



Can the Sun Lie? An Inquiry into the Epistemological Conditions of Atmospheric Reading[†]

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Abstract: The sky has long been read, and the climate crisis has renewed the need to read it. Today, changes in the atmosphere cannot be grasped simply by looking up at the sky; we encounter them through processes of observation, recording, classification, and interpretation. Yet the processes through which such readings are produced often recede behind their results. This study addresses this problem through the concept of environmental legibility, which refers to the process by which atmospheric change becomes perceptible and readable. Drawing on Derrida's grammatology and on Ingold's and Böhme's accounts of atmospheric perception, the study distinguishes two dimensions of inscription. Material-atmospheric inscription refers to physical changes that register as perceptible or measurable differences. Discursive-technical inscription refers to the human and technical practices through which such differences are recorded, classified, and calculated. The legibility of the sky emerges through the interplay of these two dimensions. This interplay is examined through Susan Schuppli's *Can the Sun Lie?* (2014) and Trevor Paglen's *CLOUD* series (2019). Schuppli foregrounds how atmospheric difference becomes evidence, while Paglen makes visible how visual differences are selected as algorithmic features. Together, the two works show how the sky becomes legible and how the conditions of its reading recede behind the result.

Keywords: Environmental legibility, Inscription, Grammatology, Environmental semiotics, Susan Schuppli, Trevor Paglen, Anthropocene

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1. Introduction

1.1. The Already-Read Sky: The Epistemological Problem of Reading the Sky

To speak of reading the sky is not merely metaphorical. The Latin *signum*, the etymological root of “sign,” referred at once to a mark, a military standard, and a constellation (Lewis & Short, 1879, p. 1697), while the East Asian term *cheonmun* (天文) referred to the patterns of the heavens. The sky has thus long been treated as a surface to be read. Anthropocene discourse adds a new condition to this longstanding relation. As human activity alters greenhouse-gas concentrations and the thermal structure of the atmosphere, the sky to be read increasingly contains changes produced by humans themselves.

Yet such changes cannot be perceived simply by looking up at the sky. The task of reading trends in greenhouse-gas concentrations or mean temperature has been delegated to observational instruments, institutions, and computation. We encounter the results of this reading in weather forecasts, such as “rain from three o’clock,” or in data visualising climate change. What was observed, and according to what criteria it was classified, does not appear in these outputs.

An epistemological problem arises here. Forecasts and data circulate as facts about the sky, whereas the observations, classifications, and calculations through which those facts were produced do not circulate with them. When the process of reading becomes invisible, its results can appear as though they were intrinsic properties of the sky itself. Yet in the sky of the Anthropocene, a substantial proportion of what changes is not simply given in advance but has been produced by human activity. Kim (2024, p. 88) describes humanity as an “unintentional author” (*auteur involontaire ou non-intentionnel*), an author that leaves traces in the atmosphere without having intended to do so.

Recent scholarship has approached weather and climate in the Anthropocene from several directions. In literary and cultural studies, *Meteorologies of Modernity* examines how literature has historically reflected and participated in discourses of weather and climate, treating cultural representation as part of the ways in which atmospheric phenomena become intelligible (Fekadu et al., 2017). In aesthetics and cultural theory, *Climate Realism* similarly approaches climate as at once environmental, social, cultural, and economic, drawing attention to the aesthetic forms through which its complex forces become perceptible and representable (Badia et al., 2021). From an ethnographic perspective, *The Anthropocene of Weather and Climate* foregrounds local weather knowledge and lived perception, showing how environmental change is apprehended through situated practices and experience in relation to scientific and policy knowledge (Sillitoe, 2022). Taken together, these studies indicate that weather and climate do not simply present themselves as self-evident objects of knowledge but become intelligible through historically and culturally situated practices of perception, representation, and interpretation. Yet the reading of the sky itself has received less attention as an epistemological problem.

Practices of reading have themselves changed: the means by which the atmosphere's traces are read have shifted from unaided observation to instrumental measurement and, increasingly,

to machine computation. A full epistemological genealogy of this transition would require a separate study. As a first step toward such a project, this study asks: how does atmospheric change become legible?

1.2. Two Analytical Levels: An Epistemological Question and Two Case Studies

This study proceeds on two interconnected levels. The first is an epistemological question: how does the sky become legible? The second is the examination of two artistic cases. Through Susan Schuppli's *Can the Sun Lie?* (2014) and Trevor Paglen's *CLOUD* series (2019), the study examines how each work makes visible the process of reading that tends to recede behind its result.

To address how the sky becomes legible, this study distinguishes two dimensions involved in reading the sky. In the material-atmospheric dimension, atmospheric change appears as perceptible or measurable “difference”; in the discursive-technical dimension, such difference is selected and organised into a legible form. The two dimensions are developed in more detail in Section 2. The central argument is that the legibility of the sky emerges through the interplay of these two dimensions. Once a reading is stabilised in the form of evidence, data, or detected features, however, the process that produced it tends to recede behind the result. Schuppli and Paglen make this process visible in different ways. In Schuppli's work, a warming atmosphere alters the apparent position of the sun, and observations of this change become evidence through testimony and scientific interpretation. In Paglen's work, what an algorithm selects from a photograph of clouds, and the criteria by which it does so, are made visible.

2. Theoretical and Methodological Premises: Grammatology and Perception from Within the Atmosphere

This study is situated at the intersection of visual art, philosophy, and anthropology. Its theoretical premises are drawn from Derrida's grammatology and from Ingold's and Böhme's accounts of perception in weather and atmosphere. Methodologically, it examines the reading of the sky through two artworks.

The two works were selected not simply because they take the sky as their subject, but because they reveal different aspects of how legibility is constituted. In each case, the analysis focuses on which differences are perceived and recorded, who or what reads those differences, which processes of mediation, interpretation, and selection intervene, and how those differences are organised into legible forms through the act of reading.

Kim (2024) has proposed, in this journal, a semiotic approach to climate change in the Anthropocene that includes a grammatological perspective on weather and climate. This study shares that concern while narrowing its focus to the reading of the sky and examining two works of visual art as case studies.

2.1. Trace and Archi-Writing: Grammatological Conditions of Reading the Sky

It is a longstanding assumption that writing transcribes speech and images imitate objects. On this view, the origin is assumed to precede its record. In *Of Grammatology*, Derrida (1967/1997) calls this order into question. Western metaphysics has traditionally privileged the speaking voice as the site of meaning's full presence, while assigning writing the status of a secondary instrument that merely records that presence. Derrida challenges the priority accorded to the voice and to a self-present origin, arguing that meaning, whether in speech or writing, depends on differences and intervals among signs. He calls the structure of difference that makes both speech and writing possible arche-writing (*archi-écriture*) (pp. 60–65). As Gasché (1986) explains, arche-writing is not another script that existed prior to speech. Rather, it names the general structure by which any sign acquires meaning only through its difference from other signs. It thus designates the relational condition of signification in general, rather than writing in the narrow sense of marks on a page.

The trace describes how a sign exists within this relational structure. A sign can mean something because it differs from other signs and therefore carries within itself a relation to what it is not. No sign is fully present to itself; it can function as a sign only through its relation to what is absent, to what is other than itself (pp. 65–73). Derrida calls this structure the trace. If a sign acquires meaning only through such relations, meaning is never finally complete but is continually deferred through further relations with other signs. Derrida's *différance* names this movement of difference and deferral (Derrida, 1972/1982, pp. 3–27).

Derrida's discussion of the trace and *différance* operates at the level of signs and meaning. His concept of the trace does not refer to a material residue, such as a footprint left on the ground, but to the relational structure through which something acquires meaning. It therefore cannot simply be identified with physical change in the atmosphere. What this study takes from Derrida is the proposition that meaning does not reside in things themselves but emerges through relations of difference. Applied to the atmosphere, this means that a physical difference in the atmosphere is not, in itself, already legible.

Szerszynski (2010) extends this Derridean understanding of difference and relationality to the domains of weather and climate. He takes arche-writing as a structure of difference and deferral (p. 20) and reads the history of modern meteorology as a site in which this structure has been at work. Knowledge of weather is produced through practices of writing involving instruments, measurement, standardisation, and statistical aggregation. Following Derrida, Szerszynski describes writing as the condition of im/possibility of meaning.¹ Writing makes meaning possible through difference, but because difference also entails deferral, meaning can never be finally settled. In Szerszynski's words, "writing itself ... is always aberrant," and reading the climate is therefore "always already subjected to the vagaries and aporias of writing" (2010, p. 22). He accordingly characterises modern meteorology as meteorography, that is, "practices of inscription in which meaning and reference can never be finally stabilized" (p. 25). He further points out that modern practices of reading climate already contain "a notion of

¹ The condition of im/possibility of meaning refers to a single condition that operates in two opposed directions. Writing leaves marks and thereby makes repetition and comparison possible; meaning is constituted through such repetition. Yet the repeatability of a mark also means that it can always be read again within new relations, so the same condition makes any final determination of meaning impossible. This is the kind of structure Derrida describes in terms of aporia, which Szerszynski applies to meteorological writing through the notation of im/possibility (2010, p. 22).

weather's technological writability" (p. 11). This claim follows from the narrative he reconstructs: humanity first marked the climate without knowing it, then learned to read those marks, and, in learning to read them more effectively, also learned to exercise greater control over the production of such marks (p. 11). If reading is oriented towards control in this way, weather is being read as something that can, in principle, be rewritten. Szerszynski's point is precisely that the scientific practice of reading climate already contains within it the possibility of weather's technological writability. To address the reading of the sky, however, one must ask not only how such reading is structured, but also where the reader reads from.

2.2. Reading from Within the Atmosphere: Weather-World and *Atmosphäre*

A reader can stand apart from a book. A reader of the atmosphere, however, is situated within the very atmosphere being observed. Ingold (2007) argues that we do not look at the landscape from the outside but live within a weather-world. We do not so much perceive weather as an object before us as perceive within it. In Ingold's words, weather is "not so much what we perceive, as what we perceive in" (2010, p. S131). Knowledge of weather is formed through the repeated perception and activity of people living within that medium. The Inuit observers' reading of the sky, discussed in Section 3, provides one example of such knowledge.

If Ingold tells us where the perceiving body is situated, Böhme (1993) asks where the perceived emerges. *Atmosphäre*, as he theorises it in aesthetics, is neither simply a property of an object nor merely a subjective mood. The clarity of a valley is not a quality attached to the valley itself, nor is it simply an internal state of the person who senses it; it is perceived in the situation in which valley and perceiver are co-present. Böhme calls what is perceived in this way "the common reality of the perceiver and the perceived" (p. 122). The same applies to reading the sky. The colour of a sunset or the apparent height of the sun is perceived through a situation involving the atmosphere, light, and the position of the observer. What is perceived by a reader of the atmosphere emerges from the relation between that reader and the atmosphere.²

Derrida's account provides one axis by showing that difference does not carry meaning in itself but becomes meaningful relationally, while Ingold and Böhme provide another for explaining how atmospheric differences are experienced and perceived as part of this process. Taken together, these two axes allow the reading of the sky to be understood not as the discovery of meanings already present in an external nature, but as a process in which an observer situated within the atmosphere encounters material change and perceives difference, which is then recorded, classified, and interpreted.

2.3. Two Dimensions of Inscription and Environmental Legibility

² Böhme's *Atmosphäre* is not identical to atmosphere in the meteorological sense. This study invokes the concept not to explain the physical properties of the atmosphere, but to clarify how perceived differences emerge within the relation between perceiver and environment.

The term legibility has been used across a range of fields. Benjamin provides an earlier model of the city as a field of signs to be deciphered (Benjamin, 1982/1999; Kim, 2014), while Lynch (1960) gives legibility a more explicit analytical formulation by defining it in terms of how readily the elements of the cityscape can be recognised and organised into a coherent image. Whereas Lynch's concept of legibility concerned the perception and spatial organisation of an environment, a related notion of legibility appears in Scott's (1998) account of how social reality is rendered readable within particular frameworks of cognition and management. Scott used it to describe the state's simplification of social realities into administratively manageable forms. Legibility, then, has come to denote more than the ease with which something can be seen or understood; it can describe the process through which a complex reality acquires a form that can be recognised and organised according to particular criteria. This study uses the term environmental legibility to describe the process through which atmospheric changes acquire forms in which they can be recognised, compared, and judged.³

The process by which atmospheric change becomes legible involves both the registration of difference in a form available to reading and the treatment of that registered difference within practices of reading. To distinguish these analytically, this study distinguishes two dimensions of inscription. Material-atmospheric inscription refers to the registration of physical atmospheric change as perceptible or measurable differences that can be identified across time and place. Discursive-technical inscription refers to the practices through which such differences are selected, recorded, classified, and organised into legible forms. Discursive practices include testimony and interpretation; technical practices include measurement, recording systems, and computation.

Why, then, does this study place the term inscription at the centre rather than trace or difference? In Derrida, trace, *différance*, archi-writing, and inscription are closely related, yet these associated terms operate as “nonsynonymous substitutions” whose emphases shift with context (Derrida, 1972/1982). Derrida relates writing (*écriture*) to “inscription, and especially the durable institution of a sign” (1967/1997, p. 44), extending writing beyond written notation in the narrow sense to archi-writing, the more general structure that makes both speech and writing possible. This study uses inscription in order to emphasise not simply that difference exists, but that it leaves effects in a medium, becomes perceptible, observable, or measurable, and can thereby enter subsequent processes of repetition and comparison. “Material-atmospheric inscription,” however, does not identify Derrida's concept of inscription with a physical trace in the atmosphere. It is an analytical term used here to distinguish the dimension in which material change produces a difference that can become an object of reading from the dimension in which that difference is organised into legible form.

Atmospheric change does not become immediately comparable data at the moment it is observed; comparison across observations requires processes of standardisation and adjustment. Observational institutions determine what is to be measured, in what units and formats it is to be recorded, and within which classificatory system observed phenomena are to be placed.

³ The expression “environmental legibility” has an established usage in urban design and spatial-cognition research, particularly in studies of wayfinding. In this tradition, which derives from Lynch, it refers to attributes of an environment, such as visibility or spatial-layout complexity, that affect how readily it can be read and navigated (Li & Klippel, 2016). In this study, by contrast, the term refers not to an attribute of the environment but to the process through which atmospheric change acquires legible form.

Edwards (2010) shows that these operations are carried out through a global infrastructure linking observational systems, standards, and data processing. Atmospheric data are therefore not straightforward transfers of physical change but products in which such change has been organised into legible form through measurement, recording, classification, and computation. These processes are closely related to the practices of writing that Szerszynski (2010) calls meteorography.

The discussion so far has followed the side of discursive-technical inscription, but the two dimensions of inscription do not correspond to two separate domains, matter and practice, that operate sequentially. Material difference is not given in advance already bearing a fully formed meaning, while practices of reading cannot operate independently of the material differences with which they engage. Moreover, the output of one act of reading may become the input for another. The two dimensions of inscription are therefore analytically distinguishable within a single process. This study refers to their relation as an interplay. The following two sections examine how this interplay appears in the works of Schuppli and Paglen.

3. Schuppli: Inuit Readings of the Sky and the Material Witness

3.1. *Can the Sun Lie?* (2014): A Nineteenth-Century Question Posed Again in the Arctic

Susan Schuppli's *Can the Sun Lie?*⁴ begins with reports by Inuit observers in the Canadian Arctic that the sun was setting many kilometres farther west along the horizon and that the stars were no longer where they should be (Schuppli, n.d.).



Figure 1. Susan Schuppli, *Can the Sun Lie?* (2014). Video still. Courtesy of the artist.

⁴ HD video, colour with stereo sound, 12:52 min.

The title of the work derives from a nineteenth-century debate over photographic evidence. The phrase “*Can the sun lie?*” appears in “The Photograph as a False Witness,” published in the *Albany Law Journal* in 1886 (Schuppli, 2014). At the time, photographs were increasingly entering American courtrooms as evidentiary materials, and their apparent mechanical objectivity was often associated with the action of light rather than the fallibility of human recollection. The 1886 article challenged this confidence in photographic truth, observing that although the sun itself does not lie, a liar may use the sun as a tool: “perhaps we may say that though the sun does not lie, the liar may use the sun as a tool.”

Schuppli transposes this question to the contemporary Arctic. According to her account, Arctic warming has altered the atmosphere’s thermal structure (the distribution of temperature across layers of air), thereby changing the degree to which light is refracted and, in turn, the apparent position of the sun near the horizon. The sun itself has not moved, yet it may appear to set in a different place. Both nineteenth-century photography and the contemporary Arctic sky thus raise the question of how the medium through which light passes affects what becomes visible and what can be recognised as evidence.

3.2. The Controversy over the Sun: Distinguishing Observation from Explanation

The Inuit observations addressed by Schuppli had already become the subject of public controversy before the artwork was made. Inuk filmmaker Zacharias Kunuk and environmental scientist Ian Mauro recorded elders’ testimony about the sun in the documentary *Qapirangajuq: Inuit Knowledge and Climate Change* (2010). Described as the world’s first Inuktitut-language film on climate change, the documentary gathers elders’ testimony on changes in ice, wind, animals, and the sky (Kunuk & Mauro, 2010). Portions of the project were released around COP15 in Copenhagen in December 2009, and media attention focused on the suggestion within the testimony that the changing positions of the sun and stars might have been caused by a shift in the Earth’s axis. Scientists rejected this explanation and warned the filmmakers that continued repetition of the claim could cause the Inuit to lose “all credibility” (Dixon, 2010). What was at stake, then, was not the fact of the elders’ observations as such, but the implications that an incorrect explanation of those observations might have for the credibility of their testimony as a whole.

Subsequent discussion distinguished observation from explanation. An alternative scientific explanation attributed the apparent change in the sun’s position to atmospheric refraction under conditions of temperature inversion, while rejecting the claim that the Earth’s axis had tilted (Dixon, 2010; Mauro, 2010; see also Davidson & van der Werf, 2005, on atmospheric refraction under temperature-inversion conditions). According to Kunuk, elders who reported the movement of the sun had been taught from childhood to go outside before breakfast and observe the weather (Dixon, 2010). Their claim that the sun’s setting position had changed was grounded in observations repeated over decades against familiar horizons and accumulated through bodily training, memory, and oral transmission. This is an instance of what Ingold calls knowledge of the weather-world: knowledge inseparable from the activities of bodies living within the weather. Public controversy, however, centred on the interpretation

of the observation, particularly the claim that the Earth's axis had tilted, while comparatively little attention was paid to how the elders had arrived at the observation itself.

3.3. Material Witness: Registering Matter and the Practices that Make Evidence

In *Material Witness* (2020), Schuppli develops the concept of the material witness, which provides a framework for understanding the operation of this video. A material witness is an entity in whose material properties the trace of an event has been registered and which can, through that trace, testify to the event. Yet the concept is not limited to matter's capacity to record. Schuppli writes that the material witness also brings into view "the very conditions and practices that convert such eventful materials into matters of evidence" (2020, p. 20). The concept therefore encompasses both the material capacity to register the trace of an event and the institutional, scientific, and discursive practices through which that trace is read and recognised as evidence.

Viewed through this concept, the atmosphere in *Can the Sun Lie?* can function as a material witness insofar as its registered effects are made legible through practices of observation, testimony, and interpretation. In Schuppli's account, warming alters the thermal structure of the atmosphere, and the changed conditions of refraction make the sun appear to set in a different position. The effects of warming are thus registered in the atmosphere as physical difference, and the elders detect that difference against a familiar horizon. Yet the altered appearance of the sun does not in itself constitute evidence of warming. The elders' observations enter public discussion through testimony and documentary film, become subject to doubt when coupled with the explanation that the Earth's axis has shifted, and are subsequently reinterpreted through scientific accounts of atmospheric refraction. If the atmosphere is the material in which traces of the event are registered, it is through observation, testimony, controversy, and interpretation that those traces are made into evidence of a particular cause.

This process demonstrates the interplay between the two dimensions of inscription distinguished in this study. Material-atmospheric inscription corresponds to the difference left by a warming atmosphere in the sun's apparent position; discursive-technical inscription corresponds to the process of observing and testifying to that difference and connecting it to a particular explanation so that it is organised as evidence. Crucially, evidence cannot be constituted by either dimension alone. A registered difference does not determine, by itself, what it is evidence of, while an explanation cannot be sustained independently of the perceived change to which it refers.

The difference identified by the elders, however, is itself produced as light passes through the atmosphere. In the text accompanying the work, Schuppli compares two photosensitive surfaces (Schuppli, 2014). On photographic plates used as legal evidence in the nineteenth century, sunlight reacted with photosensitive chemicals to produce an image that could be presented in court as objective evidence. In the Arctic, by contrast, warming altered temperatures across layers of air, changing the degree to which sunlight was bent and therefore what could be seen near the horizon. The comparison shows that, whether on a photographic

plate or in the atmosphere, a record made by light is shaped by the medium through which light passes and with which it interacts.

There is, however, an important difference between the two cases. A photographic plate is a recording medium external to the observer, whereas the atmosphere that refracts sunlight is the very environment in which the elders live. The difference they identify therefore cannot be reduced either to a property of the sun itself or to a subjective impression on the part of the observer. From Böhme's perspective, the apparent position of the refracted sun is a perceptual effect that emerges through the relation among light, the altered atmosphere, a familiar horizon, and the observer's position.

The atmosphere thus occupies a different position from the photographic plate. It is at once the matter in which the effects of warming are registered and the optical medium through which those effects become perceptible as changes in the sun's apparent position. In this case, atmospheric change does not become visible only after being transferred to a separate recording medium; rather, the altered atmosphere itself changes the path of light and thereby appears as a perceptible difference. In this sense, Schuppli's work shows that the trace left in matter and the conditions under which that trace can be perceived are located within the same atmospheric process.



Figure 2. *Sunset on the Labrador Coast*. Glass photographic slide. Collection of Susan Schuppli. Reproduced in Schuppli, *Can the Sun Lie?* (2014).

4. Paglen: Machine Readings of the Sky

4.1. The *CLOUD* Series (2019): Detection Overlaid on the Photograph

Clouds have long been objects of observation, naming, and classification, their changing forms providing ways of reading atmospheric conditions. In his discussion of the *CLOUD* series, Paglen likewise refers to this history of human cloud reading, particularly as embodied in cloud atlases and classificatory systems (Paglen, 2020). The series asks what happens when cloud forms are instead read according to the criteria of computer vision. Paglen processes photographs of clouds using different computer-vision algorithms and overlays their outputs on the photographic images. Depending on the algorithm applied, different formal features, such as lines, circles, regions, or keypoints, are detected in the photographs.⁵

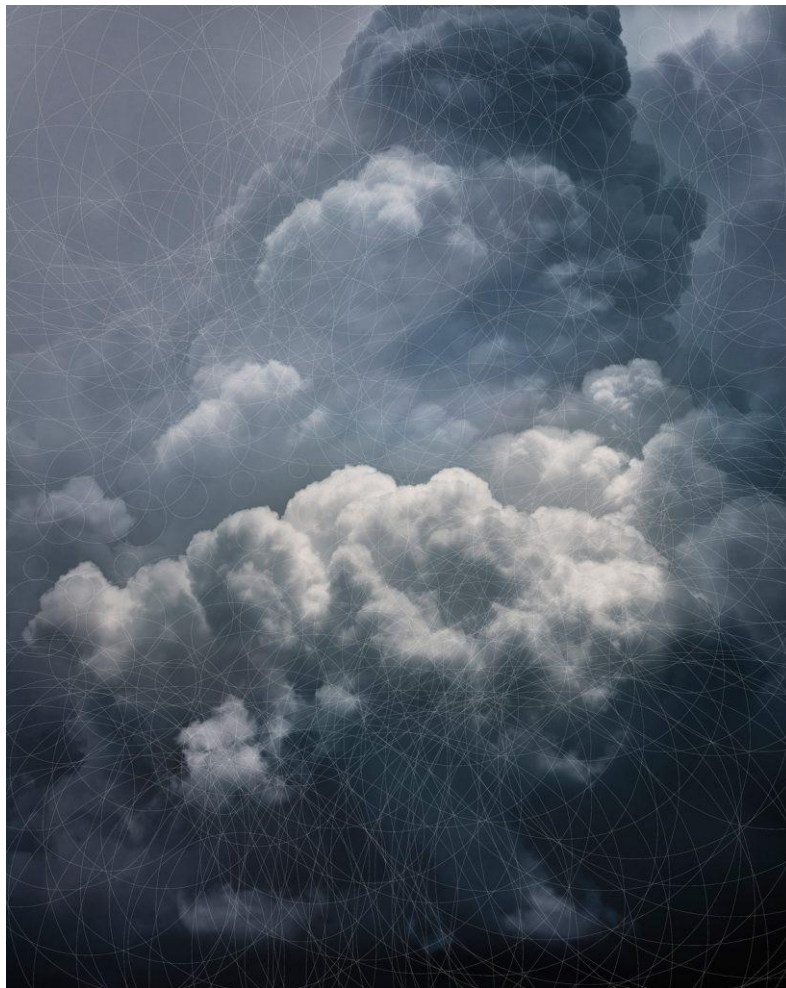


Figure 3. Trevor Paglen, *CLOUD #865 Hough Circle Transform*, 2019. Dye-sublimation print, 152.4 × 121.9 cm. © Trevor Paglen.

⁵ The names of the algorithms appear in the titles of the works. *CLOUD #865* uses the Hough Circle Transform; *CLOUD #135* uses Hough Lines; *CLOUD #603* uses Watershed; and *CLOUD #735* combines the Scale-Invariant Feature Transform, Region Adjacency Graph, and Watershed (Paglen, 2020; Pace Gallery, 2019).

Paglen describes the series as part of his ongoing investigation into how computer-vision and AI systems “see” the world (Paglen, 2020). Machines do not read images in the same way people do. Humans often recognise faces or animals in random forms. This tendency, known as pareidolia, is one way in which human perception, oriented toward meaningful forms, responds to the amorphousness of clouds. By contrast, the algorithms examined here do not interpret cloud forms as meaningful figures. Instead, they detect formal features such as lines, circles, regions, and keypoints according to criteria defined within each algorithm. Paglen makes these detection outputs visible by overlaying them on the photograph.

4.2. What Do Algorithms Detect in Clouds? Syntax without Semantics

The computer-vision methods used in the series are established techniques of classical computer vision whose operations are explicitly defined. Photographs contain boundaries between lighter and darker areas and variations in tone, and the algorithms select arrangements that satisfy their respective criteria. The Hough transform detects geometric forms such as lines or circles in an image (Duda & Hart, 1972). Watershed segmentation treats the image as a topographic surface and divides it into distinct regions. The Scale-Invariant Feature Transform (SIFT) identifies keypoints that can be re-detected even when an image is scaled or rotated (Lowe, 2004). A region adjacency graph represents how segmented regions adjoin one another. None of these algorithms interprets what a cloud means; each simply selects formal features that satisfy predefined criteria. This mode of machine reading is syntactic and lacks semantics.

The operation of such selection becomes particularly conspicuous when the object is a cloud. Paglen notes that algorithms of this kind are used in guided missiles and drones, autonomous surveillance systems, self-driving cars, facial recognition, and three-dimensional modelling (Paglen, 2020). In an interview, he gives plate manufacturing as an industrial example, describing a system that marks circles detected in an image (Knupp, 2020). With an object such as a plate, where circularity is expected, the detected circle and the object’s form coincide so naturally that the algorithm’s selection criteria recede from view. Applied to a cloud image, however, the same circle-detection procedure draws circles over fluid and irregular forms, bringing into the foreground both what has been selected and the criteria by which that selection has been made.

A further distinction concerns what the algorithm actually takes as its input. In *CLOUD* #865, the circles drawn over the cloud are produced through the interaction between visual differences recorded in the photograph and the algorithm’s criteria of detection. The algorithm cannot perform detection without differences of tone and edge in the photograph. Yet these differences belong not to the atmosphere itself but to an image produced through photography and digitisation. What the algorithm reads directly is therefore not the sky itself but a representation of the sky already constituted through a technical inscription. If photography and digitisation constitute a technical inscription that renders the appearance of the atmosphere as image data, algorithmic detection is a reading that takes that inscription as its input and selects

particular features from it. Machine reading in *CLOUD* therefore operates upon an already existing technical inscription.⁶



Figure 4. Trevor Paglen, *CLOUD #135 Hough Lines*, 2019. Dye-sublimation print, 121.9 × 165.1 cm. © Trevor Paglen.

4.3. Making Machine Reading Visible: The Criteria of Algorithmic Selection

The process of selection described above is not ordinarily presented directly to human viewers. In this series, however, the photograph and the detection output occupy the same surface. Selection by machine vision usually operates out of sight. In “Invisible Images,” Paglen (2016) argues that an increasing proportion of visual culture consists of images made by machines for other machines. The *CLOUD* series reverses this direction. Detection outputs that would ordinarily remain within computational processing are drawn onto the photograph, allowing viewers to see what has been selected and what has been passed over.

In terms of the two dimensions of inscription distinguished here, what the series brings to the foreground is discursive-technical inscription: the criteria of algorithmic selection. In the classical computer-vision techniques used in the series, criteria specifying what is to be detected

⁶ The tones and edges in Paglen’s photographs should not be equated with the “unprocessed atmosphere itself.” A photograph is already a technically mediated image, produced as light passes through a lens and is recorded by a camera. The material-atmospheric differences of the sky become available to algorithmic reading only through their photographic and digital mediation as detectable visual differences.

are explicitly defined. Yet those criteria cannot operate without the visual differences recorded in the image, and those differences, in turn, are organised through algorithmic selection into detection results such as “circles,” “lines,” “regions,” and “keypoints.” The detected feature is therefore not simply something that already existed in completed form within the image and was subsequently discovered; it emerges at the point where differences recorded in the image encounter the algorithm’s criteria of selection.

In Paglen’s case, unlike Schuppli’s, the relation between the two dimensions includes a conspicuous layer of photographic and digital mediation. The algorithm does not read the material atmosphere directly; it reads an image in which the appearance of the atmosphere has already been technically mediated through photography and digitisation. By overlaying detection outputs on that image, the *CLOUD* series makes the results of algorithmic selection available to human vision and thereby foregrounds the criteria by which machine reading selects from the image.

5. The Relation between the Two Dimensions of Inscription

5.1. The Reader and the Altered Atmosphere: Material-Atmospheric Inscription in the Anthropocene

Sections 3 and 4 have shown the relation between the two dimensions of inscription in different ways. The atmosphere of the Anthropocene adds another layer to this relation: the material change in the atmosphere that becomes the object of reading may itself be a consequence of human activity. Human activities, including the combustion of fossil fuels, have altered the composition and thermal structure of the atmosphere. Humanity, which leaves such traces, is in this sense the “unintentional author” introduced in Section 1 (Kim, 2024, p. 88): having altered the environment without intending to do so, it must then determine the significance of those changes through observation and reading. Szerszynski (2010, p. 11) likewise writes, “first we marked the climate unknowingly.”

Schuppli’s case gives this relation concrete form. If the change in the sunset position observed by Inuit elders resulted from altered inversion conditions in a warming atmosphere, then the material difference they identified would not be a trace left by a nature independent of human activity. It would also be an effect of accumulated human activity altering the atmosphere’s thermal structure. In this case, material-atmospheric inscription therefore appears not as a natural background separate from human action but as atmospheric change that already incorporates the effects of human activity.

5.2. Bringing the Conditions of Reading into View: Visible Results and Receding Conditions

Once a reading is stabilised in the form of evidence, data, or a detected feature, the conditions and procedures through which it was produced tend to recede behind the result. The statement that the sun appeared to set in a different place than before may be presented as an

observed fact, but the process through which that observation was formed through long-term environmental experience and memory, and subsequently passed through competing explanations before being accepted as evidence, does not remain visible in the final statement. The same is true when computer vision detects a circle or region in a photograph. Detection results are processed as inputs to subsequent operations, and the result alone rarely reveals which visual differences were selected as features according to which criteria.

The works of Schuppli and Paglen bring back into view these conditions of reading that recede behind their results. In *Can the Sun Lie?*, Schuppli juxtaposes different layers of mediation, including testimony, documentary footage, screens, and optical apparatuses—so that the conditions under which the sun is observed, recorded, and interpreted appear together. Paglen, by contrast, overlays algorithmic detection outputs on photographs of clouds. By retaining on the photographic surface results that would ordinarily pass into subsequent computational operations, he enables human viewers to see which visual features have been selected according to algorithmic criteria.

Although the two dimensions of inscription interact in both works, each work foregrounds one dimension more strongly than the other. In Schuppli's work, material-atmospheric inscription comes to the fore. Testimony, contestation, and redescription gather around a difference registered in the atmosphere and perceived as a change in the sun's apparent position. In Paglen's work, by contrast, discursive-technical inscription is foregrounded. The detection outputs reveal which visual differences in the digital image have been selected as features and thereby bring the algorithmic criteria of selection into view. Table 1 summarises these differences.

Table 1. The Two Dimensions of Inscription in Schuppli and Paglen

category	Schuppli <i>Can the Sun Lie?</i>	Paglen <i>CLOUD</i> series
Registered difference	Change in the sun's apparent position produced by altered atmospheric refraction	Cloud forms recorded in photographs (inscribed through photography and digitisation)
Practice of reading the difference	Elders' observation and testimony, public controversy, scientific redescription	Algorithmic selection of features according to predefined criteria
Relatively foregrounded dimension of inscription	Material-atmospheric inscription (perceptual difference produced by atmospheric change)	Discursive-technical inscription (criteria of algorithmic selection)
Product of reading	Observation recognised as evidence of warming	Detected features (circles, lines, regions, keypoints)
What recedes behind the result	The process of observation, controversy, and explanation through which an observation becomes evidence	What was selected, and according to which criteria

6. Conclusion

This study asked how the sky becomes legible and examined that process through Susan Schuppli's *Can the Sun Lie?* and Trevor Paglen's *CLOUD* series. It distinguished the dimension in which physical atmospheric change appears as perceptible or observable difference as material-atmospheric inscription, and the practices through which such differences are observed, testified to, recorded, classified, computed, and organised into legible forms as discursive-technical inscription. The legibility of the sky is not already given in either dimension of inscription but emerges through their interplay. Material difference does not by itself determine what it signifies or what it may count as evidence of, while practices of reading cannot operate independently of the material differences with which they engage.

The analysis of the two works showed that this interplay can become visible in different ways. The point, however, is not to map the two works respectively onto material and technical inscription. In Schuppli's work, what comes to the fore is how atmospheric change is observed and acquires the status of evidence; in Paglen's work, it is how something already inscribed as an image of the sky is selected as an algorithmic feature. What both works reveal is less the result of reading than the conditions under which that result comes into being. Once evidence or a detected feature is presented as a stable outcome, the processes of observation and mediation, explanation and selection that made it possible readily recede behind it. Both works bring those processes back into view.

On the basis of this analysis, the study proposes environmental legibility not as the "ease of reading" of an environment but as the process through which environmental change acquires forms in which it can be perceived, compared, and judged. From this perspective, knowledge of the environment cannot be understood as the simple discovery of meanings that already exist. What is perceived as difference, what is recorded, and which differences are organised as evidence, data, or features depend on particular conditions of observation, mediation, classification, and computation. This is especially significant in the Anthropocene, when human activity alters the material conditions of the atmosphere itself. What we know about an environment transformed by human activity cannot be separated from how that environment is observed, recorded, and read. The contribution of this study lies in proposing a way to analyse these conditions of reading from the perspective of environmental semiotics.⁷

Whereas Paglen's case in this study concerns feature detection in explicitly designed classical computer vision, the role of learning-based systems is rapidly expanding in other domains of machine reading of the environment. In learning-based weather prediction, atmospheric states that have already been observed, standardised, and rendered as data become inputs to another layer of machine reading, and the output of one stage becomes the input of the next. How the interplay between material-atmospheric and discursive-technical inscription takes shape under these conditions, and how the conditions of such readings can be analysed, remain questions for future research.

⁷ This study is a conceptual case study that analyses the structure of legibility through two artworks. It therefore does not extend the relation between the two dimensions of inscription proposed here directly into a general model of meteorological observation or environmental data production as a whole.

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