2 "The Tsunami Has No Borders": Considering the Significance of Disaster in North Pacific History

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Abstract Earthquakes, tsunamis, and volcanic eruptions have been frequent features of the North Pacific in historical times. However, these violent and dramatic events have rarely been examined by historians, and their role in the longer history of the region is murky at best. This chapter briefly surveys a few major earthquakes and tsunamis which have taken place in the North Pacific since the arrival of the Russian Empire and offers the conclusion that, while these events may have had substantial and devastating impacts in local areas, they do not appear to have substantially impacted long-term processes in the human history of the region, such as Russian and American colonisation.

Keywords earthquake, tsunami, Alaska, Kodiak, Kamchatka

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Introduction

"In regard to the dangers which plague this country by reason of earthquakes and floods, this is a disadvantage which has been observed in many other places which however are not considered any less fit to be inhabited because of this."
(Stepan Krashenninikov, 1755)[1]

"I am sure there are areas in the world having trouble with volcanoes but people live under them all the time."
(Senator Clinton Anderson, 1964)[2]

"As the tsunami has no borders and extends widely," Dr. Tatiana Ivelskaya, Chief of the Sakhalin Tsunami Warning Centre, wrote in 2015, "the exchange of tsunami warnings is also important."[3] Her comment, and the increased efforts to share scientific data concerning tsunamis in the late twentieth and early twenty-first centuries, reflect the widely held understanding that tsunamis and the large earthquakes or volcanic eruptions which often generate them are a matter of significant regional importance. Indeed, the North Pacific exists atop one of the planet's most seismically active zones, with as much as seventy-five percent of the planet's seismic energy being released at the edges of the Pacific plate, and the Kamchatka peninsula in particular has experienced a substantial tsunami roughly twice a century over the last few thousand years.[4] Despite this prevalence, the role of these geological events has rarely been considered in the historiography of the region.

Earthquakes, tsunamis, and volcanic eruptions have no regard for human organisations of space and strike where they will, regardless of human activities. The destruction caused by these hazards, however, is anything but random. Since the beginning of the eighteenth century, European empires and their successor states have reorganised space, people, and infrastructure in the North Pacific. In doing so, they have also transformed human relationships with these regularly occurring natural hazards.

However, while the relationships between people and these natural hazards have changed over time, it is less clear if this long-term pattern of

1 Krashenninikov, *Explorations of Kamchatka,* 87.
2 "Transcript of Proceedings," July 27, 1964.
3 Kong, *Pacific Tsunami Warning System*, 12.
4 Pinegina, "Holocene Tsunamis in Avachinsky Bay, Kamchatka, Russia."

geological events has had a substantial impact on other long-term processes in the human history of the region, such as colonisation and imperialism. Generally, historians of disaster have focused on singular events, and with substantial success. By contrast, some works have endeavoured to describe long histories of disasters in particular countries to examine changing responses to disasters over time. In both cases, historians of disaster frequently stress the revelatory qualities of disasters for historical research. For example, Charles F. Walker's *Shaky Colonialism*, which traces the long aftermath of the 1746 earthquake in Lima, Peru, argues: "The earthquake and ensuing tsunami cracked open Lima and provided a snapshot, albeit a dreadful one, of the city at 10:30 PM on October 28, 1746."[5] Walker approaches this event through what he calls "incident analysis," a term coined by Robert Darnton to describe a process of focusing on a certain event in a particular time or place and following its repercussions.

Another such recent work to examine an individual incident is Joanna Dyl's *Seismic City*, which tells the story of the 1906 San Francisco earthquake. Dyl examines the history of the city's construction and attempts by boosters and insurance professionals to excuse the earthquake damage by attributing it to fire, while also highlighting that the earthquake granted city officials additional tools to relocate Asian-American populations. Dyl argues that disasters "not only remind us of non-human nature's ongoing power to affect both the planet and human history, but they also demonstrate how our own actions and decisions—our own efforts to shape nature—in turn often have unforeseen consequences."[6] These studies of individual incidents also prompt questions about how the historical phenomena they identify fit within broader, long-term processes because these histories often deal only with a few specific geographies, short stretches of time, or specific aspects of disasters as phenomena.

What remains to be investigated, then, is the relationships between long cycles of disaster recurrence and other long-term historical processes. This chapter argues that, while tsunamis and other disasters in the North Pacific had substantial impacts when they occurred, they had little impact on the long-term colonisation of the region. To do this, two case studies are presented here, one for the Kamchatka peninsula and one for the Kodiak archipelago. Neither case study is exhaustive, and significant geologic events, including the 1952 Kamchatka/Kuril tsunami and the 1912 Katmai eruption, are omitted for

5 Walker, *Shaky Colonialism*, 11–12.
6 Dyl, *Seismic City,* 10.

space—to say nothing of abbreviated human events. The tsunami may have no borders, but the empires in the North Pacific certainly did, and neither the Russian Empire and its successor states nor the United States ever gave up territory or abandoned their colonial projects because of tsunamis.

The "Disaster Regime" and Other Terms

Disasters have generally been considered to be social phenomena by most existing scholarship.[7] That is to say, disasters take place within the context of human societies and so are shaped by those societies' behaviours towards them. While this understanding of disasters remains useful to clarify when we are discussing the impact of a natural hazard on people, the idea of disasters as entirely social phenomena has seen welcome reconsideration in recent scholarship.

Seeking to "guard against a slow drift toward social determinism" (that is to say, a view at the other end of the spectrum from environmental determinism, in which human action entirely causes historical phenomena), Chris Courtney coined the term *disaster regime* in his book *The Nature of Disaster in China: The 1931 Yangzi River Flood*. According to Courtney, a disaster regime describes "a configuration of human and environmental relationships which condition the humanitarian impacts of natural hazards in a particular time and place."[8] While he clarifies that each disaster is unique and that disaster regimes change over time, he also uses the concept of a disaster regime to assert that the same constellation of causes which were present during a catastrophic flood in 1931 were also present in several other disasters of the era.

The idea of tracing changing configurations of human and environmental relationships over time is a useful one for the North Pacific, where political continuity has been sporadic, with the Russian Empire, Soviet Union, Russian Federation, and several distinct eras of American administration seizing control of different areas at different times. While these changing political regimes did often change these relationships in substantial ways, comparing their associated disaster regimes also reveals a surprising degree of continuity.

7 Shimoyama, "Basic Characteristics of Disasters."
8 Courtney, *The Nature of Disaster in China, 10–11.*

Kamchatka and the Tsunami of 1737

The tsunami of 1737 began with an eruption. For more than a full day, the Avachinsky volcano in Kamchatka spewed out ashes and covered the land in a fine, grey powder. For most of the residents, this would not have been the first eruption they had experienced. The North Pacific peninsula of Kamchatka on which they lived was covered by at least twenty active volcanoes which occasionally spewed out ashes, lava, and smoke. The eruption of 1737, though, turned out to be the prelude to a far more dangerous event. At around three in the morning the following day, a powerful earthquake shook the peninsula. Many buildings were destroyed or damaged by the shaking, but the worst was still to come. The entire ocean seemed to vanish into the pre-dawn darkness, and many miles to the south, elder observers in the Kurile Islands looked on in amazement as the tops of undersea mountains which had never before been seen became visible as the sea retreated. Moments later, the frigid waters of the North Pacific came crashing back in a series of devastating tsunamis. Stepan Krashenninikov, a naturalist employed by the Russian Empire to help survey the peninsula, reported that the first tsunami surged in at a depth of 3 *sazhen*, or about 6.4 metres. The water receded, and a second earthquake and second tsunami of the same height surged in before the ocean receded so far that it could not be seen from shore. A quarter of an hour later, there was another powerful earthquake, and the ocean returned as a tsunami with a depth of 30 *sazhen*, or 64 metres. Krashenninikov writes that the seas remained greatly agitated for some time, and great terrifying sounds could be heard to be coming from underground. Meadows became hills, and fields became lakes and bays. According to Krashenninikov, "the natives lost everything, and many died horribly."[9] Tremors persisted until the following year.

The tsunamis struck a land at war. Four decades prior, a small number of agents of the Russian Empire and their allies from Siberia's central regions entered the peninsula seeking furs, especially the pelts of sables, foxes, and sea otters. To acquire these furs, they practised a time-worn strategy which had been employed across Siberia. First, they would build a fort, an *ostrog*. Then, they would take hostages from the resident population. Finally, these agents of empire compelled the relatives of the hostages to deliver a tax in the form of furs, the *iasak*. The particulars of this complex system functioned differently throughout the diverse lands of Siberia and Central Asia, but as a broad pattern these features remained consistent. In Kamchatka, attempts

9 Krasheninnikov, *Explorations of Kamchatka,* 99.

to impose this system quickly spiralled into more than half a century of raids and counter-raids, shifting alliances, pitched sieges, and bloody massacres. When the tsunami of 1737 crashed into the peninsula, the effects it would have on the people living there were closely tied to the changes this invasion had brought to Kamchatka.

There are only two extant sources for the tsunami of 1737: the accounts of the naturalists Stepan Krashenninikov and Georg Steller, neither of whom were eyewitnesses to the event. Krashenninikov experienced the earthquake from the sheltered southwestern corner of the peninsula only shortly after arriving in Kamchatka for the first time, and so based his account largely on later interviews. Steller did not arrive until substantially later and similarly based his account on interviews and the work of Krashenninikov. The accounts these naturalists wrote also included detailed ethnographic studies of the people, plants, animals, and geography of the peninsula and have formed the source basis for almost all studies of life on the peninsula during the early decades of the Russian invasion. However, it has never been remarked upon that every observation took place in a landscape and society which had just suffered a substantial disaster. This fact, in conjunction with the violent and radical changes that accompanied the invasion, makes it difficult to assess the differences between the disaster regimes which existed prior to and after the invasion; however, the extent to which the invasion changed life in Kamchatka suggests that the invasion may have substantially influenced the experience of the tsunami.

The Invasion of Kamchatka

The events of the invasion, then, deserve some commentary. While the subject has received some attention in Russian-language literature, it has never received detailed treatment in English. Furthermore, the entanglement of the violence of the invasion with intense geologic activity on the peninsula is not simply an artefact of historical coincidence. Krashenninikov commented that:

> not only the Kamchadals, but the Cossacks as well, regard the eruption of volcanoes as a presage of a bloody war, and they back up their superstitions with many examples. They say it never once happened that an eruption was not followed by much bloodshed. They

> assert, moreover, that the more violent and long-lasting the eruption, the more cruel, bloody, and deadly the war will be.[10]

Steller made similar commentary.[11] These are the only extant accounts in which this connection between revolt and volcanism is identified, and, as we will see, all other extant documents which discuss revolts on the peninsula attribute decidedly human—or at least non-volcanic—causes to the events. Further, significant eruptions like that of 1737 do not appear to have been accompanied by significant revolts. If this rhetoric of revolt entangled with volcanism is untrue, as the evidence suggests, then it is the circumstances which led to this entangling of human affairs with volcanism that ought to be considered more fully. While, ultimately, it is coincidental that the first half of the eighteenth century was a period of high volcanic activity in Kamchatka as well as a period of pitched warfare between Itelmens, Koryaks, and Russian servitors, the belief that these events might be related constitutes a close relationship between the changes brought by the invasion and regularly-recurring natural hazards of the North Pacific which has so far been neglected in the study of the region.

Excepting the disastrous expedition of the Cossack Semyon Dezhnev in the 1650s, the first major Russian incursion into the Kamchatka peninsula originated from the Anadyrsk *ostrog*, where an uneasy alliance between deer-herding Koryaks and a small number of Cossacks and Yukaghirs existed against the Chukchis to the north in Chukotka, where several failed Cossack raids had not produced a significant number of furs or ivory walrus tusks. This first raid, undertaken by the Cossack Luka Morozko at the head of sixteen Cossacks, sacked a likely Itelmen fort on the Tigil River in 1696, where they found several letters written in a language they could not understand. Later, the nineteenth-century naval historian A. S. Sgibnev would identity that language as Japanese. It was also during this campaign that Morozko first encountered information about a chain of islands extending beyond the peninsula. The account of this journey was reported to Moscow in 1701.[12]

10 Krasheninnikov, *Explorations of Kamchatka,* 102. Kamchadal is a term that was often used by Russians to describe Itelmen people. While it does still see some contemporary use, I have chosen to use the term Itelmen (English plural: Itelmens). Even this term is inadequate, as Steller specifies that people on the peninsula identified themselves according to their tribe, their settlements, their names for their neighbours, and different pronunciations of the same language.

11 Steller, *Steller's History of Kamchatka*, 31.

12 Sgibnev, "Istoricheskii Ocherk Glavneishikh Sobytii v Kamchatke, 1650–1855."

In 1697, the following year, the Cossack Vladimir Atlasov, armed with the intelligence gathered by Morozko's previous raid, returned to Kamchatka leading fifty-five Cossacks and sixty Yukaghirs. Atlasov's report to Moscow in 1701 included a variety of information, including early descriptions of volcanic activity, noting:

> A week's travel upwards from the mouth of the Kamchatka River there is a mountain, with the likeness of a stack of bread that is extremely great and high, and another mountain near it is like a stack of hay and similarly tall, and from that other mountain smoke comes in the afternoon, and at night glowing and sparks.[13]

Atlasov's report also provided information that Itelmens were already responding to the Russian threat by building additional fortifications from which to fight:

> Until the arrival of the Russians they did not have forts, and it is notable that under Russian people they build more forts. They fight from these forts, throw stones from slings in their hands, and hurl large stones by hand from the fort, and fought with sharpened sticks and poles.[14]

While the timeline of this first campaign in Kamchatka is not exactly clear, it is notable that a new kind of warfare appears to have been emerging in conjunction with visible volcanism at around this time. This new kind of defensive siege warfare, however, may have been spurred by the need to defend against Russian firearms. Atlasov's report states that they encountered heavy resistance but that Itelmens would usually flee once firearms were used. It appears, then, that in the earliest years of the invasion, Itelmens may have already been adapting to changing conditions of warfare, not staging revolts based on volcanic eruptions which happened to coincide with the appearance of novel forms of violence.[15]

13 Ibid.

14 Ibid.

15 It should be noted, however, that when Steller wrote his account roughly half a century later in 1741, he remarks that such structures had been built long before Russian arrival due to the prevalence of warfare on the peninsula. Whatever the case, it is clear that conditions of war, and not volcanic eruptions, drove the use of these structures. Steller, *Steller's History of Kamchatka*, 153.

Atlasov's initial expedition also established the Upper Kamchatka *ostrog* a few miles inland from the mouth of the Kamchatka River, and during his absence from the peninsula from 1701 until 1706, the administrators Mikhail Zinoviev and Vasili Kolesov in successive command established the short-lived first iteration of the Bolsheretsk camp in the southwest of the peninsula and the Upper-Kamchatka *ostrog* in the southern reaches of the Kamchatka River, deep in the peninsula's interior.[16] The next ten years would be defined by a series of raids and counter-raids as well as rebellions against Cossack leadership. Around 1704, the Bolsheretsk camp was destroyed by an Itelmen raid; and a collector of *iasak* was slain, along with five Cossacks, around the same time. Krashenninikov attributes these raids to the collection of *iasak* because "the severe manner in which it was extracted was a great burden to the Kamchadals, who had never lost the memory of their former liberty."[17] In 1707, Atlasov, having been freed from prison in Irkutsk, re-assumed command of the Cossacks on the peninsula and dispatched Ivan Taratin and seventy Cossacks to attempt to conquer the Itelmens who had killed the *iasak* collector three years earlier. This party encountered a force of nearly 800 Itelmens, and, after a bloody battle in which six Cossacks and an unknown number of Itelmens were killed, Taratin's party took three purported Itelmen leaders prisoner. They also briefly attempted to reconquer the Bolsheretsk camp but were unsuccessful.[18]

After 1711, when the Cossacks under Atlasov's command murdered him in his sleep over accusations of cruelty and embezzlement, this band of Cossacks returned to Bolsheretsk once again, hoping to reconquer it. According to Krashenninikov's account, the result was far more a massacre than a battle. The Cossacks destroyed an Itelmen fort in early May and began to build up an *ostrog*. By May 22, a combined force of whom Sgibnev calls *kurili*[19] (potentially Ainu) and Itelmens had assembled to retake it. The fighting lasted well into the evening, and by the time it was over, "so many of the rebels were killed or drowned that the Bolshaia River was covered with bodies."[20] The Cossacks proceeded to set out by boat to the Kuril Islands, where they raided for the remainder of the season.

16 Atlasov was imprisoned in Irkutsk at this time for plundering a merchant ship on the Tunguska River during his return journey.
17 Krasheninnikov, *Explorations of Kamchatka,* 302.
18 Sgibnev, "Istoricheskii Ocherk Glavneishikh Sobytii v Kamchatke."
19 Ibid.
20 Krasheninnikov, *Explorations of Kamchatka*, 309.

By 1713, staggered reports of the chaos and bloodshed in Kamchatka, including the murder of two other administrators by Cossacks and a failure to deliver the expected furs, had reached the regional Russian authority in Tobolsk. Prince Gagarin subsequently dispatched Pyotr Tatarinov to Kamchatka to both punish rebelling Cossacks and extract *iasak* by taking hostages. Tatarinov arrived in Anadyrsk in April of 1714, having left many of his servitors and Cossacks behind in a long trail of winter camps due to a shortage of food. When he arrived, he discovered that Afanasy Petrov, who had been in command at Anadyrsk, had left with a combined force of Cossacks and Yukagirs to attempt to conquer sedentary Koryaks who were living on the Olyutor River to the east.

The siege began on August 6, and after a bloody but successful battle in which nearly 130 Yukagirs were badly wounded, Petrov decreed that all survivors from the besieged fort should be hunted down. He ordered that the Yukagirs return with the severed fingers of the fleeing people or face hanging. These losses were compounded by the fact that the Cossacks had been feeding themselves on Yukagir reindeer herds, which were almost entirely depleted, and further still by the fact that they were forbidden from returning to the tundra while also being commanded to pay *iasak* as payment for tobacco and other goods. Tatarinov sent an order to Petrov commanding him to release the Yukagirs from their *iasak* obligations, but Petrov disregarded this order and simply left the Yukagirs at the newly established Olyutorsk *ostrog* with the remaining Yukagir reindeer. While in transit, the Yukagirs killed almost all of the Cossacks. A few managed to escape to the nearby Aklansk ostrog by December 5. The surviving Boyar Ivan Yeniseisky sent a letter to Anadyrsk stating that there were only eleven Cossacks remaining in Aklansk and that they were besieged on all sides. On December 16, Tatarinov sent munitions and gifts to attempt to diffuse the situation, but his messengers returned the next day with news that the camp had been raided. Tatarinov then sent a detachment of thirty people to capture hostages from the Yukagirs and their Koryak allies, but it is unclear if they were successful in this attempt.

In February of the following year, Tatarinov received confirmation from an *iasak* collector named Afanasy Surgutsky that all but one Cossack at Aklansk had been killed and that, while the Yukagirs had returned to the tundra, a group of Koryaks had made plans to besiege the Olyutorsk *ostrog*. At the time, the garrison within the Anadyrsk was so small (amounting to only around forty Cossacks in total) that Tatarinov feared sending any potential reinforcements, so the Olyutosk *ostrog* remained under siege until a band of twenty-nine Cossacks attempted to travel to some Koryak allies along the

coast to seek food. Nearly all of them were killed or taken prisoner by the besieging forces.

By February of 1715, an alliance of Koryaks from around Kamensky and Aklansky began to regularly raid the area around the Olyutosk *ostrog*. The besieged counter-attacked with a force of ten people, eight of whom were killed. Following this latest skirmish, it seemed likely that the *ostrog* would fall to the siege, but smallpox broke out among the besiegers, forcing the Koryaks to retreat.

From 1716 to 1728, life on the peninsula further deteriorated into a series of raids and counter-raids between Cossaks and Yukagirs, Cossacks and Koryaks, and Koryaks and Yukagirs to seize hostages and collections of *iasak*, arms, reindeer, and food. In all cases, though, this violence appears to have been motivated by immediately apparent needs and circumstances: furs and prisoners to exchange for trade goods and diplomatic leverage; reindeer for all their many purposes as food, trade goods, and pack animals, or as revenge for previous killings or betrayals. In no cases, though, do volcanic eruptions appear to have been strong motivating factors, or at least, not as apparent to the Russian observers as other, more immediate possibilities.

All the while, the furs of foxes, sea otters, and sables continued to flow from Kamchatka back towards western markets in fits and starts. In 1715 alone, more than 6,000 sable pelts were sent to Yakutsk, along with the pelts of 898 red foxes and 166 sea otters.[21] The collection of all of these furs, in addition to spurring the practices of raiding and counter-raiding, also produced ripple effects in the economy of Kamchatka. Steller remarks in his writings from 1741 that the standard practice among the Cossacks had been to coerce labour from Itelmen villages, including to hunt furs, meaning that villagers "had to neglect their own families during the best time [for food gathering]." Steller further details numerous heinous accounts of sexual assault, slavery, torture, and extortion on the part of occupying Cossacks and accuses them of pitting different groups of Koryaks and Itelmens against each other in order to more easily dominate both in the aftermath.[22] In his travels around the peninsula, Steller also noted that the landscape near rivers was lined with "so many pits and holes […] where dwellings once stood that in the summer you cannot take a step without fear of falling into a pit" and that "even now, you still find human bones and skulls as frequently as you find field stones elsewhere […] Most of these, however, were delivered from toothaches at the hands of

21 Sgibnev, "Istoricheskii Ocherk Glavneishikh Sobytii v Kamchatke."
22 Steller, *Steller's History of Kamchatka,* 173–175.

the Cossacks."[23] By all accounts, the extraction of furs from Kamchatka had introduced a state of endemic warfare and violent exploitation to the peninsula, which was accompanied by a frequent economic dislocation.

This violence and economic disruption likely impacted the ability of communities on Kamchatka to respond to disastrous tsunamis. Steller's history of Kamchatka, for example, notes that Itelmen villages were generally autonomous but were connected by familial trade networks and regular travel. He notes: "these families were in constant contact, made special friendships, and helped each other with various necessities when one had an abundance and the other a deficiency."[24] Steller also noted the importance of regional travel for Itelmen people as well as the misery that the decline of travel brought to the peninsula:

> At the beginning of winter, those living at the rivers' mouths went visiting upriver. Starting in March, those living upriver near the headwaters went visiting downriver until, having been en route for two months in order not to bypass anyone […] Their memories of their happy lifestyle now evoke many tears, and their bitterness will only be completely gone when the few remaining elders and "historians" who were alive before the arrival of the Russians will have all closed their eyes; not many of them are left anyway.[25]

In this passage, Steller confirms the importance of regional travel and connectivity in Itelmen life and directly attributes the decline of this lifestyle to the arrival of the Russians on the peninsula. If the assertions made by archaeologists elsewhere in the North Pacific are correct, then this decline in regional travel and connectivity likely deprived Itelmen populations of one of their best tools for mitigating the effects of disasters: a distributed network that was able to provide necessities in the event of shortages. An example of a site where archaeology has established a link between distributed kinship networks and disaster resilience is given later in this chapter in the case study on Kodiak. Given that, averaged over the last 4,000 years, Kamchatka has experienced a tsunami every fifty-six years, it appears likely that these social features helped to mitigate vulnerability to these regular events.

23 Ibid. 167.
24 Ibid. 161.
25 Ibid. 167.

The exploitation of Kamchatka reached a new degree of intensity with the arrival of Vitus Bering. Bering was a Danish seafarer sent to conduct an expedition to satisfy Peter the Great's curiosity about Asia's connection to America. Bering conducted two expeditions in the North Pacific between 1725 and his death in 1741. For the second expedition, he intended to set off from the eastern side of the Kamchatka peninsula. Rather than move his supplies by ship from the ramshackle maritime outpost of Okhotsk and around the southern tip of the peninsula, he ordered them to be moved overland from the Bolshertsk *ostrog* to the Lower Kamchatka *ostrog* during the winter—a distance of some 500 miles—and commanded local dogs and labour be conscripted for the purpose.

The results of this order were disastrous, even to the sensibilities of the nineteenth-century imperial naval officer and historian Alexander Sgibnev when he penned his account of Bering's activities in 1869. The trek demanded so much labour that few people were available to hunt, and so found themselves unable to gather the furs to pay *iasak*. Worst of all, though, was the loss of sled dogs, which were, aside from reindeer, the only domesticated animal on the peninsula and of critical importance to surviving the winter. A great multitude of them was required to haul the supplies over the mountainous landscape, down the frozen rivers of Kamchatka, and through the long portages between. The pace of the work was gruelling, and the dogs perished in droves. With each death, another critical tool for transportation, another object of trade to pacify the Russians, and another key to survival was lost.

Sven Waxell, a lieutenant on the expedition who would take over command following Bering's death, commented on the response to the requisition of dogs from Itelmens, saying: "The result was they became rebellious and killed several of our people." In response, a force from the expedition besieged an Itelmen stronghold in a steep place on a mountainside (which Waxell states he thinks were created by earthquakes), and "some hand grenades were thrown at them and that had a tremendous effect, for by doing this some of the male Kamchadals and some of their women and children were killed."[26] The account gives another glimpse into the violence which accompanied the requisition of supplies for the expedition as well as an additional instance of the features of the earthquake-prone landscape becoming entangled with the conquest.

Bering died on the return journey from Alaska, on a small island off the coast of Kamchatka, in December of 1741 as he and his crew suffered the debilitating effects of scurvy. As they suffered from this disease of poor

26 Waxell, *The American Expedition*, 97–98.

nutrition, they also experienced the shaking earth. That same winter, Sven Waxell recorded two earthquakes while sheltering on the island:

> During the winter we experienced two quite violent earthquakes. Our quarters, that is our pits and hollows in the sand, suffered considerably by them, being almost entirely filled with sand. Some of our people, those who were so weak that they were lying asleep, found themselves completely covered with sand when the quakes awoke them.[27]

The seismically active landscape of Kamchatka and the surrounding area, and this incident in conjunction with his subsequent questioning of people on mainland Kamchatka to confirm that they had felt the shaking on the same dates, suggest that this experience may have been one which influenced the thinking of both him and Steller—who was also present on the expedition—that earthquakes occurred seasonally.

Persistent theft in combination with the forced labour associated with moving provisions for the Kamchatka expeditions and recent memory of large massacres, such as the one in 1711, continued to spur resistance to the Russian occupation, culminating in the largest recorded revolt. In 1731, while Bering was back in St. Petersburg reporting on the results of his fist expedition and preparing for the second, insurgents who had been waiting for his ship—the *St. Gabriel*—to leave Kamchatka along with its crew, weaponry, and supplies struck at the Cossacks along the coast of the peninsula. They succeeded in capturing the Lower Kamchatka *ostrog*—an important fortress on the peninsula which had been used for the collection of the fur tax—and burned it to the ground. Only the church was left standing. According to Sgibnev, the attackers killed everyone inside the fortress, sparing no one, and afterwards celebrated their victory by drinking, dancing, and holding a prayer service under the guidance of a man named Savin, whom Sgibnev calls a "baptised Kamchadal." These tactics, as with those many raids, skirmishes, and sieges which preceded them in the previous decades, do not mesh with the reported rumours of volcanic eruptions stirring revolts, but instead demonstrates a clearly organised effort to overthrow Russian authority.

In a story recorded by Soviet ethnographers, a Koryak man named Kaynyvilyu, after returning from a journey meeting with giants on the tundra, found that his father's eyes had been gouged out. When he questioned his

27 Ibid. 140.

father, he discovered that some Cossacks who had been celebrating a wedding were responsible and were living in his house. Kaynyvilyu then immediately went to the Cossacks, grabbed them by their feet, and smashed them into a wall. He then broke all their arms and legs and threw them outside before setting off on a quest to restore his father's eyesight.[28] This story is both another example of resistance to invasion and non-volcanic motivations for counterattacks. While this story cannot be firmly placed in time, it describes decidedly human motives, not action driven by the eruption of a volcano.

Interrogations of prisoners taken by the Russians in the wake of the 1731 revolt similarly reveal non-volcanic motives. While the information taken from prisoners should be treated cautiously, these interrogations still accurately reflect the Russian view of the causes of the revolt. In one interrogation an Itelmen man, Fyodor Harchin, claimed that Russian servitors had raped his wife and demanded excessive overpayment of taxes.[29] This presents another case of entirely non-volcanic motives behind key revolts. In the end, Steller also believed that the causes of rebellions on Kamchatka were more human than volcanic: "This much is certain: that the Itelmen have always been forced to rebel."[30]

Even so, the active landscape of Kamchatka was a frequent factor in a period of pitched, brutal warfare and intense social and economic upheaval. The belief that revolts were linked to volcanic eruptions, said to have been commonplace by the 1740s, represents a linkage between the active seismic landscape and the decades of extreme violence which accompanied the conquest. This story suggests that the conquest dramatically changed the humanitarian impact of natural hazards. Still, it is important to note that such natural hazards never appear to have dissuaded imperial ambitions in the region, and Kamchatka has remained under the administration of the Russian Empire and its successor states up to the present. Commenting on the suitability of Kamchatka for colonisation, Krashenninikov wrote:

> In regard to the dangers which plague this country by reason of earthquakes and floods, this is a disadvantage which has been observed in many other places which however are not considered any less fit to be inhabited because of this.[31]

28 Dolitsky and Alaska-Siberia Research Centre, *Ancient Tales of Kamchatka*, 78.
29 *Kolonialnaia politika tsarizma na Kamchatke i Chukotke v XVIII veke*, 70.
30 Steller, *Steller's History of Kamchatka*, 177.
31 Krasheninnikov, *Explorations of Kamchatka,* 87.

While the intertwined effects of the tsunami of 1737 and the invasion of the peninsula should not be ignored, the fact that the tsunami and the frequency of observed earthquakes did not stymie the colonisation of the region remains significant.

Kodiak and the Tsunamis of 1788 and 1964

Today, Kodiak is well known as one of the early sites of Russian conquest in North America. When the Russian Empire's claim to Alaska was sold to the United States in 1867, Kodiak remained of peripheral concern to the United States until the outbreak of the Second World War, when Alaska was quickly militarised to create a Pacific fortress against Imperial Japan. Over the relatively short period of about 250 years since the Russian arrival, Kodiak has been rocked by several substantial tsunamis, earthquakes, and volcanic eruptions. These events significantly affected the people on the archipelago, even as colonisation changed almost every part of life. Still, even while they occasionally stymied efforts at settlement, these events never proved to be long-term obstacles to colonisation.

Kodiak and surrounding areas on the Kenai Peninsula, Cook Inlet, and Prince William Sound have been homes of Alutiiq people and their ancestors for at least 10,000 years. It is difficult and largely inadvisable to attempt to summarise the diversity of Alutiiq culture over the course of such a long period of time, but it can be said that over this extended period, Alutiiq people traded and interacted with the many other groups living in the region while developing a succession of cultures that made use of the abundant natural resources of the region, including salmon, birds, and sea mammals. They have also lived alongside the frequent natural hazards of the North Pacific and adjusted their lives to these events when necessary.

Earthquakes occurring in 1150 AD and 1550 AD do not appear to have had long-term impacts on Alutiiq society. A combination of maritime skill, large social territories, and strong inter-village relationships allowed communities to disperse and coalesce in response to disasters, mitigating their effects.[32] This is not to say that earthquakes, tsunamis, and eruptions never had any negative effects. These natural hazards disrupted shellfish beds and salmon runs and changed the elevation of the coastline. Still, the ability to move from a damaged site to another while the local ecology recovered appears

32 Saltonstall and Carver, "Earthquakes," 172–173.

to have been an invaluable part of life on Kodiak for hundreds of years, and constituted a disaster regime which mitigated the scale of destruction of these regular events.

In addition to ample geological evidence of these events, the oldest known human record of a volcanic eruption in Alaska comes from Kodiak. The record is the painted panel of a wooden box depicting an erupting volcano and a series of low humps speculated to indicate tsunamis. The box dates to about 1550 AD, approximately the time of the eruption of the St. Augustine volcano, which is suspected to have repeatedly erupted and generated tsunamis during the same period.[33] Whether or not the artefact is related to the eruption of the St. Augustine volcano, its existence is demonstrative of existing human relationships with these natural hazards prior to the Russian invasion.

Alutiiq people often moved their settlements in historical times due to economic or environmental changes, including the effects of volcanic eruptions and earthquakes. This has resulted in outsiders viewing certain village sites as "abandoned." However, as Marlane Shanigan of the Kanatak Tribal Council argued in 2001, "abandonment means that one leaves without the intention of returning."[34] In many cases, Alutiiq communities have maintained lasting connections to village sites as well as the intent to eventually reoccupy these sites at some point in the future. This long-term process of relocation and resettlement is predicated on a system in which people belong to the land, an understanding which clashed with the idea of human ownership of land imported with the arrival of the Russian and American empires. While the arrival of the Russian Empire would change many aspects of how people on Kodiak lived with natural hazards, within only four years of the initial invasion of the archipelago, the violent movements of the earth forced the Russians, too, to relocate a settlement.

The conquest of Kamchatka provided a springboard from which the Russian invasion of Alaska's archipelagos commenced. Driven by the high price of furs in Europe and China, fur traders and Cossacks moved from island to island, enacting similar patterns to those they had practised in Siberia and Kamchatka: locating population centres, crushing resistance, and taking hostages to compel tribute in the form of furs, food, labour, and tools. Agents of the Russian Empire subjugated the Kodiak archipelago in a series of confrontations and massacres from 1784–1786. As Lydia Black has argued, the conquest of Kodiak was qualitatively different from the later activities of

33 Steffian, Begét, and Saltonstall, "Prehistoric Alutiiq Artifact."
34 Crowell, Steffian, and Pullar, *Looking Both Ways*, 84–86.

other merchant skippers in Alaska, who generally sought trade and temporary stays in the region. By contrast, the Russian operation led by Grigory Shelikhov sought out armed conflict and the creation of a permanent base in a populated area from which to move to the Alaskan mainland.[35] He would later appoint a man named Alexander Baranov to govern the colony. Baranov governed for almost thirty years from Kodiak and a subsequent stronghold at Sitka. The first attempt at establishing a permanent colony would be at a site called Three Saints Bay in the southwestern corner of the Kodiak archipelago.

Shelikhov, from the early years of his arrival, envisioned Kodiak as a potential site for agriculture. In a report on the island, he commented on the success of his experiments and his future aspirations for the settlement:

> The islands lying along the American coast and extending from Kykhtak [Kodiak] to the east, and to Northeastern America are mainly rocky and mountainous. However, there are also good lands suitable for agriculture, which was confirmed by my own experiments having planted barley, millet, peas, beans squash, carrots, mustard, beetroot, potatoes, turnips and rhubarb. Everything came up very well except that the millet, beans, and squash did not develop seed and that only because they were not planted in time. There are meadows suitable for making hay, and many types of grass, and in places cattle can subsist through the whole winter without hay.[36]

These projections would prove to be rose-coloured over the following decades. While a few cold-hardy vegetable crops would experience small degrees of success, production never rose to the levels necessary to sustain an agricultural export economy.

This outpost at Three Saints Bay would not last long, however. A major earthquake occurred on July 11 (on the Julian calendar; July 21 on the Gregorian calendar, accounting for the international dateline), 1788 and—possibly—a substantial aftershock on July 27 (Julian calendar; August 6 on the Gregorian calendar, accounting for the international dateline). Both events (if, indeed, there were two) were followed by substantial tsunamis which badly damaged the settlement. The specifics of the tsunamis of 1788 have long been the subject of some confusion, with some sources citing a single event, others citing two, some mentioning only an earthquake, and others emphasising

35 Black, "The Russian Conquest of Kodiak," 165–188.
36 Shelikhov, *A Voyage to America, 1783–1786*, 52.

only a tsunami. In all likelihood, there was only a single earthquake which resulted in a tsunami in 1788, with several significant aftershocks. A letter from Shelikhov to Baranov in August of 1794 mentions that the entire island of Kodiak was "not such a strong location, taking for example after my past departure from Kodiak, and the former Three Saints harbour, in which place I had experimented in planting grains and had vegetable gardens that were sunk by an unexpected rise in seawater" and goes on to list the various advantages of settling on the mainland rather than on an island.[37] Shelikhov was, of course, not on the island at the time of the tsunami and received his account second-hand. An earlier 1793 letter from Baranov to Shelikhov concerned his reasons for beginning the process of relocating the town the previous year. He suggested that the subsidence had permanently altered the site to such a degree that settlement was no longer possible:

> Our old harbor has become hopeless as a place for men to live in. After the earthquakes, the ground settled and became so low that there are regular straits between the buildings, and during extremely high tides there is very little dry ground left.[38]

As is often the case, the person to do the most research on the earthquake and tsunami of 1788 was a seismologist, S. L. Soloviev of the Soviet Union. His research determined that the existing almanacs of 1968 used the report of the Russian missionary I. Veniaminov as their key source. Veniaminov lived in the Aleutian Islands from 1824–1839 and so was also not a first-hand witness, but drew his information from church records. His account stated of the event of July 21 (Gregorian calendar): "In one of the notes I have seen, it was told that on July 11, 1788 […] on Unga Island, there was an earthquake so strong that one could not stand on his feet. Many mountains crumbled, and after this event during some time there was a terrible flood." Veniaminov also described a second event, writing: "I have seen a note in one of the church books in an old handwriting in which it was told, that on July 27 [August 6 Gregorian calendar] 1788 there was a terrible flood on Unga Islands from which many Aleuts died but the Russians were saved by God and old men say that (this time and later) the water level rose up to 50 sazhens [117 meters]." Soloviev contends that this second date is a false one, arguing that the ship *Three Saints* was in harbour at Three Saints Bay on July 27 (Julian calendar)

37 Alekseev and Fedorova, *Russkie ekspeditsii*, 322.
38 Pierce and Donnelly, *A History of the Russian American Company*.

and made no mention of a tsunami in the ship's journal.[39] It is likely, then, that while there were probably substantial aftershocks, there was only a single tsunami that year at Three Saints Bay on Kodiak, even if there was indeed a separate event on Unga Island.

Soloviev also provides a new source: a letter to Shelikhov from Vasili Merkuliev on Kodiak from May of 1789, which contains perhaps the only written account of the event from a witness. It is also likely the means by which Shelikhov first learned of the event. It reads:

> in 1788 on July 11th, here on Kodiak Island we had a big earthquake and some thought that the earth would collapse. The earthquake was so strong that one could not stand on his feet. We did not have time to recover from this earthquake when a flood came from the sea. We had a deluge in our harbour, and at that time every man was looking for a safe place to save his life. The flood did a lot of damage. First, my barabara was flooded and the merchandise was carried away as were other small structures and the palisade. In your garden all of the soil and vegetation were washed entirely away and at this place water brought in gravel and dug holes in the ground. The raise of the level of the water was almost up to the windows in your room. However, the flood only lasted a very short time, there were two large waves and the rest of them were minor. After this the earth was shaking every day for a month or longer. It was shaking two or three times a day and even more often. Since the time of the earthquake, our place near the harbour subsided.

This account was likely the driving factor behind Shelikhov's choice to advise Baranov to seek a new site for his town on Kodiak. When Yuri Lysianskyi visited Three Saints Bay in 1805 as part of his circumnavigation of the world, he noted of the harbour, "its shores were formerly tolerably high, but since the earthquake of 1788, they have sunk so much, that the equinoctial floods cover them almost to the very mountains."[40] This again suggests a single event in 1788. Still, the destruction of 1788, in conjunction with the lack of forests in the area, led Baranov to relocate the base of operations in 1792 to St. Paul's Harbour on the eastern side of the island, the site of the contemporary city of Kodiak.

39 Soloviev, "The Sanak-Kodiak Tsunami of 1788," 232–237.
40 Lysianskyi, *A Voyage Round the World*, 183.

While this earthquake and its aftermath are well attested, it is notable that it does not seem to have been a matter of grave concern for either Shelikhov or Baranov. Their designs were commercial, and the presence of earthquakes—with which they were surely already familiar, setting out as they did from the Russian Far East—does not appear to have dissuaded either of them. Dealing with earthquakes, we can infer, was simply another risk of doing business in the North Pacific, where harsh storms, shipwrecks, starvation, and scurvy were likely far more imminent threats than the possibilities of future earthquakes.

Following the initial violence of conquest, Russian agents compelled the Alutiiq residents of Kodiak to perform labour gathering furs and food, disrupting the local economy. Men from Kodiak were sent to places as far off as the Kuril Islands north of Japan and California to hunt for sea otters, and life in the archipelago became increasingly centred upon Russian outposts. Following a smallpox epidemic in the late 1830s, the roughly 2,000 survivors were relocated to only seven settlements, nearly all of which were located adjacent to Russian trading posts on the coast, and left many former villages at least temporarily uninhabited.[41] The smallpox epidemic ultimately made Kodiak into a far more colonial place than it had been before.[42] That is to say, the life of the survivors on the island became far more centred around the commerce which took place at the Russian trading posts. These changes in spatial organisation would go on to have important impacts on human relationships with natural hazards in the coming centuries by steadily concentrating population centres into fewer and fewer coastal locations.

From its new base at St. Paul's Harbour, the Russian Empire administered first a trade in furs, especially the skins of sea otters. Later, these efforts expanded to include short-lived ventures in whaling and ice production, among others. During these years, the Russian Orthodox Church maintained a significant presence on the island, and thousands of Alutiiq people converted to Russian Orthodoxy.[43] This conversion was fuelled in part by the work of Egor Ivanovich Popov, a missionary who would later come to be canonised as St. Herman. Orthodoxy brought with it a new, theological means of understanding the turbulent earth on which Kodiak sat. Among the miracles cited for St. Herman's canonisation was the prevention of a tsunami by placing an icon of the Mother of God on the shoreline. The source for this information appears to be from a document compiled by a man identified

41 Crowell, Steffian, and Pullar, *Looking Both Ways*.
42 Luehrmann, *Alutiiq Villages Under Russian and U.S. Rule*, 46–47.
43 Mousalimas, "The Account from Old Harbor."

as the Creole Constantine Larionov and published in St. Petersburg by the Valaam Monastery in 1900. The relevant passage reads:

> At the settlement of Father Herman on Spruce Islands in the first year there was a flood [navodneniye], or a high tide of the sea [priliv morya] (which must have been from an earthquake) and the people inhabiting that place were afraid and told the elder, who went from his cell to the home of his disciples where every Sunday he served divine liturgy for hours for lack of a chapel or a church, and took an icon of the Mother of God and bore it to the shallows on the shore where the water had risen last time, and placing the icon began to pray to God, and having finished his prayer, declared to those present not to fear, saying, "greater or further from this place, where this sacred object is placed, the water will not go!" which those who heard the event affirmed. When it was necessary to carry the icon back, after instructing the people, Herman allegedly said to Sofia Vlasova (who was already the caretaker of the young girl disciples) that in the event the sea rises again in the future, to place the icon on the shallow shore and promised that the sea would not rise beyond that place.[44]

The author goes on to cite several people from around the archipelago who had heard the story and at least one who had not. A few details are worthy of emphasis here. First, the author clearly recognises the connection between earthquakes and flooding. According to the story, the people were afraid that the flood would come, indicating some widespread foreknowledge of the event. This presents two possibilities. This first possibility is that there was an earthquake, and the island's residents recognised that it might portend a tsunami. The second possibility is that a first tsunami wave had already arrived, and people went to Herman fearing a second, as Herman bore the icon "to the shallows on the shore where the water had risen last time." However, this could also mean that Herman either knew or was told of the effects of a previous tsunami and brought the icon to that place to stop it. In either case, this story establishes the existence of widespread knowledge of the dangers posed

44 *Valaamski Missioneri v Amerike*, 172–173. My thanks to Heghine Hakobyan for her assistance with the details of this translation. No precise date exists for this event, but it was likely sometime between 1811 and 1817. Korsun and Black, *Herman: A Wilderness Saint,* 91.

by earthquakes and tsunamis on the island in the early nineteenth century. The second item of importance is the creation of a tradition of invoking the power of icons to avert natural hazards. In the story, Herman teaches Sofia Vlasova to use the icon in the event of future floods, establishing both that it was known such events would happen again in the future and that Russian Orthodoxy was a known means of mitigating the events.

This was not the last time residents of Kodiak would turn to their faith to understand the tsunami. Only about a century later, in 1964, when a magnitude 9.2 earthquake rocked Alaska, the town of Kodiak—now a busy American fishing port which grew rapidly following the militarisation of Alaska—was devastated by a tsunami. Reconstruction after the fact never seems to have been in question. Only three days after the earthquake on Easter Sunday, Father Marx, the local Catholic priest on Kodiak, preached, "Nineteen hundred years ago when Christ died on the cross, God reached out his hand and shook the earth. This Good Friday He again caused the earth to shake to remind us to rebuild our lives close to Him even as we try to rebuild our city."[45] Many who wrote letters in the days following the tsunami reflected similar thoughts: that the damage was terrible, but rebuilding was the only option. While the island's only newspaper press had been destroyed by the tsunami, once the island's only newspaper, the bi-weekly Kodiak mirror, finally put out a stopgap issue in April, the headline read, "Kodiak Will Rebuild!" and reported that: "Kodiakans, generally, are very optimistic about the future." Following a brief accounting of the many businesses and buildings which had been damaged or destroyed by the waves, the paper concluded, "Thus the picture damage-wise is not pretty. It is a low blow economic-wise to Kodiak, which seemed favoured by the gods up to now. But all seem to think Kodiak will build on its misfortune a better, cleaner, more modern and attractive city."[46] This statement betrays the general lack of understanding the new settlers on Kodiak had of the history of the environment in which they lived. Within their limited knowledge of the island, they could only assume that such an event as the 1964 tsunami was a one-time event, rather than a long-term pattern: a supposition that would dominate rebuilding efforts.

On July 28, 1964, the Federal Reconstruction and Development Planning Commission for Alaska convened in Washington DC to discuss the ongoing process of rebuilding Alaskan communities following the earthquake. Tensions were beginning to run high in the meetings of the commission as the short

45 Martinson, "Good Friday 1964."
46 "Kodiak Will Rebuild!"

summer construction season waned and several important decisions about funding reconstruction remained unfinalised. Most contentious of all was the designation of so-called "high risk" areas by the Scientific and Engineering Task Force. These "high risk" areas included many lightly damaged homes and commercial buildings and were described by the Task Forces as "land considered unstable, particularly in the event of future earthquakes. No economical means of stabilisation known. No repair, rehabilitation, or new construction involving use of Federal funds is recommended."[47] Nevertheless, loans for the repair of damaged structures amounting to 6 million dollars were already being disbursed for the high risk areas at the time of this July meeting, and the Small Business Administration only required that a building be structurally sound under present conditions. As one committee member, Mr. Schaem of the US Army Corp of Engineers, said, "we are not saying these are safe houses. They are structurally safe, as far as the house is at the present time, under current conditions, but not under another earthquake."[48] Eventually, Edward McDermott, the director of the Office of Emergency Planning, expressed some frustration with the proceedings, stating, "My concern goes to this question of whether we, as the federal government, aren't getting too deeply into this question of being the ultimate prophet of what is going to happen to everything in Alaska […] we should be mindful of the Federal commitment […] that attaches to all of this prophesying we are doing about the security and stability of these properties up there. Theoretically, they [the SBA] shouldn't be loaning money to people who live near airports because an airplane might fall on the house." While the possibility of future earthquakes and their consequences was known to the members of the committee, absent any certainty about the timing of these future events, they elected to pursue a policy which supposed the land to be a static thing. It was a policy anchored in an imagined eternal present, disconnected from the slow but steady movements of the earth over time. The declaration of safety "at the present time, under current conditions" effectively abdicated responsibility for the consequences of future earthquakes.

While the committee established early on in their deliberations that geological data would be necessary to inform their decision-making, the chair of the committee, Clinton Anderson, set the tone for the discussion of future earthquakes. When Vic Fisher warned that every geologist gave the

47 "Transcript of Proceedings: Meeting of the Federal Reconstruction and Development Planning Commission for Alaska July 28, 1964", 738.

48 Ibid. 743.

opinion that the current town site of Valdez should be abandoned and the town rebuilt elsewhere, the senator responded that "they said the same thing about San Francisco but the people are still living there" and went on to say: "I am sure there are areas in the world having trouble with volcanoes, but people live under them all the time." In August of 1964, about five months after the committee had begun its work, Senator Anderson recommended a return to the pre-earthquake system of planning in Alaska, and in October of 1964, duties for planning and reconstruction at the Federal level were handed over to the newly formed Federal Field Committee for Development Planning in Alaska and President's Review Committee for Development Planning in Alaska.[49]

Just as had been the case 176 years earlier in 1788, the earthquake and tsunami of 1964 did not prove to be a substantial detriment to the continued occupation of Kodiak and other sites in Alaska. While the disaster did prove to have many effects, both short-term and lingering, the long process of colonising the archipelago was not substantially dissuaded.

Conclusions

The prevalence of earthquakes, tsunamis, and volcanic eruptions in the North Pacific has received relatively little attention as a historical phenomenon, a fact which is surprising given their dramatic interjections at some of the most critical moments during the conquest and colonisation of the region. However, while these powerful events were certainly devastating to the communities they impacted, and triggered both immediate effects and long-term changes, they had little impact on long-term human processes such as the colonisation of the region. As the Russian Empire and the United States expanded into the North Pacific, they altered the way people in the region experienced these frequent natural hazards, but these changes seldom deterred colonisation. As environmental historians continue to assess the importance of earthquakes, tsunamis, and volcanic eruptions in the North Pacific and elsewhere, we must also remain open to the possibility of their unimportance. Given that the societies which have resulted from colonisation have persisted in the North Pacific and the virtual certainty of future earthquakes, tsunamis, and

49 Committee on the Alaska Earthquake of the Division of Earth Sciences National Research Council, *The Great Alaska Earthquake of 1964*, 154.

eruptions, the factors which proved to make colonialism so durable under these circumstances are deserving of further inquiry.

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