme form of time-lapse. But these photographic images seem to beg the question of credibility: Were the conditions comparable in successive frames? Are they evidence of atypical seasons rather than larger tendencies? And the question that scientific empiricism has taught us to ask: exactly what degree of change is occurring beneath the appearances? Appearances can deceive, as everyone knows, but the industrialized and informatic cultures of the developed, and increasingly of the developing, world place a great deal of faith in numbers. We are more convinced by numbers than by pictures.

Unfortunately, numbers are not intrinsically photogenic. We need to see these invisible tendencies formed visibly for us. Of course, a matrix of integers is always a possibility, but that requires skill and time to read, and the discourse of climate change is urgent. It is also populist, at the very least in the sense of being driven not by party politics but by a sense that the case must be won by appealing to the masses directly, unmediated by the representational procedures of elections and bureaucracy. As political movement, environmentalism has a tendency towards populism. In Ernesto Laclau's theoretical conceptualization , populism is a political term resting on a particular conception of the *people*. For Laclau, the “people” are not a political given, but constructed through political life. This often implies identifying the whole of the population with the underdog, or equally fictitiously identifying one sector of the population as the whole of it (the 'we' of “We don't want immigrants”). More important for this analysis, Laclau argues that populism mobilises affect, emotion, passions. The unit of social and political life, Laclau asserts, is neither individual nor group (by class, society, or other such categorizations) but demand[[2]](#endnote-2). The strange quandary for environmentalism thus is that it most often employs scientific rationalism in pursuit of affective mobilisation of demand. But to the extent that populism is a political movement, the demand it seeks to mobilise is specifically human. In contrast, the demand environmental politics seeks to voice is not exclusively human. Data visualisation, which seeks to give a voice to non-human actors, operates along the fault-lines opened up in the contradictory populism of environmental politics.

Picturing, on the other hand, is a humanism. Where populism is always about an embattled people and their demand, realism – the theory that photography and cinematography have a privileged relation with the world – begins with the assumption that human perception is the unique and universal criterion of truth. This is a political position only in the sense that it forecloses an essentially political struggle over the status of the real. In film studies, pictures were once held to be the essential hegemonic machinery of ideology. Some leading figures in the field today – among them D.N. Rodowick and Mary-Anne Doane[[3]](#endnote-3) – assure us that photographic picturing is a truth-bearing mode of 'indexicality', a direct record of an event that occurred in front of the lens. For the older film studies, no symbolic activity could articulate reality, which was definitionally excluded from the symbolic domain. Reality in this case was what symbolization produced as its other. Just as the subject was "an effect of language" (and other symbol systems), so reality was considered an effect of representation, which produces the object of the subject-object relation. We set all sorts of nets and traps but reality is what evades them, becoming the impossible object of our desire for possession, for pleasure, and the passion for order that underlies our lust for knowledge and command.

A very similar dualism of opinions holds good in environmentalism. While some deep ecologists contend that “Nature” is a transcendental reality beyond the human[[4]](#endnote-4), sociological environmentalists recognise that nature is constructed as what seems to stand over and/or against the human, either as resource to exploit or wilderness to protect[[5]](#endnote-5). In either case, 'nature' appears as the apolitical object of human action. For the emergent eco-film criticism, this argument implies that pictures are evidence of humanistic attempts to define the world as object of perception, and so to found our control over it. Such humanism of control originated in the nascent republicanism of the Renaissance and Reformation, and the war waged by Pico, Bacon and Luther to establish the centrality of the individual soul and the human observer. Today, however, humanism recurs as a defence of the secular science that is its legacy, but now with an investment of faith that turns it into a new form of absolute deity. Pictorial realism wants to maintain a five hundred year old thesis that the world is its own cause, and that the human being alone is its witness, the observer for whom all of creation renders itself visible. Clinging to a historical epoch that made possible, and descended into, the maelstrom of industrial capitalism, the humanism of pictorial realism appears nostalgic, which explains the elegiac tone of so much landscape cinematography in ecocinema.

But, along with photographic realism there is also that other mode of imaging involved in ecocinema: data visualisation.. Data visualisation aims to mobilise demand in the people by translating the empirical data of experts into visually legible symbols for the mass population, ostensibly to persuade through reason but actually to mobilise at an affective level. Meanwhile photographic realism, while laying claim to a special relationship to reality, places us invariably in a purely human mode of perception, framing the demand of the non-human other, nature, as that which must be represented, but which can only be said to represent *itself* if it does so *for us*. As we shall see, integrating the oscillation between modes of imaging, between demand and nostalgia, populism and humanism, is a key strategy in ecocinema, and allows us to expand ecocriticism beyond the exclusive terrain of environmentally explicit cinema.

Time-lapse already represents a kind of data-fication of the photographic image, by concertinaing past time into brief sequences. Then, when such remote sensing data is represented in cinema, as it is extensively in *An Inconvenient Truth*, there is a parallel data-fication of future time. Sequences such as the depiction of the retreat of the Columbia Glacier, are based on porting Earth observation by satellite (EOS) into geographic information systems (GIS). There are two stages to this data-fication process. In the first, data gathered from orbital instruments, often tuned to receive in non-visible regions of the spectrum (infra-red, ultra-violet, radar, lidar, radio and others), are combined and converted to red, green and blue (RGB) channels, so they can be handled in digital colour management systems, displayed on digital screens and seen by human observers. In the second, the visualisations are articulated with GIS visualisation systems, including perspectival representations of the globe, overlays of political boundaries, and ground-based observation, including terrain elevations. As opposed to normal photography and cinematography, EOS imaging has a strong claim to ‘indexical’ realism: expeditions can be and are sent to confirm or disprove the accuracy of EOS records and their interpretations. However, assimilating them to other types of visual techniques brings that empirical realism into question.

Interpretation is a critical issue in EOS[[6]](#endnote-6): it takes extensive training and real skill to decipher the inferences of colour codes. The red channel, for example, combines data from both near- and far-infra-red reflection. Underneath the surface of a digital image lie hexadecimal or other mathematical values for the colours. When these values express either a specific observation from the corresponding point on the Earth's surface or the arithmetic result of combining or differentiating two types of signals, the resulting colour value is also expressed as a mathematical value. The presentation of data as colour allows rapid scanning of large areas, or more specifically large datasets. Interpretation, therefore, has to be checked against two discrete 'truths', the numerical data and the spot on the planet referred to in the observation. The latter is also significant: in modern satellites, the directional sensors count as scientific instruments in themselves, so the alignment of the pixels – also expressed mathematically, in this case an address given as XY coordinates in Cartesian space – with specific places is significant. A pixel of EOS data is an average of responses, in as many as five or six wavelengths, from the equivalent of a few square metres on the planet’s surface. The process of averaging is integral to this type of instrumentation: the purpose of visualisation in image form is to help the researcher/viewer compare data across a large area; and the process of extrapolating data on change and rates of change is a process of averaging tendencies across a wide range of results. This is the case, most clearly of all, with the famous 'hockey stick' diagrams, the two charts of Northern hemisphere temperatures and CO2 concentrations with their level past and rapidly upward-curving present that Gore uses as a particularly dramatic counter to climate-change skeptics. Sequences showing developing climate trends work with very large data sets over periods of years by comparing figures derived from old and new satellites and instruments of differing sensitivities. Because they derive from such different sources, aggregating their data is bound to use algorithmic techniques to derive average tendencies, interpolating missing data by extrapolating from the data they do have. Such practices move very rapidly from specifics to statistics, as if audiences would not be able to respond to the individual incident (the notorious photographic image of a specific polar bear on a specific melting ice-flow, for example) as much as to the big-picture, data-driven diagram, even though both types of visualisation play not on reason but on affect as political modus operandi.

To the extent that it colludes in this statistical management of data, populist environmentalism of the kind promoted by Al Gore belongs in the mode of government described by Foucault[[7]](#endnote-7) as biopolitics, which takes the mass of the population as its object, statistical management as its method, and the regulation of life as its goal. Of course, such regulation extends to the life of the biosphere. Yet as fellow French philosopher, Jacques Rancière is at pains to point out, politics is the struggle over inclusion in the arena of the political. In ancient times the artisans, and in modern times the landless and women, were governed without the possibility of joining the governing. Today this exclusion stands over prisoners, immigrants and refugees, who are governed by coercive actions in which they have no say[[8]](#endnote-8). Taking the example of Rosa Parks, Rancière argues:

This is what the democratic process implies: the action of subjects who, by working the interval between identities, reconfigure the distributions of the public and the private, the universal and the particular. Democracy can never be identified with the simple domination of the universal[[9]](#endnote-9).

The universal, in the case of populist environmentalism, is a human *populus* presumed to represent “all of us”, the interests, as we so often hear, of the species, who alone have governance of the survival of the planet. If the subject of pictorial realism posits the human individual as the measure of perception, the universal subject of data visualisation, the universal subject of science, posits the human as species, and as the universal subject of politics. It is this exclusive claim to knowledge and power that marks the objective political frame surrounding populist environmentalism: the difficult, strictly unimaginable leap required to include “nature” as a political subject. Ecocriticism must follow the lead of Rosa Parks, and contest the boundaries between (human) subjects and (environmental) objects of rule.

**The End of the World, Part One: Armageddon**

In the case of traditional film (and indeed television and animation), we rarely come across data visualisation on its own. As Leon Gurevich[[10]](#endnote-10) points out, the rare example of Charles and Ray Eames’s film *Powers of Ten* (1968) is more a pre-genitor of Google Earth than a model for later cinema; it is, in effect, an example of graphic design in motion rather than a cinematic piece. In general we come across data visualisations either as inserted graphics, as in TV news and documentaries like *An Inconvenient Truth*, or displayed on screens in the pro-filmic sets of narrative film. I want now to look at three, somewhat traditionally eco-themed films, all directed by Roland Emmerich: *Godzilla* (1998), *The Day After Tomorrow* (2004) and *2012* (2009)[[11]](#endnote-11). We can bear in mind a general criticism of these films, voiced long before environmentalism emerged as a political movement, by Walter Benjamin, who wrote in 1936, “Mankind, which in Homer’s time was an object of contemplation for the Olympian gods, now is one for itself. Its self-alienation has reached such a degree that it can experience its own destruction as an aesthetic pleasure of the first order.”[[12]](#endnote-12). Today it is not just our own extinction that is at issue. We have already witnessed the extinction of the gods, whose place as privileged witnesses we usurped; what the populist discourse of environmentalism presents to us is the destruction of the world as a proximate possibility, first as the terminus of predictive modelling, and second as computer-generated imaging.

Rather surprisingly, of the three films it is *Godzilla* which exhibits the largest proportion of data visualisations. The title sequence establishes a key visualisation technique in the film, cartography, as a hand plots a course to the Mururoa atoll where the precipitating event, nuclear testing, takes place in archive sepia. Maps recur throughout the narrative, in both electronic and paper form, some static and some animated, all demonstrating the passage of the threat from the remote Pacific to Manhattan. The electronic maps merge with radar presentations, many of them sporting now dated 8-bit graphics: in one scene fish icons are used to represent the baited trap that has been laid for the monster and little Pacman-like symbols appear when the characters are navigating a street map of the city. Compared to these ostensibly objective accounts of action, the video inserts providing eye-witness observations are fragmentary, grainy, subjective and unreliable. Four sets in particular are rich in data visualisations: an army HQ (which gets progressively more data-rich as the film progresses), a UPS van, and later the apartment occupied by Philipee Roché’s (Jean Reno) French police team, and a submarine which navigates up the Hudson River in an attempt to torpedo Godzilla. There are odd conflations: more than once, the submarine's displays of depth contours are overlaid by a compass rose, maps are overlaid by graphics announcing the names of new locations, and topographical schematic is overlaid on an aerial photograph. Much of this either reminds the viewer “these are technological locations” or serves the principle of excessive obviousness, as when a map logo repeats dialogue indicating Lower Manhattan. The most interactive screens in the film are weapons displays, bordered by option boxes, and with progress bars and clocks attached. Clocks are ubiquitous, but their displays are more about time passing than informing us of the time: they convey urgency rather than information, a characteristic of the use of the affective use of non-photographic visual media in fiction films, from intertitles to street signs.

*Godzilla* follows a common narrative structure: an incompetent and self-serving political class is in cahoots with a profit-driven sensationalist press and relies on the brute force of military solutions until the army proves itself incompetent. In this instance, the alliance must rely on maverick action heroes (the French) and a heroic if bumbling scientist (Matthew Broderick), to carry out the decisive action. With the notable exception of *Troy* (2004), it is unusual for Emmerich’s films to feature a heroic, epic-scaled hero. Such characters do appear in contemporary cinema – Ridley Scott is notable for producing such larger-than-life heroes in *Gladiator* (2000), *Kingdom of Heaven* (2005) and *Robin Hood* 2010) – but they are increasingly rare in Hollywood. Far more typically, it is the ordinary person, the little man, who is forced to take on the role of hero. As populism, this makes sense. Brain power, but above all cunning, wins out over institutionalised inertia, self-interest, and failure of affect. Emmerich's heroes are the small entrepreneurs playing smart against government, with a little vituperation left over for corporate greed, such as we see pilloried in many science fiction films. Something similar occurs in *Godzilla* in terms of data and its trustworthiness: the heroes throw away a paper map because it fails to provide the subterranean data they need, but rifle through paper records for the vital cab radio frequency that allows them to triumph. The broader reliance on electrical power supply is never brought into question. After politicians, the military – who initiate the story through nuclear testing, nearly end it by firing on Manhattan, and come close to destroying everything by refusing to check their success – come out lowest in the hierarchy. But their tragedy, the tragedy of the military, is that both at Mururoa and in Manhattan, they have failed to recognise what they have and haven't accomplished, especially the unwanted and deliberately ignored side effects of weaponry: the monster in the first instance and its offspring in the second. The irony is that the monsters are themselves CGI: entirely created from data.

While *Godzilla*, a monster movie that loosely mimics earlier monster films (such as the 1956 film by the same name) abounds in data visualization, curiously there are very few instances of data visualisation in *The Day After Tomorrow*, a film looking to a future devastated by climate change. Its claims to realism are carried photographically, with the brief exception of an animated diagram explaining the workings of the North Atlantic conveyor, the thermohaline system that moves water between the warmer, fresher surface of the oceans and the saltier and colder depths. Satellite mapping is used to emulate the evolution of the superstorm, and scientists constantly refer to their off-screen screens, but the film has far fewer passages of data visualisation than *Godzilla*, as if the tepid audience response to the earlier film led the producers to avoid its geekier aspects and ramp up the action. But if so, the process did not continue into the third of this loose trilogy, *2012*. In this film, the crisis is neither anthropogenic nor terminal. The survival of a baby Godzilla is certainly readable as a cynical plant to allow for a sequel[[13]](#endnote-13). The ending of *The Day After Tomorrow* allows for a clever and pointed satire on US border policies. *2012*, however, is frankly muddled: the world is to be repopulated, after it suffers apocalyptic scouring as a result of a solar flare, by arks filled with bloated plutocrats, corrupt government officials, the military (again), and a family who scrape their way aboard. The triumphalism of the final scenes is premised on viewers forgetting that the rest of us – bar one sentimental representative of the little people – are all dead.

It is hard to pinpoint the motivating idea behind *2012*: far harder than in the two earlier films. Like the meteorite in *Armageddon* (1998), for example, the cause of the disaster is utterly non-human, but unlike *Armageddon*, there is no suggestion of an intrinsic malevolence in the actions of the universe. The wrong kind of solar neutrinos, coinciding with a desultorily brushed-in reference to ancient prophecies, suggests only bad luck; the film lacks even a half-hearted gesture towards a concept of destiny, which could not have withstood the survival of lapdogs and oil billionaires in the final scenes. But science fiction is widely held to reflect on the state of the contemporary world, not necessarily as allegory or satire, but as an expression of anxieties and perhaps yearnings. The great pleasures of the film are associated with the destruction of various cities and landscapes, so establishing its claim for a Benjaminian yearning for extinction. At the same time, its monologues on the value of books and art point in quite another direction (though the emblematic book here is one no-one has in actuality ever read, having been authored by one of the characters). Weeding through the vast library of culture to select, in a lottery of accident, the few items that will survive into the new society is one thing; selecting the people who will populate the suddenly empty world is another. We could with some legitimacy believe that the film plays to a desire to simplify, but most of all to de-populate the planet. *2012* expresses a nightmare of overpopulation different from the echo of Aushwitz in *Soylent Green* or the more recently the BBC TV drama series *Torchwood: Miracle Day* (2011). There is a chilling eugenic undertone to the concluding scenes of *2012*: the film goes through the motions of deploring how places are reserved only for the wealthy and powerful aboard the departing vessels, but the final scramble for places looks all the more like neo-Darwinian survival of the fittest.

Neither the pure accident of the narrative premise nor the pure ideology of the ending, however, prepare us for the intensity of data visualisation in *2012, which* returns to the levels of *Godzilla* ten years before. Three minutes into the film, Helmsley (Chiwetel Ejiofor), viewing an arcane display at a subterranean Indian lab, asks 'So, what are we looking at?' This is the basic question viewers ask of data visualisation: the presentation does not stand on its own feet. It requires supplementary knowledge – where, when, at what scale and in what time frames the phenomena occurred or is occurring. In this case, the dialogue gives us that information, revealing the basic plot premise that solar neutrinos have changed nature, interacting as they normally do not with the Earth's core. Later visualisations are more self-explanatory: data overlaid on images of solar flares, maps used in sets and as props, and miscellaneous headquarters and other power centres (with the notable exception of the Oval Office) festooned with a variety of data screens.

In *Godzilla* these visualisations recall both industrial VTRs (video tape recorders) and Next computers, then the apogee of computer design. In *2012* they share the design of contemporary utility and highway control rooms, radiating the efficiency of the engineer, the competitiveness of the neo-liberal, and the leadership of the bio-politician. Data visualisation here expresses the contemporary technical form taken by power. It subordinates economics to power, a constant feature of cinema of the neo-liberal era (as we can also see in the simulations and datagraphics so prevalent in the command centres of *Avatar* [2009]). This thought needs to be balanced with Theodore Porter's thoughtful boundary-setting to his analysis of the rise of quantification: “I do not claim that quantification is nothing but a political solution to a political problem. But that is surely one of the things that it is”[[14]](#endnote-14). The implication here is that quantification responds to a crisis in representation by resorting to numerical symbols, rather than pictures or words. Visualisation acts as a supplement to quantification, undercutting the ostensible objectivity of the numbers by reporting them in humanly perceptible form, even though that form still requires the verbal supplement ("What are we looking at?") to complete the communication. By reducing observation to integers (counting numbers), quantification assembles them as unitary and discrete objects of knowledge, an essential step if phenomena are to be brought under bio-political control, and equally essential to their commodification. Rendering the world as data thus is a fundamental stage in contemporary political economy.

But, as already mentioned, visualising the results of quantification as graphic displays has the tendency to statistically aggregate. That aggregation itself is not necessarily unit-based but the typical diagrammatic display is. Time is typically laid along the (horizontal) X axis and counted in familiar calendrical units; temperatures, accumulations of carbon, and other variables are mapped in similarly appropriate units on the (vertical) Y axis. The passage from observation to statistical aggregation is equivalent to the work of interpretation: it is a hermeneutic. In this instance the question is less whether that hermeneutic is beyond question, and more about the subsequent step. The passage from statistical interpretation of the data to its rendering on a Cartesian coordinate grid is always a passage from the potentially infinitesimal, and therefore uncertain and emergent nature of small numbers, towards the monumental stability of the counting numbers. It is thus not so much the visualisations of Emmerich's films but the calibrations appearing in their frames that signifies both the duty to witness, derived from scientific rationalism, which the films appropriate to regimes of power and control; and the attempt to compress an unruly and untidy world into the rectangular grid of a raster display. Implicit references in these films to the commodification of data are in a sense merely background, even when, as in *2012*, they play with the question of the cash value of a human life.

As Hamblyn and Callanan note, “climate warming figures tend to be globally averaged, so it is to be expected that some places will show localized cooling, some will show localized warming, while others will show no change at all”[[15]](#endnote-15). Thus while some local observations will support evidence for anthropogenic meteorological change (as in the case of the British Antarctic Survey's account of the depletion of ozone over the South Pole in the mid 1980s, leading to the Montreal protocol), other observations may not. Microclimates are by now familiar to many people: one suburb windier, another drier; the valleys on one side of a hill wetter or mistier than on the other. We understand microclimatic changes, if only at an intuitive level, as we walk down a shaded lane, where the still air encourages various flying insects and the specific kinds of bird that hunt them. The dissemination of “chaos theory” through popular books, comics, films and TV series makes it clear now that knowledge of ecology is always incomplete, and that predictions based on such popular knowledge are unlikely to come to pass the further from actual observation we progress. But still the lure of precognition draws us in. This is the philosophy underpinning Emmerich's films: all three approach – as fiction – possible scenarios resulting from nuclear weaponry, climate change, and cosmic accident. It is notable that the one which has the strongest scientific claim to likelihood, *The Day After Tomorrow*, should be the one that uses the least data visualisation, particularly modelling and simulation.

**The End of the World, Part Two: Irreality**

The whistleblower narrative is a familiar piece of the environmental thriller genre: *The China Syndrome* (1979), *Silkwood* (1983), and *The Insider* (1999) among them. Emmerich's films use the same figure. Edward Tufte's axiom, that “a lack of visual clarity in arranging evidence is a sign of a lack of intellectual clarity in reasoning about evidence”[[16]](#endnote-16) suggests, in the negative, one reason why. The ignored or silenced witness shouts louder and louder, with less and less care for the communicative niceties. But it also suggests a struggle in the field of statistics, a struggle to gain control over their presumed predictive power. The contradiction here is between the prophet and the manager. The humanistic tradition of photorealism calls for a human witness inspired to express their fears or hopes for the future based on what they have seen in person: this is the prophetic power of the witness-figures in *The Day After Tomorrow*. The less credible – and less visible – Armageddon phenomena of *Godzilla* and *2012* call for simulations, in the sense of computer-driven what-if scenarios, modelling and managing the possible outcomes of past trends.

Such visualisations are more correctly labelled virtual, the more they engage in the multitude of possibilities that emerge from any actuality. This formulation derives, not from the popular distinction between digital and real, but from the philosophical distinction between virtual and actual. What is actual is the result of previous actions: the virtual is about the emergence of new possibilities from what actually exists, and thus about the possibility of new actions. It is the potential (which, as Arendt [2003] points out, means “power”) to realise something new, the “potential difference” you might say, of the future from the past that makes time move forward. The problem with the kinds of visual displays represented in the Emmerich films is that they are not displays of potential but of its opposite. Power, in the era of biopolitical population management, is even more deeply engaged in restricting possibilities, reducing risk, maintaining the status quo. Today, power aims to minimise that very potential that, in other political ages, defined politics: the power to make change has been relinquished in favour of the power to maintain a steady state. Ecology, in its systems-theoretic guise, has provided a “natural” analog for this new de-politicisation of the political sphere. Ecocriticism has a special duty, therefore, in correcting the denuding of political life, with its pathological fear of struggle and disorder, and its thorough distrust of evolutionary or revolutionary change[[17]](#endnote-17).

Biopolitical data visualisation is a contradictory beast. In the first instance, its task is to portray the object-world not to the ordinary human perceiver but to a *sovereign subject* – that most intrinsically self-contradictory entity. Constituting the object-world as its own cause is ostensibly a humble act of self-deprecation on behalf of the subject: the world *is*, but I merely observe. In the first place, then, data visualisation shares with photorealism a disciplinary humanism which gives *ordinary* human beings the duty of caring for the world. In a second moment, however, the move from cartography as disciplinary tool to instrumental tool in the control of society's database/spreadsheet/geographic information system integration is *mass* data visualisation. Such visualisation strives towards biopolitical domination over statistical tendencies, rather than the specific events that photography captures, and which form the objects of older disciplinary regimes. Integrated data management takes the typical rather than the unique as its norm. Every square of a traditional map is unique: whereas every cell in a database is effectively exchangeable for every other. These two modes, the older disciplinary humanism and the new biopolitical populism, thus co-exist in uneasy collaboration in contemporary data visualisation strategies.

Modelling – computer simulation of extrapolated trends to provide predictions of future developments – extends this already unhappy manipulation of statistical norms into control over future developments. Unique events appear in these models as risks, and the task of modelling is to reduce or remove, that is to manage risk, to manage the emergence of the future as such, and in part, as Beck[[18]](#endnote-18) implies, to apportion the greatest quantity of risk to the poorest and weakest sectors of the population. The future being definitionally different from the present, reducing its difference from the present effectively reduces the quality of futurity. Unique events are programmed into the simulation as scenarios, fictional and theatrical, in which the reassertion of normality can be acted out in forms that have clear beginnings, middles and most of all ends. The narrative closure sought is comic: resolution of crisis through the restitution of the existing order. The satirical version presents the opposite case: the apocalypse as tragedy. In the former case, the tragic quality of life is as superficially denied as it is in advertising. In the latter, the actual pain of existence is justified by its termination. One thing the narrative structures of modelling are not good at is subtlety in affective registers. The ability to model scenarios is based on the idea that potential can be reduced to the capacity to manage situations. Situations themselves are envisaged either as unforeseeable acts of nature, or as predictable outcomes of complex systems, and often, as in the case of the 'perfect storm' of *The Day After Tomorrow*'s one graphical display, a combination of the two. Nature here is abstracted into a set of variables, and the modelling allows a game in which political managers test their skills in responding.

A key lesson of modelling, however, is that it is never too soon to start preparations. The management of future scenarios, however fictional, requires prescient action in the present in order to lessen risk (that is the potential for radical change) and to make the future as much like the present as possible. However, such normative policing of the present produces unfortunate scenarios, some with the quality of nightmares, of the Philip K Dick paranoid variety, such as in the films *Minority Report* (2002) and *Paycheck* (2003). In one variant, the present is actually the future, and the deployment of governmental oversight (state, military, corporations) predates and prefigures a future totalitarianism, which is effectively pre-destined precisely because it is so richly anticipated, for example Tony Scott's *Enemy of the State* (1998). In a second variant, both present and future lack reality. They are already simulations: aggregates of statistical variables, already manipulated in the interests of maintaining the existing database economy. This motif is the basis of films like *Dark City* (1998), *The Matrix* (1999), *The Thirteenth Floor* (1999), and in recent rush, *Deja Vu* (2005), *Next* (2007), *Knowing* (2009), *Inception* (2010), *The Adjustment Bureau* (2011) and *Source Code* (2011). The most recent cycle (with the exception of the apocalyptic *Knowing*) trivialises the virtual to the extent that it now *means* simulated, rather than potential. Unlike the late 1990s cycle, the new group present worlds which are not so much unreal as “irreal.” The idea of the irreal is presented as a scenario that encourages second chances, often in the form of comedies of (re)marriage. Where the irreality of past, present and future alike deprives scenarios of all actuality, that is of their presence as situations resulting from decisive human actions, action now appears as a move in a game, as a performance that can be revised and reversed. This is the sense of simulation as ahistorical, where it meets the idea of biopolitical management as an Olympian sport in which the lives of the pieces can always be rebuilt, with the result that no action is ever decisive, nor any reality determinate. In such worlds of ontological uncertainty, everything rests on control over knowledge.

Tony Scott's *Deja Vu* is not generically an eco-film; but it works on a certain ecological principle that is most spectacularly on show in the sequence when Denzel Washington is taken for the first time to a time travel facility. In a large hangar, various military and engineering activities are going on but at the core of the place is a long, low-ceilinged room whose walls are completely covered in screens, in front of which is a control or mixing desk with smaller screens perched along its forward edge. Scott had already worked the theme of surveillance in *Enemy of the State* and the idea of a world shaped by number and pattern in the TV series *Numb3rs* (2005-10), which he executive-produced. Here the paranoia of the former meets the policing mentality of the latter; including, as a new feature in his work, uncomfortably voyeuristic scenes in which policemen observe the private moments of an unknowing young woman. As in many of the HQs portrayed in these films, the bare walls are packed with electronic equipment, sporadically flashing lights and numerical displays. The major visual displays are either plain numerical matrices or large and small satellite images of the city, and diagrams that are too far away from the lens to make out in detail. The sheer scale of numerical data is the point.

*Deja Vu*'s premise is that the world is composed of a datastream and that assembled instruments allow the police to view a travelling moment of the past, at any moment four and half days prior to the present. There are several references to surveillance, and to the impossibility of recording so much data (the cinematic rendering of the past that the police view is not stored but live). This introduces the first irreality into the ontology of the film. The next comes from a second plot element: Denzel in the present falls in love with a murder victim in the past. While Scott leaves in passing references to the enormous surveillance machinery of state agencies, there is also a motif of the guardian angel in the murdered girl's intuition that she is being watched. This kind of spirituality runs the gamut of irreality films, which also play on themes of data-based afterlives and, in *The Adjustment Bureau*, of a divine intelligence ordering the world. This sense of a second world alongside ours, a parallel universe of uncertain value (heaven, hell, dream, etc.) plays against the theme of destiny claimed by the bomber at the heart of *Deja Vu*'s storyline but is actively played out in the neat resolution of temporal contradictions in the film's finale.

Both humanist and populist simulations are premised on the exclusively human privilege of witnessing, and our contingently unique control of symbolising and ordering the real. Apocalypse, in this framework, is the genre which imagines futures in which agencies other than human (DNA, Gaia, the Sun, etc.) contradict the immaculate constellation of power over present and future. Like the Emmerich films, irreality films also tend to ridicule the pomposity, hubris, and illusory self-sufficiency of military and political leaders (in *Deja Vu*, for example, the agency closes down the time device but the hero and a rogue scientist secretly turn it back on to make an unprecedented journey back in time). But beyond this satirical moment, irreality films, rather than imagining an inhuman agency,which claims a part in the politics of the planet, ultimately accept the constitutive unreality of human subjectivity.

The description of the world as symbolic system, as pattern, number, spatial geometries, datasets, tends to reduce technical instruments to windows, as in the cinematic display of *Deja Vu*'s time device, and disregards their active participation in the production of both knowledge and control. At the same time, human power and its technological subordinates are presented as power (or the failure of such power) over an object world. Populism always addresses itself to, and poses as the voice of, the ordinary people. The 'people' of this populism are users of technology, but not its subjects; their knowledge is intuitive rather than organised, and so marked as a quality of their ordinariness, even when protagonists are endowed with special detective skills or scientific insight. But this ordinary *populus* is also exclusively human. They are concerned to maintain the exclusivity of the species, and the right to rule and overrule any non-human entity, even at the expense of undercutting the foundations of human subjectivity. Instead of allowing a battered Gaia to move from the position of the governed to partake in government – with all the radical change to politics that entails – these films suggest that even plummeting into the *mise-en-abîme* of *Inception* is preferable to breaking the hegemony of political managerialism. Placing love at the heart of history is a way of ensuring that history itself is always seen *sub specie aeternitatis*: as the villain in *Deja Vu* remarks, “In all eternity I am here.” If it also places the narrative in a nasty fictive bind, echoing the moment in *Vertigo*, one Hitchcock's most sadistic films, when Washington asks his new-met love to dress differently, it also reflects the motif of undying love which ratifies the removal of action from history in favour of the universality of the romantic couple, and its abstraction from time. All data visualisations tend towards spatial solutions for the problems raised by time. Cinematography raises one solution, or family of solutions, in the humanist tradition, which retains, however tortuously, a connection to the future-orientation of the open gesture. In these films, the contradictions between time-based cinema and spatially-oriented data visualisation are never played out; and, therefore, the account which they must give of love is as resolution and stasis. Love in the age of the database economy is eternal but unchanging.

**Conclusion**

Science is no more unmediated than any other human activity. The choice of instruments helps shape the kinds of science that are done, just as much as theorising science leads to new instrumentation[[19]](#endnote-19). In the case of the complex systems investigated by ecology, instrumentation is likewise intrinsic to the observations that can be made with them. The kind of systems thinking that has evolved in both ecological science and systems engineering has tended to converge on a shared thesis of dynamic equilibrium, a model dynamised by the random mutations of Darwinian evolution but still held to be ideally homeostatic. The part to be played by ecocinema studies then should include study of the visualisation (and in good time sonification) technologies used to mediate between three sets of agents: the scientific community, the natural world, and the mass of the population. This chapter has argued that the mass population is also a construct, specifically of the statistically-based mass-observation technologies of data visualisation. Our relationship with the environment is a subject-object relation which has deep roots in the historical formation of concepts of human and natural, which ecocriticism is especially attuned to. In the works examined here, the contradictory relation between the humanism of pictorial realism and the mass-management of data visualisation illustrates a contradiction between the unaided human sensorium as paradigmatic subject of truth and the universal sovereign subject of scientific empiricism. In recent narrative cinema, it is clear that control over visualisation in the scientific community is the object of a political struggle between factions, in which the claims of scientific neutrality are frequently questioned, whether by populist, heroic representatives of the 'little guy' or by overweening military and political elites. Data visualisation is synonymous with eco-science; representations of data visualisation in these films show how powerful such visualisation can be in communicating the claims of elites to power over decision-making. At the same time, the homeostatic normativity underlying statistical data-gathering, increasingly explicit in future-modelling, poses a disturbingly distinct ontology, which the second group of films examined here explore in terms of ruptured reality, especially of the temporal order of causality. In the irreality film, these contradictions begin to emerge as anxieties, vertiginous and unsettling, even though they are resolved in the narratives. A key task of ecocritical film studies is then to work at this contradiction, in the hope that it will make possible the emergence of a new and unforeseeable future subjectivity, and with it a new relation to the 'object' environment.

The specific political analysis argued in this chapter is less important than the principle of eco-film criticism's ambition which is to articulate the material, economic, governmental, phenomenological, and aesthetic properties of contemporary mediation, properties made evident in data visualisation and its uncomfortable assimilation into photographically realist narratives. Eco-film criticism’s over-arching purpose should not be to impose a political program, and still less to propose a more “efficient” communication of scientific truth to a waiting audience, but to help create public spaces for debate and argument over the claims of the environment for a place in political life.

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1. **Notes**

 A number of literary ecocritics have already argued for this extension of ecocritical analysis beyond the boundaries of explicitly environmentally concerned texts, most influentially notably Lawrence Buell in his *The Future of Environmental Criticism: Environmental Crisis and the Literary Imagination* (Oxford: Blackwell, 2005) and *Writing fr an Endangered World: Literature, Culture, and Environment in the U.S. and Beyond* (Cambridge Mass: Harvard University Press, 2001). [↑](#endnote-ref-1)
2. Ernesto Laclau, *On Populist Reason* (London: Verso, 2005), 225-7 [↑](#endnote-ref-2)
3. D.N. Rodowick, *The Virtual Life of Film* (Cambridge MA: Harvard Unversity Press, 2007); Mary Anne Doane, “The Indexical and the Concept of Medium Specificity.” *d i f f e r e n c e s : A Journal of Feminist Cultural Studies* 18.1 (2007): 128-52. [↑](#endnote-ref-3)
4. For example, Arne Naess, *Ecology, Community and Lifestyle: Outline of an Ecosophy*, trans and revised by David Rothenberg (Cambridge: Cambridge University Press, 1989), and rather differently Carolyn Merchant, *Reinventing Eden: The Fate of Nature in Western Culture* (New York: Routledge, 2003) [↑](#endnote-ref-4)
5. See the authors surveyed in David Demeritt, 'What is the 'social construction of nature'? A typology and sympathetic critique', *Progress in Human Geography* 26,6 (2002): 767–790 [↑](#endnote-ref-5)
6. See Emilio Chuvieco, *Earth Observation of Global Change:The Role of Satellite Remote Sensing in Monitoring the Global Environment* (Springer, Berlin, 2008); see also Thomas Lillesand M, Ralph W Kiefer and Jonathan W Chipman.. *Remote Sensing and Image Interpretation.* 6th edition. (New York: Wiley, 2007). [↑](#endnote-ref-6)
7. Michel Foucault, *The Birth of Biopolitics: Lectures at the Collège de France 1978-1979.* Edited by Michel Senellart, trans Graham Burchell. (Basingstoke: Palgrave Macmillan, 2004); Michel Foucault, *Security, Population, Territory: Lectures at the Collège de France 1977-1978.* Edited by Michel Senellart, translated by Graham Burchell. (Basingstoke: Palgrave Macmillan, 2007). [↑](#endnote-ref-7)
8. Arash Abizadeh, “Democratic Theory and Border Coercion: No Right to Unilaterally Control Your Own Borders” *Political Theory* 35.1 (2008): 37-65. [↑](#endnote-ref-8)
9. Jacques Rancière, *Hatred of Democracy.* Translated by Steve Corcoran (London: Verso, 2006) : 61-2. [↑](#endnote-ref-9)
10. Leon Gurevich, “Google Warming: Panoptical Regimes and the Machinima of the Visible.” manuscript (Wellington: Victoria University, 2011). [↑](#endnote-ref-10)
11. A fuller analysis would include his *Independence Day* from 1994 and the 2008 *10,000 BC* [↑](#endnote-ref-11)
12. Walter Benjamin, “The Work of Art in the Age of its Technological Reproducibility: Third Version.” *Selected Writings, Vol 4, 1938-1940*. Edited by Howard Eiland and Michael W Jennings. (Cambridge MA: Bellknap Press / Harvard University Press, 2003), 251-283: 283. [↑](#endnote-ref-12)
13. Though the lack of box-office success for the 1998 movie meant that plans for a sequel were put on hold. An animated TV series did appear, and production companies Sony and TriStar's rights to the franchise expired in 2003. A planned 2012 film is widely seen by fans as a 'reboot', with no relation to Emmerich's film. [↑](#endnote-ref-13)
14. Theodore M Porter, *Trust in Numbers: The Pursuit of Objectivity in Science and Public Life* (Princeton: Princeton University Press, 1996): x. [↑](#endnote-ref-14)
15. Richard Hamblyn and Martin John Callanan *Data Soliloquies.* (London: UCL Environment Institute, 2009): 32. [↑](#endnote-ref-15)
16. cited in Hamblyn and Callanan *Data Soliloquies*: 29 [↑](#endnote-ref-16)
17. Chantal Mouffe, *On the Political.* (London: Routledge, 2005); Rancière, *Hatred of Democracy*. [↑](#endnote-ref-17)
18. Ulrich Beck, *World Risk Society.* (Cambridge: Polity, 1999). [↑](#endnote-ref-18)
19. See the introduction to Peter Galison, *Image and Logic: A Material Culture of Microphysics*, (Chicago: University of Chicago Press, 1997). [↑](#endnote-ref-19)