

Learning in seismic time: Japanese and Chilean education in the *Anthropocene*

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Abstract

Scientific consensus agrees that over recent decades and generations, Earth has entered a new geological epoch, termed the *Anthropocene*. Whereas previous new epochs are postulated to have followed comet strikes and solar realignment, it is demonstrable that it is now human activity that most affects climate change, the release and transformation of chemicals, and general endangerment to life forms. At the same time, human societies throughout history can be seen to have adjusted to effects beyond their control. This is particularly clear in countries marked by frequent seismic activity, with Japan and Chile being prime examples. Particularly, changes in educational policy over the last hundred years appear to correlate to responses to major seismic catastrophes in these countries, with this article proposing to supplement understandings of educational policy evolution with consideration of the legacies of such cataclysms and the revised priorities they elicit.

Keywords: Higher Education in Emergencies, Earthquakes, Tsunamis, Japan, Chile

I. Introduction

This article aims to combine several simple but interesting developments in international scholarship to argue that, over time, major seismic disasters can be seen to influence the development of those societies most frequently affected by them. It is adapted from an earlier Japanese-language article (Kim, Leihy, Freeman and Teo, 2023), and focuses on the massification of educational opportunity as occasionally disrupted by natural disasters. Firstly, it considers the ambiguous relationship between anthropocentric views of nature and particularly seismic disruption of human society, and the new consensus that our geological age is now the *anthropocene*, with shifts in climate primarily sparked by expansive human activity. Worldwide, Japanese aesthetics of technology and fatalism connect particularly well with this outlook. Next, we look at another particularly seismic country, Chile, and ways that its history can be periodized between major seismic disasters, creating pivotal points for social change, particularly through intergenerational investment of education. Finally, we apply such periodization to the last hundred years of Japanese history, proposing a supplementary view of how Japanese society interacts with its ecology.

II. Anthropocene and *antropocentrism*

Do humans dominate the earth, or does the earth (along with human conceptions, such as divine will and scientific orderliness) dominate the humans? Maybe this is a false dichotomy; it is possible that each human individual does not really understand humanity enough to allow a meaningful collective comparison between humanity and everything else. Nevertheless, human science seems to agree that humans are now more influential over their immediate environment than other terrestrial forces and celestial movements. Perhaps humans really are responsible for our collective condition now?

It is not often that a book by a Japanese academic becomes a worldwide hit, but Saito Kohei's *Capital in the Anthropocene* (Jap. 2020; Eng. 2023) has all of the elements to succeed. The title is fashionable, almost to the point of plagiarism. Saito combines *Capital* – with French economist Thomas Piketty having achieved great fame with his *Capital in the Twenty-First Century* (Fr. 2013; Eng. 2014). A decade ago, Piketty's book was enthusiastically greeted for rescuing Karl Marx's insights into industrializing societies for our times. Saito goes one logical step beyond Piketty's proven formula by tying in the concept of the *anthropocene* epoch. The term *anthropocene* has been used in academic contexts for a couple of decades, but only recently has been adopted as standard terminology for the transition to a planet Earth where humans (*anthropos*, in Greek) are making a bigger impact (*kenos*, a new context) than the movements of celestial bodies that are thought to have led to changing climate patterns and eruptions over previous millennia. For Saito, the degree of commercial cynicism in paraphrasing Piketty's title with another element of the zeitgeist has, ironically enough, led to renewed interest in the enduring insights of Marxian political economy among young Japanese readers.

Like many influential re-castings of Marxian theory (and indeed like much philosophy since the middle of last century), Saito's work stresses the virtue of an equilibrium between human activity and the wider ecology. Scholars such as Martin Heidegger (1951), Herbert Marcuse (1964), Shoshana Zuboff (2019), Toby Ord (2020) and Nika Dubrovsky and David Graeber (2020) have noted a kind of ecological crunch point where technology has overtaken even the mythological imaginaries with which societies understand natural order. If "cultural Marxism" is an enduring criticism of forms of despondent social criticism such as Marcuse's, we might locate Saito's approach within this growing corpus of environmentalist Marxism.

If Saito's work stands on the shoulders of other giants, any derivative aspect is part of its genius in bringing current pressures into focus. In a certain way, Saito embodies the "imitate, then overtake" ethos ascribed to the great Japanese industrial reconstruction after the Second World War (Quark, 2013). *Capital in the Anthropocene* is an especially enticing evocation, given that since the middle of last century economists have been concerned with the post-Marxian concept of human capital, popularised by Gary Becker (1964). Human capital is a useful metaphor, because it allows for the idea that individuals, groups and whole societies (indeed, all humanity) can access, store and exchange "capital" to the extent that skills and knowledge can be cultivated. Human capital is also provocative, imagining skill levels as fungible tokens within economic interactions. There is empowerment, however, in the group choices and changing values reflected in the ways in which human societies assemble their skills and knowledge.

That we have entered the *anthropocene* epoch does not make it less important to learn from living memory, and especially from group trauma, whether from apparently accelerating

natural disasters, plagues such as the Covid-19 pandemic, or violent conflict. Human societies and humanity overall have the opportunity to adjust priorities not only in response to human-caused climate change (although of course it is important to learn and respond), but also from the timely reminders of periodic seismic disasters that remain, even in the *anthropocene* epoch, bigger than humanity.

III. Seismic periodization in Chile

The concept of the *anthropocene* is compelling, as it recognizes a new geological epoch defined by human impact; as far as human science can reconstruct, new geological epochs historically tend to come tens of thousands and millions of years apart. At the same time, the histories of each nation-state (the current standard societal division) are often divided into periods that more or less reflect human life-spans, such as periods between major wars, between the adoption of major constitutional changes, the reigns of monarchs, or even, in the case of the theory that emerged a century ago now known as Kondratiev waves (Kondratiev, 1984), long-term cycles of economic behaviour and technological innovation. Here we would like to consider instead the human capacity to make changes based on major seismic disruptions. We trace this notion to an almost accidental insight from the Chilean writers (daughter and father) Elisa and Jorge Quiroz in their book *Between 2 Earthquakes* (Sp. *Entre 2 Terremotos*, 2019). First, however, it is interesting to consider the recent reception of the Japanese word tsunami in other countries affected by the phenomenon.

Transpacific tsunami

The recorded history of human observation of seismic activity of course revolves around how humans were affected; in that sense, ancient descriptions are anthropocentric precisely because they tended to be associated with divine intervention and unknown forces. The description of earthquakes and tsunamis gradually evolved to reflect a better and more scientific understanding of geology. Beyond Japan, the now internationally adopted word “tsunami” reflects the need for a technical word whose literal meaning most of its users do not understand —while Japanese speakers understand its anthropocentric focus on the harbour, to others it is seen as more scientific because it has replaced the former demonstrably erroneous belief that such waves were “tidal” (which are primarily determined by movements of the Earth’s moon; c.f. the obsolete English term “tidal wave”). The Spanish adoption of the Japanese loanword “tsunami”, however, reflects something other than the embrace of an exotic and inscrutable word —it is also a renunciation of a better pre-existing term, and in that sense, a sign of a lack of confidence in the Spanish language itself. In Chile, as a Spanish-speaking country much exposed to tsunamis, this sudden lexical change in only the last decade or so indicates what might be called “parochial cosmopolitanism”.

One ironic way in which Japanese culture’s strong elements of humanism and perhaps even anthropomorphic religious imagination have influenced the globe is through the foreign misunderstanding of the Japanese language as bearing descriptive straightforwardness. Over recent decades, the Japanese word tsunami has been borrowed into many of the world’s languages, with varying levels of fidelity as far as the pronunciation goes. “Sunaami” is very common —a massively destructive example emanating from the Indian Ocean in December 2004 cemented the term in the global imagination. The Japaneseness of tsunamis in the international imagination is no doubt influenced by the popularity of Hokusai’s *Great Wave* woodcut as the apotheosis of Japan’s achievements in *popular* culture late in the period of

Tokugawa isolation. Also, coastal Japan has long supported some of the densest population in the world and so been particularly affected over recorded history.

The Japanese language has a strange capacity —perhaps more than any other within the huge diversity of Asia languages, including the Chinese from which so many of its concepts are derived— to put names to phenomena that somehow connect universally with the human imagination. It is possible that other cultures simply like the way Japanese words look: exotic, but confidently meaningful. The practice of using the Japanese word tsunami internationally started with experts of oceanology. Google Ngram Viewer attests that tsunami overtook tidal wave in 1961 in English overall and 1964 in American English, but really came into dominance for 2000. The wake of the 2004 tsunami coincided with the peak, so far, of mentions of tsunamis in English texts.

Tsunami might be anthropocentric, with the term reflecting human concerns for their harbours (and many tsunamis never reach a shore in force), but it is still an improvement on “tidal wave”. The basic problem here is, the Spanish language already had a better, plainer and more scientifically parsimonious word for the phenomenon: *maremoto*, literally “sea movement” and corresponding nicely with the word for earthquake *terremoto* (“land movement”). Spanish, it would seem, adopted the Japanese word in imitation of English, rather than of Japanese itself. Nevertheless, recent enthusiasm for this word reflects, in Chile and other Spanish-speaking countries, a sense of being able to draw on evolving international knowledge to make meaningful responses to such national disasters.

Chile between earthquakes

Chile is an isolated country with an unusual talent for exposing its parochial character in any attempt at cosmopolitan modernity. This is clear in its adoption of the loanword from Japanese tsunami, prized for its novelty value. It is also clear in one of Chile’s most interesting recent historiographic innovations: dividing periods of time between major seismic disasters (Quiroz & Quiroz, 2019).

If Saito’s theory of Capital in the Anthropocene echoes the popular notion of “imitate and overtake” associated with Japanese industrialization, Quiroz and Quiroz’s notion —between earthquakes— is also redolent of Chilean creativity, in the sense that it seems to be a by-product of the aim of addressing the Chilean imitation of a successful enterprise in other places, only to produce an insight that is entirely autochthonous. The nominal conceit of Quiroz and Quiroz’s book was simply to add some generally controversial, relatively recent personalities to a list of national heroes compiled for a 2008 television special in imitation of exercises elsewhere where the hundred greatest compatriots are voted on by the public, stemming from 100 Greatest Britons in 2002. The notable innovation that Quiroz and Quiroz actually achieved was a genuine breakthrough: by focusing on a period that happened to fall between major earthquakes, they model a way to periodize history not through the ultimately man-made terms of major constitutional rewrites (Ruiz-Tagle, 2021), or major wars, but rather through seismic disasters. In the following section, we cite Chile’s five great seismic disasters since the beginning of last century, with some discussion of how they have framed society, and particularly social consensus around educational priorities.

Chile has frequent earthquakes and tsunamis. The 1906 earthquake striking the port of Valparaíso (the same year as a major earthquake in San Francisco) occurred during a fairly aimless phase for the Chilean Republic following a 1891 civil war. This war confirmed the

dominance of a ruling class that benefited greatly from the exportation of nitrates; the chemical synthesis of saltpetre (crucial for the production of explosives) would greatly reduce that source of competitive advantage, and more organised working classes were beginning to advocate for better conditions (termed the “Social Question”, and central to intellectual debates during the centenary of Chilean independence in the 1910s). The ensuing decades would see the need for universal schooling take a central place in gradually democratizing political discourse.

January 1939 would see Chile’s next great earthquake, devastating the small but historically important city of Chillán. At that time, war was about to erupt in Europe, to complement the entrenched conflict between Japan and China. In the Chilean case, the earthquake saw a redoubled focus on education and economic development. President Pedro Aguirre Cerda had once worked as a schoolteacher, and made “To educate is to govern” a campaign slogan (Leihy and Salazar, 2017), as well as a policy of general export-focused neutrality during the conflict. Chile pursued a somewhat ambiguous diplomatic relationship with Japan during the war and was keen to supply copper directly to Japan from the end of the American occupation in 1952 (Japanese Embassy in Chile, 2017).

Chile’s Valdivia in 1960 saw what is considered by many to be the largest reliably recorded earthquake in history: 9.6 on the Moment Magnitude Scale subsequently developed by Thomas Hanks and Kanamori Hiroo (1979). The destruction slowed what had been the promising early development of Valdivia’s Universidad Austral (founded in 1954, with the recruitment of European academics to an area that had attracted considerable German settlement in the mid nineteenth century). In 1960, Chile was preparing to host the 1962 FIFA World Cup, and experts from around the world were consulted on improving engineering and other technical capacity. Impatient efforts to spark greater development in the 1960s and 70s, however, would tend to be more divisive than unifying.

In their use of “between earthquakes” to describe the half-century between 1960 and 2010, Quiroz and Quiroz skip an important earthquake in 1985, which saw 177 deaths but more importantly enormous destruction of buildings and infrastructure. Retrospectively, reconstruction from that earthquake would see a recovery from a deep recession and steadily rising participation in all levels of the education system. It should be noted that considerable input by Japanese seismologists and architects would lead to more resilient building standards in Chile (Moroni, 1993). The 1985 earthquake is also commemorated by the ice cream and cheap wine cocktail called a *terremoto*, now a fixture of Chilean national holiday celebrations, hence “between 2 earthquakes” (*entre 2 terremotos*) being a light-hearted pun by Quiroz and Quiroz with regard to the national curse and opportunity for discussion provided by seismic activity.

Chile’s most recent major earthquake and destructive tsunami (the novel loanword then much embraced by government and media) came in 2010, the Republic’s bicentenary year. From the point of view of societal learning, this was also a time in which university protests at a market-oriented education system were spreading. By 2022, student leaders from that era had swept into power at the national level, including the 35-year-old Gabriel Boric as president. While this millennial generation had enjoyed unprecedented access to education, its complaints about educational quality and the new government’s shortcomings in technical competence and judgement reflect a transformed but in many ways frustrated society. Chile today in many senses continues to live in a period that can be traced from that last great earthquake. Chile remains an interesting country to compare with others, simply because (at

least in the past) it has seemed to pull together through its disasters. Political and economic crises (generally poorly understood by the wider population and mostly commemorated with heavy ideological piety) elicit responses that indicate varying degrees of learning and incorrigibility, but it is seismic events that really showcase the country's capacity to pull together.

IV. A seismic reassessment of Japan's last century

Japan and Chile lie diagonally opposite across the Pacific Ocean, and benefit and suffer from the movements of the tectonic plates that lie between them. In other ways, they are not the most symmetrical countries to compare, for a simple reason: Japan has cultivated an image of cultural greatness (as befits a place which for centuries has been one of the most densely populated on earth), whereas Chilean self-identity revolves around a sense of peripherality. In Japan's case, its culture is heavily informed by mainland East Asia, and particularly the Chinese cradle of civilization – even Japan's name reflects Chinese thinking (where the sun rises, from a Northern Chinese perspective). Chilean culture, on the other hand, also acknowledges being on the edge of great civilizations —of the Inca and then the Spanish Viceroyalty of Peru, and from the 19th century, the extraordinarily creative, immigrant-nativizing culture of Argentina. Whereas Japan has refined many concepts emanating from China, Chile has no pretences about doing the things neighbouring societies have done well.

In fact, it is worth noting that Argentina is a nation-state routinely compared to Japan in the kind of rule-of-thumb wisdom taught at business schools. Argentina itself is often subject to other international comparisons, for example, with the other geographically huge and demographically mid-sized Canada and Australia (Di Tella and Platt, 1985). These three countries all looked set for comfortable development a century ago, but Argentina has been left behind. In fact, Argentina is arguably the only country since the industrial revolution to transition from developed to developing status. With respect to Japan, a famous observation is attributed to economist Simon Kuznets (1901-1985): there are four categories of country: developed countries, underdeveloped countries, Japan, and Argentina. Of course, since Kuznets passed away in 1985 other development outcomes are evident —the oil-rich Gulf States, Singapore, South Korea, the post-Soviet world— but there is a lasting resonance to what Kuznets meant. Basically, Japan is developed despite not following guidelines or expectations from anywhere else, and Argentina is undeveloped despite a suffocating preoccupation with national stimulus and productivity drives, and despite enormous natural resources and cultural dynamism. While Chileans greatly admire Argentine culture, they are also proud of doing everything in their power to avoid the nationalistic nature of Argentinian exceptionalism and instead having a more empirical view of how to develop opportunities and to learn from setbacks.

Japan between earthquakes

The periodisation of Japanese history customarily follows imperial reigns; the clarification of the terms of the monarchy under the 1947 Constitution that generally divided the Showa is also crucial in terms of public policy, including in education. As in Chile, to a large extent, Japan's major seismic disasters of the twentieth and (so far) twenty-first centuries are quite compatible with narratives of national progress. Nevertheless, by applying the "between earthquakes" approach to Japan, some further elements of societal learning are evident. The Japanese population has suffered many major seismic events over time, and in many ways it

is a tribute to human ingenuity that over the last hundred years, despite such a dense population and so much industrial activity, damage has been relatively contained. In the same spirit as Quiroz and Quiroz's "between earthquakes" approach, we can briefly comment on the most destructive Japanese earthquakes of this period.

Japan's first massively destructive earthquake of the twentieth century is one of the world's worst on record; the Great Kanto Earthquake of 1923. Over 140,000 people died, and thousands more members of persecuted ethnic (especially Koreans) and political minorities were killed in subsequent violence. In retrospect, rebuilding from this earthquake would see a Japan that had famously rapidly industrialised since the Meiji era find greater focus during the Showa era that began in 1926. Despite damaging earthquakes in 1927 and 1933, and while the Great Depression of 1929 caused considerable hardship, industrial intensification and overseas aggression saw initial progress and then the disastrous overreach of the Second World War. Historical analysis of the Japanese education system prior to the war would create a narrative of a highly hierarchical system that was reformed in favour of meritocracy under post-war reforms. Twenty-first century studies, however, have revealed that, at system level, great progress was made in achieving universal participation in the first eight years of schooling by the 1930s, not least in order to strengthen industrial productivity (Krämer, 2006). The Japanese education system was a cornerstone of resilience to natural disasters and economic tides.

The final phase of the war and its immediate aftermath under American occupation saw several earthquakes with medium levels of destruction, perhaps reflecting a reduced capacity to respond. Remarkably, 1948 saw the last hugely destructive earthquake of the Showa period (a 1983 earthquake saw the highest death-toll of 104). The period from the adoption of the 1947 constitution to the end of the Showa in 1989 represents one of the greatest periods of cultural and economic creativity in any country in history; and time of stable *wa* (Kim, Leihy, Freeman & Teo, 2021).

In contrast, the Heisei era from 1989 to 2019 is generally associated with very moderate and modest economic development in Japan, as previously less-developed Asian countries showed more impressive growth in the post-Cold War world. While the Ministry of Education made important policy adjustments to greet this new era, it is also interesting to consider how demographic evolution and the effects of globalization would create different phases as the Heisei wore on. The destructive seismic events of 1995, focused especially on Kobe, and in 2011 around Tohoku and famously affecting the Fukushima nuclear power plants, occurred as very different cohorts of young Japanese were coming of age. While the mid-1990s saw an acceleration of Japanese students studying abroad at undergraduate and postgraduate levels, by 2011, many Japanese schools and universities had adjusted to the need of all students to undertake global studies, and increased intakes of foreign students. The Reiwa era that began in May 2019 might normally be expected to see a general reassessment of education in Japan, but the Covid-19 pandemic and economic vicissitudes of the early 2020s have greatly complicated the prospectus.

V. Conclusion

Returning to the original question of whether humans dominate the earth or the earth dominates humans, a provisional answer might be that humans enjoy the unusual privilege of being able to monitor their environment with increasing

insight. It is no coincidence that societies expose themselves to seismic risk; rich volcanic soil and harbours near the fecund supplies of sea life that unstable seabeds foster are important factors in the exposure of people to earthquakes and tsunamis. Necessity is the mother of invention in dealing with the blessing and curses of seismic activity. The degree to which seismic movements affect human society is largely beyond precise human control, and yet the very fact we have developed advanced instrumentation to investigate past, present and potential earthquakes and tsunamis reflects societies motivated to learn. As such, from the periods between major destructive earthquakes emerge important phases in the ways societies operate and see themselves.

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