

# WASSHOI!

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Interdisciplinary Magazine on Japan

**NATURAL DISASTERS**

KEYNOTE

**Impact of Earthquakes  
in 10<sup>th</sup> Century Literature**

ARTICLE

**Japan's Disasters  
and the Age  
of Climate Change**

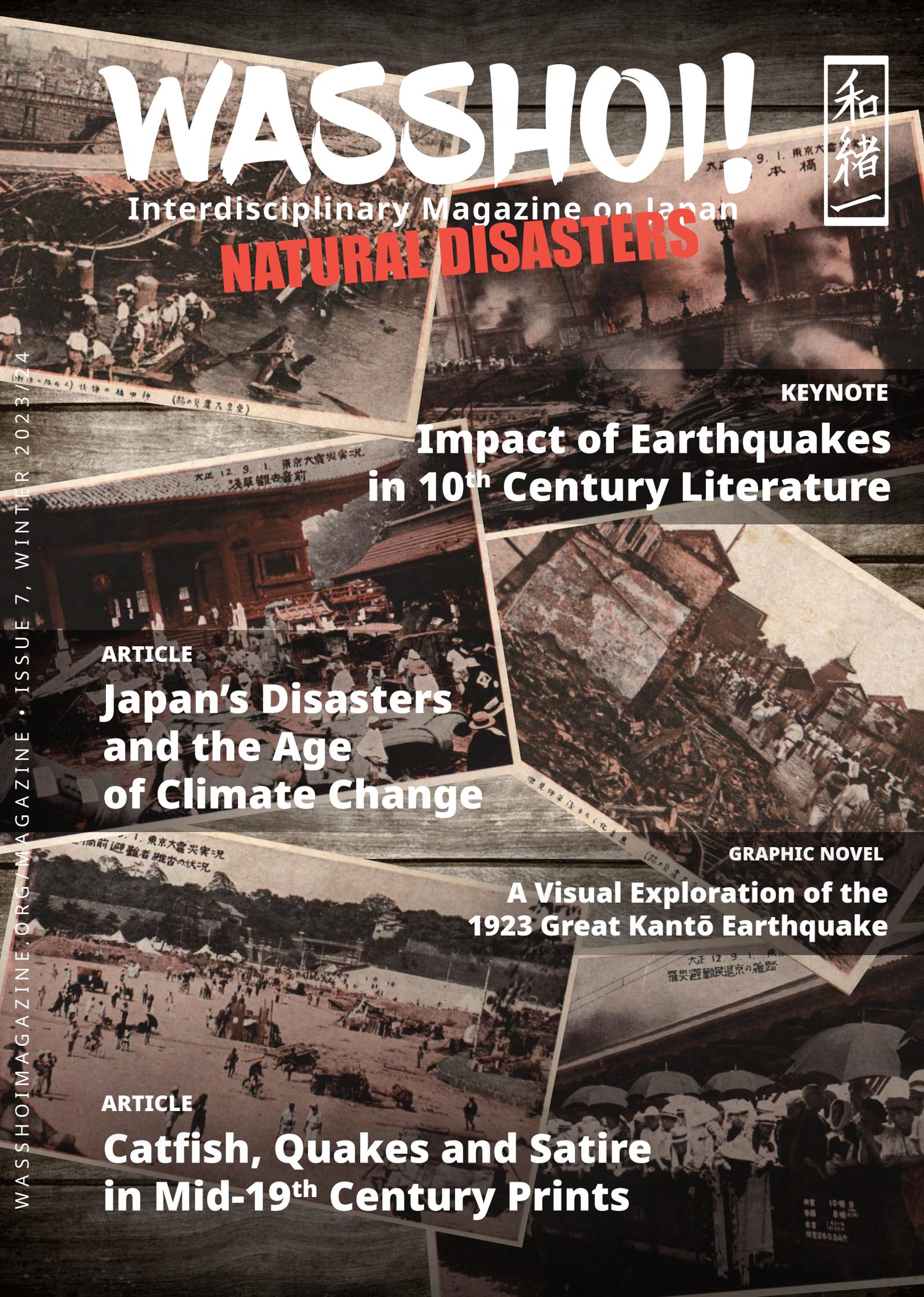
GRAPHIC NOVEL

**A Visual Exploration of the  
1923 Great Kantō Earthquake**

ARTICLE

**Catfish, Quakes and Satire  
in Mid-19<sup>th</sup> Century Prints**

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# WHAT JAPAN'S PAST DISASTERS CAN TEACH ABOUT THE AGE OF CLIMATE CHANGE

Jonas Rüegg

On 11<sup>th</sup> March 2011, a giant tsunami overran the reactors of Fukushima Daiichi, a nuclear powerplant built on the shoreline of one of the most seismic zones on earth. With the triple disaster that ensued – an earthquake, tsunami, and nuclear meltdown – a broader awareness emerged in Japan and abroad that ‘natural’ disasters are never simply ‘natural’. To call ‘3/11’ an ‘enviro-technical disaster,’ as scholars suggested in the aftermath, expresses a more profound reconfiguration of the human relationship with an altered and transforming global environment. With sea levels rising, a ‘mass extinction event,’ and an unprecedented hike in atmospheric CO<sub>2</sub>, the global environment in the twenty-first century can no longer be separated from humans, their politics, and their biases.

Japan’s past disasters, and especially the generationally recurring large tsunamis of northeastern Japan, can help understand the discrepancy between an increasingly sophisticated risk awareness and collective decision making. As the global climate shifts, humanity is confronted with a changing ‘riskscape’ – a sociological term

that describes dynamic geographies of heightened hazards and unequal abilities to cope with them – that pushes entire regions beyond insurability. The rapid pace of irreversible environmental change contracts prospective geological change to a human time scale. Ancient and weathered warnings in the tsunami zones of northeastern Japan illustrate that lessons from the past can’t be learned by archiving. Rather, collective decisions rely on the inclusion of marginalised voices in a pluralistic conversation.

Consortia of concerned scholars from various disciplines point out that living in the new ‘riskscape’ of climate change necessitates new, multi-disciplinary networks that transcend scientific and humanistic knowledge and are attuned to perceived realities on the ground. The efforts to recover unheard voices and forgotten experiences from Japan’s disaster archives, to which the authors in this issue of *Wasshoi! Magazine* contribute, are therefore part of a holistic approach to understanding the human predicament in the age of climate change.

< **Fig. 1** The idyllic landscape of Jōdogahama, or ‘Pure Land Beach,’ near Miyako in Iwate Prefecture.

## Seismic Culture

The Sanriku Coast of northeastern Japan is of deceptive beauty. Its tall promontories, sheer cliffs, and elongated bays have long inspired travellers to ponder the essence of art and aesthetics. It is said that the Buddhist monk Ryūko (龍湖, ca. 1681–1727), having first glimpsed the precipices outside Miyako in today's Iwate Prefecture, invoked the Buddhist Paradise – hence naming the littoral *Jōdogahama*: Pure Land Beach.

But at least since the devastating Jōgan tsunami of 869 CE, this pure land also harbours a dire history of disaster. Generationally recurring tsunamis have been known to haunt the region. An unknown number have come ashore over the centuries, of which only the most destructive experiences have been recorded and passed on.

**Fig. 2** The fishing village of Tarō, just about 5 kilometers north of the idyllic Jōdogahama, was among the hardest-hit in the tsunami of 1933.



Near the harbour of Yagi in the northern reaches of Iwate Prefecture, a moss-covered epitaph memorialises one tsunami that struck the region in 1896. It tells of how the elderly recognised the ominous signs when the sea retreated in the wake of an earthquake. Born from jolts in the ocean's depths, the waves rapidly towered up as they entered the shallow waters, before bays and inlets directed them ashore. This so-called Meiji Sanriku Tsunami demanded a toll of 22,000 lives. Yet moss had grown over the engraved admonishment by the time the next major tsunami struck the coast in 1933, again killing thousands and obliterating entire villages. Tarō, a village that lost three fourths of its population to the 1896 tsunami, was again struck particularly badly. With only eight buildings left intact, half of its 1,800 inhabitants went missing in 1933.

A few villages further down the coast, one survivor engraved yet another stone to lament his loss:

*How forgetful is the human race! Those who will see this stela in days to come must remain cautious and careful not to be oblivious again! This is my heartfelt wish.<sup>1</sup>*

What more does it take than a warning set in stone for us to remember disasters past? Or should we ask: what are the values and beliefs behind the decision to embrace, time and again, the danger associated with living on the shoreline?

<sup>1</sup> Uesugi Hideyuki, 'Himei: Kaishū kinenhi [Epitaph: A tsunami monument],' *Hikari takuhon database*, Project of Epigraph Archiving, August 2019.



**Fig. 3** Moss-covered warnings from past disasters spot the shoreline of northeastern Japan.

Students of Japanese history will know that coping with disaster is a collective and therefore deeply political act of negotiating safety against possibility, and traditional knowledge against modern ambition. As historian Peter Duus once put it, 'the pattern of reaction to catastrophic disaster can be broken down into several overlapping phases: blaming, coping, hoping, learning and forgetting'.<sup>2</sup> And what is more: as 'natural' as a disaster may seem at its origin, its impact is refracted across the tectonics of human society, following the fault lines of countless past decisions.

<sup>2</sup> Peter Duus, 'Dealing with Disaster,' in *Natural Disaster and Nuclear Crisis in Japan: Response and Recovery after Japan's 3/11*, ed. Jeff Kingston (New York, NY: Routledge, 2012), 176.

## Rationalising Disasters

Seismic disasters – earthquakes and the tsunami they create – are moments in which human and geological timescales intersect, revealing a conflict between ‘rational’ reasoning, based on the brief human experience, and the disruptive power of an unpredictable environment. In Europe, the attempt to ‘disenchant’ nature and to disentangle it from the apparent whims of a divine power became dominant in the eighteenth cen-

ture, as a product of the Enlightenment. Unlike earlier systems of knowledge, ‘enlightened’ science attempted to reduce natural systems to mechanical and therefore objectively determined processes. The assumption of a rational mind, unaffected by cultural or personal biases, emerged from this way of thinking.



**Fig. 4** A *kawaraban* newspaper telling of the great Ansei earthquake and ensuing fires in the city of Edo, November 1855.

In Japan, as well, attempts to rationalise suffering inspired mechanical explanations of earthquakes long ago. While most terminology used to discuss science and technology in modern Japanese were coined in the so-called ‘Japanese enlightenment’ of the late nineteenth century, ‘rational’ explanations for natural phenomena circulated widely in early modern Japan.

In these discourses, rationalist concepts evolved around terms such as *kotowari* 理 and *dōri* 道理, approximate correspondents of ‘logic’ and ‘rationality’ in the modern language.

The Kyoto-based writer Asai Ryōi (浅井了意, ?–1691), for example, remarked in the aftermath of a 1662 quake that seismic jolts recurred cyclically and had been recorded for well over a millennium at his time. Vernacular explanations continued to relate calamities to social disorder or anthropomorphic divine powers, such as the giant cat-

fish Namazu whose movements on the ocean floor sent shockwaves through the land. Asai, however, chose a Chinese model that explained disasters as the effect of an imbalance between *yin* and *yang*: the imbalance needed to correct itself periodically in a sudden discharge of energy or *ki*.<sup>3</sup>



**Fig. 5** ‘Killing off Namazu:’ the population of Edo takes revenge on the giant catfish in revenge for the Kantō earthquake of 1854. The catfish Namazu was cited in vernacular, and sometimes satirical discourses to explain the recurrence of earthquakes. This popular picture stands in stark contrast with more academic attempts at the time to rationalise disasters.

<sup>3</sup> Gregory Smits, ‘Earthquakes as Social Drama in the Tokugawa Period,’ in *Environment and Society in the Japanese Islands: From Prehistory to the Present*, ed. Philip C. Brown, and Bruce L. Batten (Corvallis: Oregon State University Press, 2015), 68–69.

The historian Gregory Smits notes that this apparent energy transfer between ground and atmosphere was empirically affirmed: when the earth trembled in the destructive Ansei Earthquake of 1855 in Edo (Tokyo), skyward lightnings of *ki* were reported at Asakusa's Sensōji Temple just moments before the onset of the initial jolts.<sup>4</sup> These theories, not too different in principle from the idea of plate tectonics, represent a process of rationalisation that removed the spiritual and whimsical from the 'natural' environment.

With the emergence of systematic meteorological observation in the Meiji period (1868–1912), earthquakes could be described and analysed with increasingly specific and combinable data. Besides accurate instruments, data compilation necessitated an international network of measuring stations and intellectual exchange. This is illustrated by the excited report to the Japanese government from a seismologist, working for the Smithsonian Institution in Hokkaido in 1872, on the discoveries gathered from macroscopic data evaluation:

*On April 6 at 3:30 AM, we observed an acute earthquake here that rocked the furniture constantly for some twelve seconds, running from north to south. On the same day at 2 PM, a quake occurred in Manila – one of the islands of the Philippine archipelago – that ran north to south, so strong that temple bells rang by themselves, and clocks stopped working. Assuming that these are one and the same quake, we can infer that the speed of an earthquake is 120 miles per hour.<sup>5</sup>*

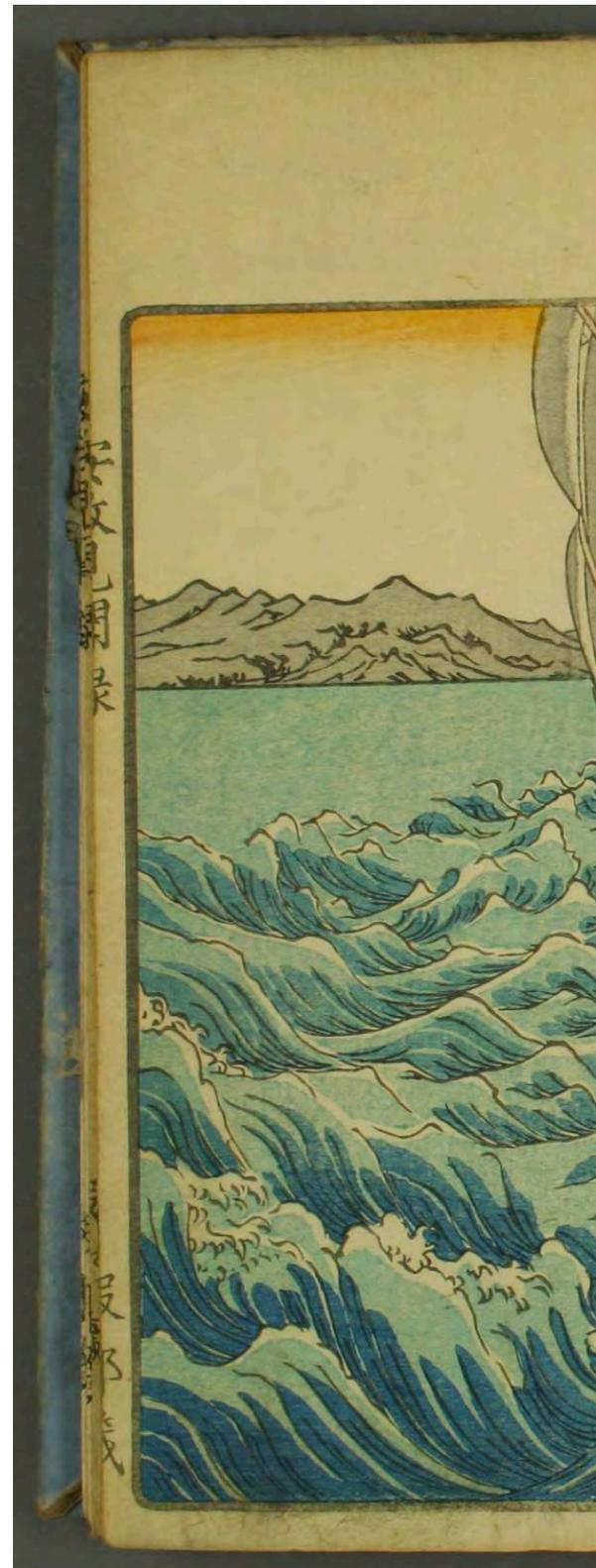
By the close of the nineteenth century, the earth quaked no longer in response to social disorder, bad government, or due to the movements of the giant catfish Namazu. Rather, the project of decoding nature according to mechanical laws had separated the human mind from its object of study and planted the promise of technological progress in the collective mind.

<sup>5</sup> Manuscript booklet, '*Antisell kem-paku* アンチセル建白 [Memorandum from Dr. Thomas Antisell],' 1872, イ14 A4564, Waseda University Repository, Waseda University Library, 18-18.2015), 68–69.

<sup>4</sup> Ibid., 60–61.

The increasingly sophisticated knowledge of natural phenomena also signified a break with earlier, 'non-scientific' knowledge. By comparison, however, the modern perception of time was inherently shallow. The break with 'premodern' cultures of knowledge, and the task of studying the world through meticulously collected data, limited the framework of reference to decades or centuries at best – a heartbeat in geological terms. Even the Japan Meteorological Agency's website only lists tsunami records from 1872 onwards, when exact data on magnitude, amplitude, and specific impact were collected.<sup>6</sup> The abstraction of empirical observations into a transferable and universally applicable format also alienated knowledge from its locally specific meaning.

Despite significant progress in statistical and hypothetical prediction of seismic disasters over the past century, one essential problem remains unchanged: science could not change the fact that collective decisions – such as where to build a power plant – remained subject to social and political dynamics. In other words, protection from tsunamis depends not just on factual knowledge, but on the meaning assigned to scenarios of risk and opportunity.



<sup>6</sup> Japan Meteorological Agency. 'Kako no jishin tsunami saigai (Earthquake and tsunami disasters of the past),' accessed May 2023.



宮の津小  
旅人津浪  
懼は國を

二正身月金

月音舟

申正三

**Fig. 6** Representation of a passenger ferry caught in the 1855 tsunami.

## Bias and Technology

On 11<sup>th</sup> March 2011, the entanglement of 'natural' and social disasters were laid bare in the most painful way. Within minutes of a magnitude 9.0 quake, waves up to 14 meters tall crashed over fields and towns and flooded an atomic power plant built right on the shoreline. At the time the powerplant was built, in the late 1960s, the last major tsunami had been less than a decade prior, but the rapid progress in science and engineering gave reasons to believe that man would prevail over nature. The reactors Japan purchased were designed in the United States, and constructed to withstand the hazards best known to their American creators: tornadoes. Prudently, the engineers positioned the generators at earth level, and the emergency aggregates were placed in the safety of the basement.<sup>7</sup>

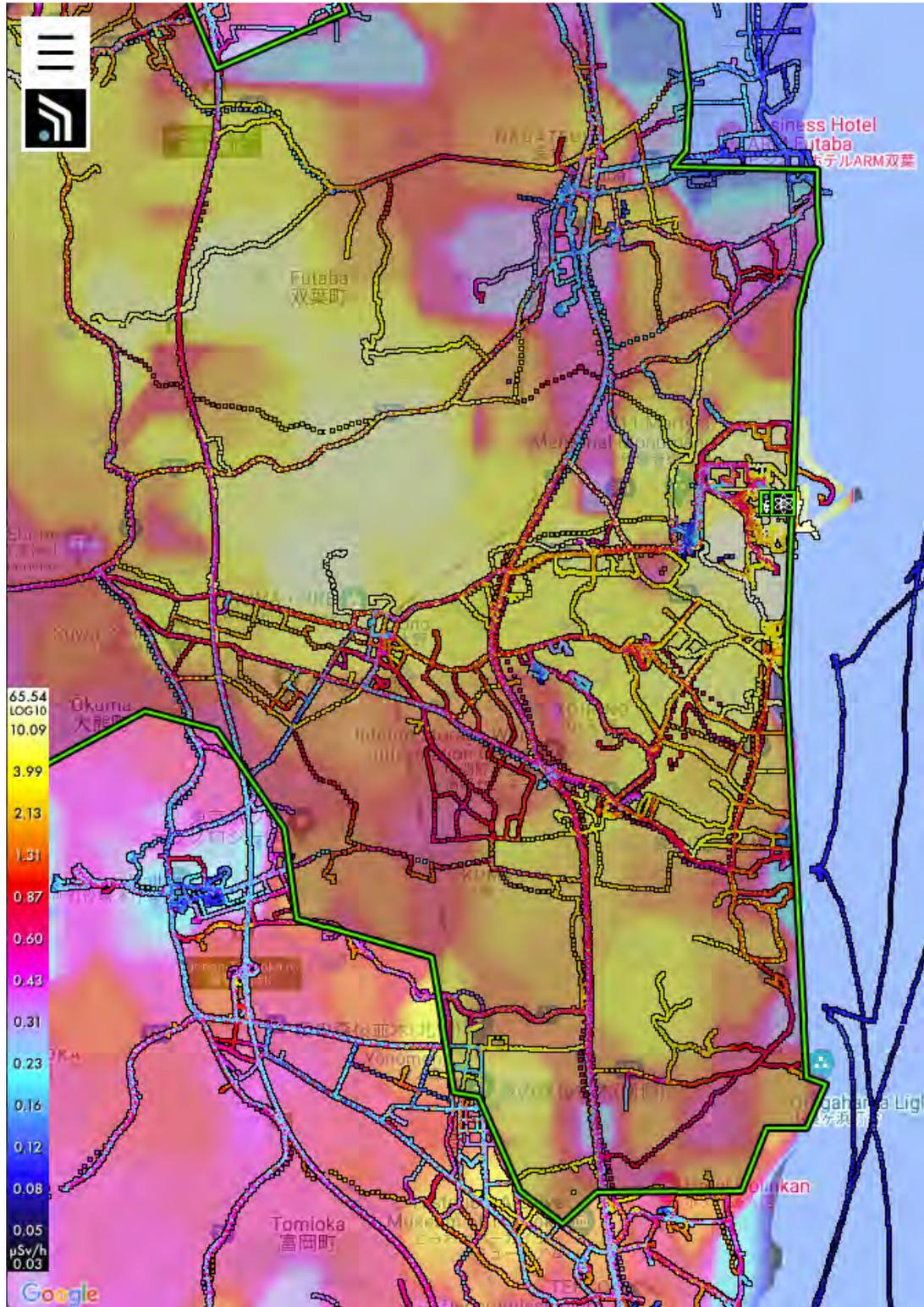
Japanese engineers, emulating the technological achievements of their American allies, were blinded to the obvious, too. As Tsuneo Futami, a former director of the plant, later confessed in the *New York Times*: 'We can only work on precedent, and there was no prec-

edent. When I headed the plant, the thought of a tsunami never crossed my mind.'<sup>8</sup> How come engineering decisions at the highest level could be so fatally decoupled from basic knowledge of the local environment?

The nuclear meltdown can all too easily be assigned to an unfortunate constellation of events, a so-called 'black swan', or to the greater power of unavoidable, 'natural' disasters. The assessment of risk, however, is more deeply rooted in the personal bias of those in charge. In Fukushima, local and experience-based knowledge was replaced by modern science and academic expertise. The centralisation of authority under an 'iron triangle' of ministries, corporations, and a self-righteous political establishment favoured decision-making oriented towards GDP growth, promoting a quasi-religious trust in nuclear technology that justified silencing local voices of concern. The meltdown of 2011, in that sense, was the inter-generational bill for decisions that had fuelled the economic growth of decades past.

<sup>7</sup> Daniel P. Aldrich, *Black Wave: How Networks and Governance Shaped Japan's 3/11 Disasters* (Chicago: University of Chicago Press, 2019), 7.

<sup>8</sup> *The New York Times*, 'Japanese Rules for Nuclear Plants Relied on Old Science', March 26, 2011.



**Fig. 7** Radiation map in the exclusion zone around the Fukushima Daiichi nuclear power plant, as of May 2018. Screenshot taken from Safecast.

Risk is usually framed as the numeric probability that a conceivable hazard will materialise, relative to a defined time horizon. Accordingly, insurance companies interpret disasters as a contained interval between onset and end, resulting in a clearly definable toll of lives and goods. This definition has proven useful to insure damage from punctual incidents, such as a fire or an avalanche. But what if 'disaster' is no longer a punctual event, but rather a permanent state of affairs in an altered 'risky landscape'? Is it still possible to speak of individual 'disasters' in view of the complex and slow-moving manifestations of global climate change? Can the chaotic transformations of the Earth System be objectified as a 'regime change', or are we confronted with one coherent 'disaster'?

For the foreseeable future, environmental risks are on the rise. As Julia Thomas and others have argued, 'the Anthropocene', the new geological epoch characterised by an impact of human society on the global environment, is not a problem, but a 'predicament':

*A problem may be solved, sometimes using a single physical or conceptual tool produced by experts in the only appropriate field, but a predicament presents a challenging situation requiring resources of many kinds. We don't solve predicaments; instead, we persevere with more or less grace and decency.<sup>9</sup>*

In other words, the Anthropocene is not only a material process that comes to us in the form of climate change, but also a cultural transformation that redefines the relationship between science and society, the living and the unborn, the affluent and those left behind.

Academic explanations of disaster have long worked to rationalise suffering. Yet the Anthropocene makes it increasingly difficult to distinguish disaster and non-disaster, as it is manifest not as a punctual moment of crisis, but in the gradual expansion of heightened environmental risks. In this sense, Japan's historical experience with a seismically active and highly unpredictable environment may offer a window to the future of a planet in flux.

<sup>9</sup> Julia Adeney Thomas, Mark Williams, and J. A. Zalasiewicz, *The Anthropocene: A Multidisciplinary Approach* (Cambridge UK: Polity Press, 2020), 3.

## Japan and the Riskscape of a Slow-Moving Disaster

If chaotic transformations within the global ecosystem are the product of human activity, can human decisions be upheld as autonomous vis-à-vis an unpredictable planet? The study of environmental disaster is inseparably tied to the study of the social structures that condition it: rising sea levels must be seen in the context of political choices that perpetuate fossil fuel dependence, and environmental health issues are critically linked to suppressed attempts to regulate polluting industries. In all these fields, Japan's recent past offers rich objects of study, as the environmental historian Brett Walker, among many others, has shown.<sup>10</sup> In other words, climate change forces us to define 'disasters' on a greater spatial and temporal scale, and by way of it, to try and understand human actions, subjective, biased, and tied by material interests, on these expanded scales of cause and effect.

In Japan as elsewhere, climate change will profoundly alter landscape and economy within the foreseeable future. Even optimistic scenarios predict that by the end of the century, sea levels will rise up to 110 cm at a global average. The Intergovernmental Panel on Climate Change (IPCC) warned in 2022 that weather events now occurring once in a century must be expected on an annual basis by 2050 in 'many low-lying cities and islands at all latitudes'.<sup>11</sup> Japan, with many of its most fertile plains not far from the shore, will likely be a frequent victim of storms, salination, and inundation.

<sup>10</sup> Brett L. Walker, *Toxic Archipelago: A History of Industrial Disease in Japan* (Seattle: University of Washington Press, 2010).

<sup>11</sup> Hans-Otto Pörtner et al., 'The Ocean and Cryosphere in a Changing Climate: A Special Report of the Intergovernmental Panel on Climate Change' (Cambridge, UK and New York, NY, USA: Cambridge University Press, 2022).

# 茅ヶ崎市津波ハザードマップ



えほし麻呂とミーナ



地震・津波はいつ、どこにいるときに発生するかわかりません。  
 「茅ヶ崎市津波ハザードマップ」は、発生頻度は低いものの、発生すれば茅ヶ崎市に甚大な被害をもたらすおそれがある津波を想定し、浸水すると予測される区域を示したうえで、津波一時退避場所や標高などの情報を加えたマップです。また、別冊の「茅ヶ崎市津波ハンドブック」は各家庭で避難先や避難経路を記入し、津波からの避難にそなえていただくための冊子です。

## 地震発生!!

- 地震（強い揺れ、長時間の揺れ）の対応**
  - ・落ち着いて身を守る
  - ・火の始末
  - ・出口の確保
- ①…津波警報発表
- 津波一時退避場所や避難所等への避難**

揺れがおさまったら状況を確認し、すぐに津波一時退避場所や避難所、または標高が高い場所（高台）へ避難する。
- ②…津波情報を入力
- 津波情報を入力**

安全な場所で防災行政無線、ラジオ、テレビ、携帯電話等から情報を入力する。
- ③…自宅または避難所へ移動
- 自宅または避難所へ移動**

津波警報が解除されたら、一時退避した場所から自宅または避難所に移動する。
- ④…自宅または避難所での生活
- 自宅または避難所での生活**

自宅や周辺が安全であれば、自宅で生活し、安全が確認できなければ避難所で生活する。

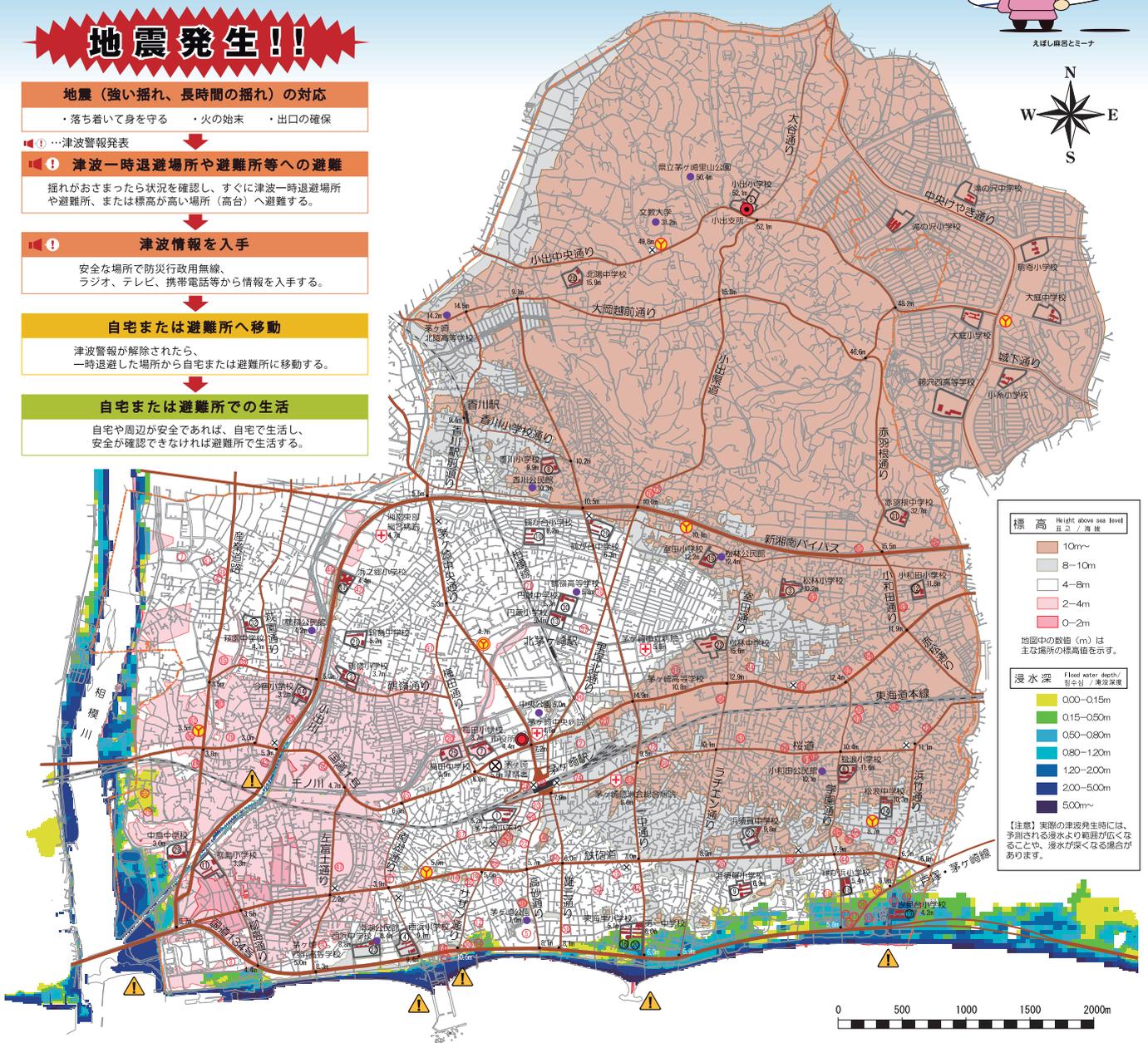


Fig. 8 Tsunami hazard map published by Chigasaki City, Kanagawa prefecture. Note that only the light-orange zones are more than 10m above sea level.

Climate change is slow-moving, man-made, and global in scale. Japan's history of disaster illustrates how landscapes of hazard and moments of disaster time and again engender negotiations of subjective and objective approaches. As the Holocene earth abandons its climatic patterns and transitions to an unknown future equilibrium, humanity is growing aware of the unpredictable. Expanding scale and frequency of future disasters may necessitate a new culture of knowledge.

As consortia of scholars from various disciplines have concluded, living in the new 'risky landscape' necessitates multi-disciplinary systems of knowledge that transcend scientific and humanistic knowledge, and are attuned to realities on the ground. In this re-localisation of knowledge, subjective and culturally specific experiences will be a continual challenge to technocratic complacency.

Eventually, only an engaged civil society can give voice to moss-covered warnings and bring lessons drawn from past disasters into decisions of the future.

## Suggested Readings

Pritchard, Sara B. 'An Envirotechnical Disaster: Nature, Technology, and Politics at Fukushima.' *Environmental History* 17, no. 2 (2012): 219–243.

Thomas, Julia Adeney, Mark Williams, and J. A. Zalasiewicz. *The Anthropocene: A Multidisciplinary Approach*. Cambridge UK: Polity Press, 2020.

Walker, Brett L. *Toxic Archipelago a History of Industrial Disease in Japan*. Seattle: University of Washington Press, 2010.



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