Subsistence and Resource Availability in Variably Isolated Insular Environments:
Analysis of Zooarchaeological and Ceramic Remains from Three Sites in the Kuril Islands, Russian Far East

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The Kuril Biocomplexity Project is the first major study of this insular region to combine archaeology, geology, volcanology, biology, and climatology in a holistic examination of human-environment interactions. The examination presented here looks at various aspects of archaeofauna retrieved during the 2006 Kuril Biocomplexity Project excavations, as well as the presence of repair marks on pottery – particularly on pieces of Late and Epi-Jomon, Okhotsk, and Ainu pottery within the region through time, in an attempt to synthesize a model of resource usage in the unique island environment that the Kuril Island chain represents.

Discussion focuses on examining three sites in the Kuril Islands: the Ainu Creek site on Urup Island in the south of the chain, Vodopadnaya on Simushir Island in the central Kurils and the sites of Bolshoy and Baikova on Shumshu in the north of the archipelago. Analysis will address resource availability by comparing frequency and species selection of faunal remains throughout these three sites in an attempt to come to a greater understanding of the effects of island isolation on human resource management in the Kuril Islands through time. A brief look at changes in pottery styles will aid in determining relative cultural periods and resource utilization.

In theory, the southern and northern sites would have benefited from their closer proximity with the mainland (Hokkaido and Kamchatka, respectively) in acquiring those

resources not available on the islands or in particularly hard times access to resources that were likely to have been acquired through trade networks or forays. The geographic isolation shared by the central islands would have made trade difficult and dangerous and therefore rare, although there is ample archaeological and ethno-historic evidence that it did occur. This isolation would have no doubt proved a severe hindrance to the acquisition of certain resources. While some prey species may have been abundant, others were not and material possessions such as different types of workable stone for lithic tools and workable clay for pottery manufacture may have proved difficult to come by. Additionally, though some species may have been potentially available and accessible year-round, seasonal availability or lack thereof, may have forced inhabitants to access resources not exploited by their neighbors in the north and south extremities of the island chain.

With this in mind, patterns of species exploitation are likely to show a more varied selection of available fauna in the central islands, either a wider range of utilized species in general, within the more limited range of available species, or less selectivity due to age or sex than will be seen in the northern or southern islands. Given the principle of Island Biogeography Theory presented by MacArthur and Wilson (1967), predation is likely to have had greater and presumably more lasting effects in the central islands as well, and with less species available to choose from, a wider range of animal resources must be used than in areas where abundant resources allow for more specific choices in animal procurement, i.e. where specific prey is abundant and less reactive to seasonality, fewer species may be relied upon on a regular basis and larger, more productive prey is selected.

Material goods less likely available through trade networks, but no less important to daily life would require greater maintenance in isolated regions as opposed to those areas in which

access was less restricted. Pottery repair indicates such necessary upkeep and therefore be a way of determining relative isolation at is pertains to trade and resource acquisition.

Geography & Historical Context

Islands: (what follows is a brief description of the three islands addressed in the analysis. See Appendix for site descriptions and excavation notes.)

Urup:

Urup Island is the third large-sized island in the southern Kurils as one looks north from Hokkaido at approximately 149.5° E longitude; 45.6° N latitude. The Ainu Creek 1 site is located near sea level on the southwestern end of the island just a few kilometers from its southernmost tip. Urup is the last large island in the southern section of the Kuril chain before encountering the Bussol Strait effectively separating the southern islands from those of the central Kurils. The location of the site on the Okhotsk Sea side of the island may have allowed for slightly less hazardous seafaring than the generally stronger currents of the Pacific ocean, however, the relatively close proximity to the southern end of the island and thus open water leading out to the Pacific may have been a boon as underwater upwelling within the DeVries Strait separating Iturup and Urup and the Pacific ocean from the Okhotsk Sea is likely to be the cause of major nutrition sources in the surrounding waters, thus providing a lucrative hunting ground for fish and marine sea mammals (Gladyshev 1995). True to its name, the site is in close proximity to a freshwater stream likely to have made the site appealing to ancient settlers. Perhaps in defiance of the site's name, a number of cultural levels have been uncovered at the

site including artifacts (many examples of period-diagnostic ceramics) of Jomon, Epi-Jomon, Okhotsk origin throughout the various occupations of the site through time. Due to both natural turbation and human agency many areas within the overall site complex have been damaged and surface finds are common. A road-cut bisects a portion of the site, passing directly through a large midden. Test pit 4 was excavated directly into the left side of the road-cut approximately 50 meters up the road from the beach. Test pit 5 (yielding 33 instances of Epi-Jomon and Okhotsk ceramics) was excavated into the side of a dune on the right side of the road only approximately 15-20 meters up from the beach. Faunal remains, pottery, and lithics were recovered from the site.

Simushir:

Simushir Island is the fourth large island in the chain as one travels north from the southern extreme of the chain, and is the largest of the southernmost members of the central islands group, cut off from the southern group by the Bussol Strait and separated from the rest of the central islands by the Diana Strait. The island consists of a number of relatively large volcanic peaks and calderas. One such volcano, Mt. Milna, makes up the southern end of the island and another, Prevo Peak, dominates the geography 3/4th way up the island to the north. At the northern tip of the island rest the remnants of a massive caldera near Karlomyy Volcano that opens out toward Ketoi and the rest of the central islands, creating the crescent-shaped Broutona Bay. The site of Vodopadnaya 2, the most significant 2006 site on the island (in terms of number of excavations and finds), is roughly centered around an expansive marine terrace overlooking a small bay and river outlet on the northwest coast of the island facing out toward

the Okhotsk Sea. As shown below, cultural materials and evidence of occupation were abundant as faunal remains, pottery, and lithic materials were recovered from the site.

Shumshu:

Shumshu Island lays at the northernmost extent of the Kuril chain only a handful of kilometers from the large northern island of Paramushir and within visual distance of the southernmost point of the Kamchatka Peninsula, Cape Lopatka. Unlike most of the islands in the Kuril chain, Shumshu does not rise far from sea level and is veritably littered with small freshwater lakes, streams and marshes. Baikova 1 rests along Baikova Bay on the west side of the island close to a freshwater stream and within clear view of the northeast coast of Paramushir in the proximity of a militarized bluff. Bol'shoy 1 and 2 lie on the northern end of the west side of the island along the southwestern end of an extensive beach strand stretching nearly the entire length of the north coast. The two sites considered here are in close vicinity to each other and show evidence of congruent settlement; the sites are lumped together in this analysis in order to achieve a larger sample size for represented archaeological materials in the area. The Bol'shoy sites are within close vicinity to Lake Bol'shoye, the largest lake on Shumshu Island. Bol'shoy 1 yielded only two pieces of ceramics. Compounding this misfortune is the additional happenstance that one of the pieces was recovered by surface collection. Bol'shoy 2 was even understatedly less productive, surrendering no evidence of ceramics from either test pit. However, bulk samples of fauna remains were collected.

The Kuril Island chain stretches from the southern edge of the Kamchatka Peninsula southwest along the Kuril Trench roughly 1200km to the northern tip of Hokkaido. The chain

divides the Sea of Okhotsk to the northwest from the Pacific Ocean to the southeast. The island chain is divided by a number of straits, most significantly the Bussol Strait, effectively forming biogeographical barriers which greatly affect biodiversity within the archipelago. Inter-insular isolation within the Kuril chain has created a unique environmental system, affecting human-environmental interaction, as well as cultural transmission within the Okhotsk Sea region. Due to these factors the Kuril Islands are an ideal environment for the study of colonization processes similar to those leading to the colonization of the American continent in the late-Pleistocene. Focusing on ceramics repair and zooarchaeological analysis represented in excavated faunal samples at three sites in the Kuril Islands, this paper will attempt to uncover how isolation in insular environments plays a roll in resource acquisition and utilization. Understanding human-environmental interactions within a relatively closed biogeographical system can shed light on what effects prehistoric human migrations had on local and regional resources. Additionally, examination of maritime adapted colonizers into the Kurils suggests closely related cultural relationships in space and time that contribute to the understanding of colonization histories in the Okhotsk Sea Region. Changes in prey utilization as represented in faunal remains from middens and other archaeological contexts indicate climatic and seasonal change along with other environmental changes, such as localized reactions to disasters such as tsunamis, earthquakes and volcanic eruptions. Cultural preferences and hunting strategies can be seen to change through time, adjusting to the availability of new resources even as others may become rare or unavailable; such change is seen in the central islands where abundance of bird bones in the archaeological materials at Vodopadnaya appears to herald use of both migratory birds and seabirds as food sources likely supplementing a diet not unlike in other areas of the Kurils, based largely on fish and sea mammals. Some technological and ideological changes are transferred

through diffusion or direct contact with already established groups within the islands. Others are caused by migrations into and out of the insular regions; trade plays a major role in cultural transmission and is likely the cause of adaptations and stylistic innovations visible in material culture. For instance, changes in ceramic decoration in Jomon pottery types are so well recognized and typologized that they are used by archaeologists to indicate the presence of various cultural movements throughout temporal and spatial ranges of Jomon occupation. Examining when and where these changes in strategy take place in the archaeological record helps reveal how early people settled and abandoned the islands at various stages and likely for a number of extremely different reasons. What role did the varying degrees of isolation represented in the south, central and northern regions of the island chain play on human inhabitants, and what impact did those subsequent incursions have on the biogeographically fragile island environments?

Early archaeological evidence indicates the earliest cultural movements into the islands as having traveled north into the southern Kurils from Hokkaido as far as Iturup by at least 4000 BP (Zaitseva et al 1993). Ethnographic accounts attest to strong connections between people living on the northern Islands to those living in Kamchatka, and with various island occupations having cultural affinities with historic and pre-historic people from the Amur River Basin (Befu & Chard 1964; Chard 1960; Quimby 1947).

To appreciate the colorful history of the islands and their surrounding region it is necessary to briefly visit earlier material cultures of Japan and the Okhotsk Sea. The Upper Paleolithic in Japan is represented by numerous sites dating to at least 20,000 B.P., and in Kamchatka to around 10,500 B.P. Holocene occupations of the Okhotsk Region fall within the Jomon Period, characterized by the introduction of corded-ware pottery into the region around

16,000 B.P. (Fitzhugh 2002; Slobodin 1999). It has also been suggested that earlier pottery from Japan, predating cord-marked pottery, existed just before the Incipient Jomon (Pearson 2000). Archaeological evidence indicates human occupation in the Kuril Islands as early as 4000 B.P., during the Late Jomon Period (Zaitseva et al. 1993, from Fitzhugh 2006: 95). Late Jomon or Epi-Jomon in the region is replaced around 1300 B.P. by the Okhotsk Period, which is itself replaced by the Ainu Period around 800 B.P. The ethnographic history of the islands consists mainly of Ainu groups throughout the chain having contact with Hokkaido, Sakhalin and Kamchatka between the 11th and 12th centuries A.D. The Ainu period continues well into the period of first Russian contact as documented by explorers and fur traders (Snow 1897; Krusenstern 1813). Contact with Russian and Japanese fur traders and explorers boomed in the 18th and 19th centuries, first Russian contact was recorded in 1646, and it is probable that earlier Ainu contact with both groups went unrecorded.

Biodiversity & Biogeography

At the heart of the Kuril Biodiversity Project (KBP) is the complex yet intuitive concept of biodiversity. William Michener and colleagues (2001: 1018) define biodiversity elegantly as, "Properties emerging from the interplay of behavioral, biogeographical, chemical, physical, and social interactions that affect, sustain, or are modified by living organisms, including humans." In short, biodiversity is the functional interaction of environmental and biological systems. Part of the National Science Foundation's (NSF) Biocomplexity Research Program focuses on "Complex human-environmental interactions, including the basis for land-use decisionmaking… (And) dynamics of coupled natural and human systems (Michener et al. 2001: 1022)." One of the goals of the NSF Biodiversity Project is to "Learn about human influences on natural

processes and of natural processes on human behavior (Michener et al. 2001: 1022)." It is within this focus on the effects of humans within the natural environment that understanding the history of human migration, colonization and resource utilization within the Kuril Islands is important (Fitzhugh et al. 2005).

Along with biodiversity, biogeography is an important concept for understanding the complex environmental-biological relationships within an environment (Sauer 1977). Isolated insular environments, such as those within the central region of the Kuril chain, provide a unique laboratory setting for examining intricate interspecies interactions (Pietsch, et al. 2003: 1298). MacArthur and Wilson's theory of island biogeography states that the smaller and more isolated an insular location, the more likely inhabitant flora and fauna are to fluctuate and go locally extinct due to changes in environmental equilibrium within the relatively compact geographically restricted island confines (Macarthur & Wilson 1967). Island biogeography is important to human colonization and utilization of insular environments for a number of reasons. Diversity and availability of prey species is directly affected by resource limitations in isolated environments. Changes in the ecological equilibrium of a given environment can be altered drastically by human adaptive behavior. Like any other invasive species, human colonization and settlement of insular ecosystems can be tenuous, as isolated and limited resources are obtained and depleted by humans in competition with, and direct opposition to, other species (Terrell 1971).

In essence, island biogeography theory indicates isolated environments such as that of the central Kurils will see less species variability, thus hunter-gatherers living in such an environment will be less variable in the prey species they may select. Distributions of faunal remains from different extremes of the chain should relay this discrepancy.

Cultural Movements and Interactions

Tracking the movements of peoples within the Kuril Islands and surrounding regions provides a wealth of discourse on cultural diffusion in the prehistory of the Russian Far East. Chard (1956; 1960) contends that initial colonizations of the islands likely originated from the south on Sakhalin and Hokkaido, ultimately from the Amur Region of the Russian Far East, and moved north through the chain, a picture of migration shared by Fitzhugh and others (Befu & Chard 1964; Fitzhugh et al. 2004; Matsumura et al. 2006). Similarly, cultural connections have been made between the Northern Kurile Ainu and Aleutian islanders of the Aleutian Islands. Even the Dorset of Labrador and Greenland have been suggested to have possible links to Kuril inhabitants (Befu & Chard 1964: referencing Heizer 1956, Jochelson 1925, La guna 1946, Chubarova 1957: 3, 10, 12, respectively, and Chard 1960: 84). Extensive reliance on the presence of large numbers of sea mammal remains, harpoon types (toggles), stone lamp styles, semi-subterranean pit houses and settlements are shared between the Okhotsk complex, Kurile Ainu and Aleut-Eskimo groups, suggesting possible cultural connections (Befu & Chard 1964: 3, 12; Quimby 1946, 1947: 178). Chard surmises that Aleutian artifacts found in the northern Kurils were likely transplanted when the Russian government relocated Aleuts into the area in the 18th century (Chard 1960: 74). Ainu in the Northern Kurils maintained close contact to people living along the coast of Southern Kamchatka (Fitzhugh et al. 2004a: 103).

Documentation

Ainu ethnography and historical documentation are valuable tools in examining the practices of the various inhabitants of the Kuril Islands. Harrison's exhaustive translation of

Takakura's ethnography, *The Ainu of Northern Japan*, is an excellent source of Ainu hunting and fishing traditions, as well as economic and social practices (Shinichiro & Harrison 1960). Divisions within historical Ainu culture, commonly divided into Hokkaido, Sakhalin, and Kurile Ainu, allow for examination of cultural similarities along the north-south axis of the island chain, such as shared practices of fish storage and bear deification, as well as dissimilarities such as lower dependence on sea mammal predation among the Hokkaido Ainu and nearly exclusive use of birds by Kurile Ainu (Ohnuki-Tierney 1976: 304). Such information is valuable in gathering a living picture of Kuril inhabitants, so as to educate probable prehistoric analogies and interpret the archaeological record.

Habu (2001: 102) concludes that Moroiso early phase Jomon people were likely much more mobile than previously thought. Comparable patterns of mobility are attributed to the maritime adapted Okhotsk culture which moved rapidly from the mainland, through Hokkaido and up into the Kurils (Befu & Chard 1964; Hudson 2004). Likewise, evidence of substantial mobility is presented from much of the KBP 2006 data, showing that during the Epi-Jomon pottery had made its way into the isolated central islands and people were present in the northernmost islands ~3300 BP, much earlier than previous evidence demonstrated. Fitzhugh et al. (2002: 84) acknowledge similar trends were indicated through analysis of ceramic material collected by the IKIP 2000 expedition. This raises further questions as to how and when Epi-Jomon traditions were transmitted into the northern islands. Earlier materials may not show up in the central islands as they have in the north due to greater mobility than previously postulated. The discrepancy may also be reflective of small sample size and/or previously sparse attention given to the central islands. Additionally, the smaller more isolated central islands may have served more as "jumping-off" points for earlier mobile maritime hunter-gatherers rather than

areas of permanent or semi-permanent settlement (Fitzhugh & Etnier 2007). Abundance of sea mammal resources may have made the central Kurils an attractive hunting destination for very short seasonal forays. Thus, the islands would likely be sparsely occupied seasonally on an annual basis but not permanently settled until much more recent times, during the Ainu period, when relatively large populations are observed in historic accounts (Kruzenstern 1813; Snow 1897).

As mentioned above, Hokkaido and the Kurils lag somewhat behind the typical Jomon chronologies of Japan due, most likely to obvious spatial and biogeographic factors. In her examination of Moroiso phase Jomon settlements (late early-Jomon), Junko Habu (2001, 102) established that by the late early Jomon period people were both subsisting in semi-sedentary settlements as well as relatively mobile units. It is likely that settlements in the Kurils, which began roughly within the same timeframe, were not sedentary and were likely distributing themselves seasonally to places of resource abundance. These relocations were likely to the mouths of rivers with seasonal salmon runs as well as to places in close proximity to large sea mammal rookeries and haul-outs.

Methods:

Archaeological excavations undertaken during the KBP 2006 field season were conducted judiciously given the destructive nature of excavation. Careful consideration was given to each site toward determining where and how much to excavate. Surveys were conducted to establish likely site boundaries and wherever possible detailed maps were created to preserve the integrity of given sites. Although permits were acquired for more extensive excavations, test pits were often the only excavations undertaken at most locations, and these only at periphery positions so as not to disturb the overall integrity of preserved features such as

likely house pits. As detailed in the site descriptions to follow, so-called "test pit" excavations consisted of a 100cm X 100cm dimension hole dug to a particular depth, ideally to the point at which cultural materials cease. Levels were established either arbitrarily at intervals (usually 10cm) or by following features within the stratigraphy, most often where the presence of volcanic tephra layers or tsunami deposits made distinct layers most obvious.

Analysis of some cultural materials was limited to in-the-field and on-site examination, or not possible due to customs requirements between the U.S. and Russia. No formal artifacts of any kind, including ceramics and lithic tools, along with any other items deemed "cultural" were allowed to leave Yuzhno-Sakhalinsk, as such items are considered culturally significant materials by the Russian government and thus legally obliged to remain in the country. As a result, pottery analysis as it appears here is based on personal examination of pieces in the field and during ship-board lab time conducted over the summer field season. Careful examination of detailed photographs and personal illustrations of diagnostic ceramic sherds has also been undertaken wherever possible.

All bulk midden samples and faunal remains required the acquisition of permits, but were allowed out of Russia for continued analysis and currently reside in lab facilities at the University of Washington.

Faunal remains were cleaned and sorted by site, test pit and level. Specimens were given catalog identification numbers relevant to their sample bags. Sea mammal, bird, fish, and shellfish were separated from each other. Identification was performed using sample specimens from the Burke Museum fauna collection. Identifiable pieces were divided into their respective

Genus and rarely, but sometimes into particular species where absolutely determinable. Bones were also separated in to right and left side where appropriate.

It merits noting that screening methods used during the KBP 2006 expedition were not sufficient to retrieve the very small bones of herring and certain other fish, though the likelihood of their presence in the assemblages is highly attested to in ethnographic materials.

Once processing was completed, distributions of sea mammals are seen as differences evident in the various biogeographically diverse regions represented by the sites examined (i.e. southern, central, north).

Notes on Faunal Analysis

As with all resources, availability of prey species is variable from island to island and throughout the larger chain as a whole. Proper examination of faunal remains and establishment of either Minimum Number of Individuals (MNI) or Number of Identified Specimens (NISP) is essential to inferring prehistoric subsistence practices and patterns in zooarchaeological context (Grayson 1973). Understanding selective utilization of animal species by prehistoric people as a way of tracking cultural change, movement, and occupations within a given environment is necessary to establish a lucid picture of human-environmental interaction at a given place and time. In the case of the Kurils, as various groups within the Okhotsk Sea Region take advantage of different biotic resources, those resources will come under pressure as a reaction to predation (Fitzhugh et al. 2004: 97; Smith 1979). Analysis of faunal remains and hunting technologies (harpoon types, etc.) within human occupation sites allows for the establishment of cultural analogies, indicating possible cultural interactions between various groups throughout history

(Chard 1956; Matsumura et al. 2006). One important aspect of these analyses is that all three sites here examined are on the Okhotsk side of their respective islands. This may be a cause for certain resource biases on the part of ancient site occupants. Further examination of Pacific sites will shed valuable light on similarities and variations between Okhotsk Sea sites and Pacific-facing sites and the resource reliance and acquisition practices employed thereon.

Importance and Significance of Sea Mammals:

Throughout most of the Kuril Islands large terrestrial mammals are not abundant or, as is the case in the central islands, non-existent. Hunter-gatherers in the islands would have been forced to adopt maritime foraging strategies to survive, or be lucky enough to already have such strategies firmly in place. Luckily, the abundance of fish and sea mammals throughout the chain provided a variety of exploitable marine resources.

The importance of sea mammal hunting at all cultural periods in the Kurils cannot be overemphasized. Sea mammals represent much of the fauna remains extracted from all three sites regardless of biogeographic isolation. Within the assemblages examined here Steller's Sea Lion *(Eumetopias jubatus)*, the now-extinct Japanese Sea Lion *(Zalophus californianus japonicus)* and sea otter (*Enhydra lutris*) are the most likely species represented and where possible have been identified to such a degree. Where it has not been possible to make such a specific distinction between species, samples have been reduced to genera as with the majority of cetacean bones and a number of other animals.

Various cetaceans are represented as well, most abundantly dolphins and porpoises, although very large cetacean bones do turn up. In general, the sea mammal remains recovered are consistent with faunal remains found throughout maritime Jomon sites, especially those of

the Late and Epi-Jomon maritime traditions, as well as Okhotsk and Kurile Ainu (Habu 2004; Befu & Chard 1964). Evidence of Sea Lion predation by Okhotsk peoples is prolific, being noted in Japanese texts from the 8th and 12th centuries, along with abundant archaeological evidence throughout northern Honshu, Hokkaido, and the Kurils (Hudson 2004: 302). Historically, sea otters are commonly noted to have been a regularly exploited resource by the Ainu throughout the region, not only as a subsistence foundation but as a trade commodity (Snow 1897; Krusenstern 1813).

Sea Lion and Steller's Sea Lion (*Eumetopias jubatus*) show up in the assemblages from each site and there is evidence that they may have played a part in ritual practice as well as subsistence. Steller's Sea Lion inhabit north Pacific waters ranging from the southern California coast up along the western coast of North America into the Gulf of Alaska, to the Bering Sea and along the coast of the Russian Far East, the Sea of Okhotsk and down to the southernmost islands of Japan and along the Korean Peninsula. They migrate seasonally, sometime to great distances. Large individuals can grow over three meters in length and can weigh just less than one metric ton, making them a tempting species for predation by hunter-gatherers seeking optimal return ratios. Sexual dimorphism is present between males and females, particularly in skull morphology (which bears significant importance to our examination of at least one find in particular, see below), making sexual identification relatively unproblematic.

Sea Lions, along with other pinnipeds and cetaceans, played a key role in cultural ritual and subsistence practices of the maritime Jomon, Okhotsk, and Ainu peoples. For example: the island of Shiashkotan among the northern-central Kuril Islands group literally translates to "Sea Lion Village" in the Ainu language (personal communication T. Amano 2006). Ethnographic evidence from among the Kuril and Hokkaido Ainu relates the interesting practice of ritual

trepanation of *E. jubatus* skulls, particularly the practice of extracting the brains of female specimens by boring a hole in the right side of the skull exclusively (personal communication to Mike Etnier from T. Amano 2006). The Steller Sea Lion skull from Bolshoy 1 is clearly that of a male, although the trepanning hole rests conspicuously along the right side of the skull, in opposition to the assumed ritual practice associated with common practices of brain removal.

Analysis of Faunal Remains:

Table 1 in the Appendix illustrates the proportions of various sea mammal remains from the sites examined. Clear distinctions in prey species are evident even from the relatively small samples here examined and further archaeological work in the areas will bolster future sample sizes for more representative calculations.

At Bolshoy and Baikova sea otters and seals dominate the recovered sea mammal remains, together making up 96.4% of represented sea mammals at Baikova and 75% at Bolshoy. Sea otters make up nearly 2/3rd of the sea mammal species from Baikova and 1/5th of those from Bolshoy, at Bolshoy 50% of the sea mammal remains recovered were those of seals. This difference in seal and sea otter proportions from such closely located sites may be the result of local bathymetry and/or propinquity to seal haul-outs or rookeries.

At Vodopadnaya seals make up 95% of the sea mammal remains excavated during the KBP 2006 excavations there, while 5% of the remains identified are those of cetaceans (*Otariidae* sp.). This strong reliance on seals was also supplemented by a variety of fish and birds, full examination and identification of which is yet to be completed, but initial identifications indicate the presence of Albatross (*Diomedea sp),* Cormorants (*Phalacrocorax* sp.), Fulmars (*Fulmarus* sp.), Puffins (*Fratercula* sp.), as well as Salmon (*Oncorhynchus* sp.),

and Mackrel (*Pleurogrammus* sp.), among others. Dependence on seals may have been a result of regular hunting practice, or may indicate an abundance of prey likely resulting from close proximity to rookeries. The local bathymetry in the vicinity of the Vodopadnaya sites may be such that the surrounding waters do not provide an ideal environment for sea otters, explaining their complete absence from the assemblage. For whatever reason, the inhabitants of the Vodopadnaya sites were utilizing seals extensively, to the apparent preclusion of other sea mammal species.

At Ainu Creek, sea lions make up nearly 2/3rd of all sea mammal remains examined, followed by 31.3% seals. As with the other sites, this may have been due to a number of factors, the most likely being simply that sea lions were the predominantly available species in the area. This was likely due to close proximity of the site to a haul-out or rookery where animals could be harvested with relative regularity. Deficiency of sea otters is likely due to local bathymetry not supporting the necessary conditions for sea otters to thrive. Additionally, at Ainu Creek a fair number of unidentifiable cetacean bones were represented throughout the site indicating at least minor importance placed on the acquisition of dolphins (*Lagenorhynchus* sp. and *Delphinus* sp.).

Ritual Considerations for Faunal Remains:

Ethnographic and archaeological evidence of various ritual practices cannot be overlooked when examining faunal remains recovered at such close proximity to, and in such close association with, ancient peoples that have been shown to have a spiritual connection to specific animals through fetishism and similar animistic beliefs and practices. While one can only infer as to the traditions and beliefs of Jomon and Okhotsk people from the archaeological evidence available, much is known ethnographically of Ainu subsistence and ritual practices that

may be related to the institutions of prehistoric people (Hammel 1988; Ohnuki-Tierney 1974; 1976; Sinichiro 1960). It is vital to take into consideration the role that such beliefs may have played, not only in the choice and capture of certain prey species, but also in the manner of the discard of their remains – which is an integral part of this analysis.

Bones from sea mammals were used to make tools and artistic/ceremonial objects by every culture that inhabited the islands. Evidence supporting this is represented by numerous forms of harpoon heads and other such utilitarian objects as well as artistic objects such as the bone disk unearthed at test pit 3 of the Vodopadnaya 2 site. In addition, practices such as those involving the ritual disposal of fish bones (particularly salmon) back into the sea have been documented from many North Pacific Rim cultures, including the Ainu (Gunther 1926; Naumann 1974; Okamoto 1961). A number of works have investigated the intriguing Ainu Bear ceremony or festival wherein the bear is represented as the divine manifestation of "Chira-Mante-Kamui", the Ainu god of the mountains. The ritual, called 'Iomante,' 'Kumamatsuri,' or 'Kamui-Omante,' literally, to "send-off to god" takes place during mid-winter and is the culmination of the raising of a bear cub to such a familial degree that during its rearing it is fed and treated as a member of the family or village. Ultimately, the bear is sacrificed at the end of an elaborate ritual (Kitagawa 1961; Kindaichi & Yoshida 1949; Yuko et al. 1994).

Another less investigated ritual practice involves the deposition of sea lion skulls in association with house features as noted by Fitzhugh et al. (2002) from excavations at Peschanaya Bay on Chirpoi Island in the central Kurils. In addition to this Yamaura and Ushiro (1999) reveal similar Okhotsk cultural practices involving both sea lion and bear skulls. If these practices are related, as they may be, even if only as a ritual practice adopted from the Okhotsk by the Ainu, given the profusion of ceramic traditions and maritime adaptations throughout the

islands, this indicates a ritual practice continuing through from at least ~1180 ± 30 BP at the northernmost extent of the Kurils down in to the central islands circa ~160 BP, well into the Ainu period (Fitzhugh et al. 2002).

Within the faunal assemblages collected during the summer of 2006 were found pieces of a bear skull from at least one site, Kubushevskaya 1 along the Okhotsk side of Iturup Island, roughly midway along the island's NE – SW orientation. Whether these remains represent natural death, ritual sacrifice or subsistence hunting remains to be seen, but given the close proximity of the remains to at least one house pit feature, along with the ethnographic record of bear symbology in the practices of the various ancient peoples of the islands, none of these possibilities can be entirely ruled out. Additionally, being in the southern group of the Kurils, Iturup Island was inhabited into very recent times by Ainu people, providing for a greater possibility that ritual usage may be a prospect.

These factors suggest that a greater distinction should be made between terrestrial-dependent Jomon and maritime Jomon cultures, especially in the biogeographically isolated Kurils.

Birds:

Although not fully included in the faunal analysis discussed here, birds played an important role in subsistence strategies in the Kuril Islands. Preliminary observations of avifauna in the assemblages from the KBP 2006 excavations reveal a wide variety of birds being used by humans throughout the islands. Examples of represented avifauna in archaeological contexts from sites examined during the KBP 2006 season include a variety of species: Horned Puffin (*Fratercula corniculata),* Tufted Puffin (*Fratercula cirrhata)*, Common Murres (*Uria*

aalge), Double-Breasted Cormorant (*Phalacrocorax auritus)*, Northern Fulmar (*Fulmarus glacialis)*, Leach's Storm Petrel (*Oceanodroma leucorhoa)*, Pigeon Guillemot (*Cepphus Columba*), Steller's Sea Eagle (*Haliaeetus pelagicus),* Albatross (*Diomedea sp.).*

Fish:

Fish were a valuable element in subsistence practices throughout the Kuril chain. Fish associated with maritime adapted Jomon people on Hokkaido include black "snapper" sea bream (*Acanthropagrus* sp.), sea bass (Lateolabrax sp.), flathead mullet (Mugil cephalus), flathead (Platycephalus sp.), Tuna (Thunnus sp.), bonito (Katsuwonus pelamis), yellowtail (*Seriola quinqueradiata*), sardine (*Sardinops melanosticus*), anchovy (*Engraulis japonicus*), horse mackerel (*Trachurus japonicus*), carp (*Cyprinus carpio*), Japanese eel (*Anguilla japonica*), catfish (*Silurus asotus*), Dog Salmon (*Oncorhynchus keta*), Cherry Salmon (*O. masou*, a species of trout found only in this region of the North Pacific Rim) (Habu 2004; Matsui 1996). Okhotsk fishing strategies included herring (*Clupea* sp.), cod (*Gadus macrocephalus*), and Atka mackerel (*Pleurogrammus monopterygius)* (Amano 1979 referenced in Hudson 2004). In the Kurils, an array of fish species was available for hunter-gatherer procurement, most notably Cherry and Dog Salmon, mackerel, smelt (*Osmerus* sp.), and stickleback (*Gasterosteus* sp. and *Pungitius* sp.) (Glubokovsky 2001).

Fish of all sizes, saltwater, freshwater, and anadromous played an important part in the diets of maritime adapted hunter-gatherers throughout the region.

Anna Reid (2002) points out early 19th century explorer and Russian naval officer Capt. A. J. von Krusenstern's amazement at the abundance of marine resources available to the Ainu noting from his diaries that "during the herring-run the natives caught their dinner in pails." No

doubt small fish were a valuable resource in Ainu subsistence, a practice that was likely taken advantage of by earlier peoples as well. Working backward in time from the Ainu, Befu and Chard (1964) acknowledge similar importance of various fish in Okhotsk subsistence strategies. As seen above, Habu (2001: 2004) details Jomon reliance on a range of diverse fish species, including a wide variety of relatively small species (Katayama & Habu 2006).

Salmon played an extremely important role in human subsistence throughout the island chain, though Fitzhugh (2002) points out that limited riverine systems on many of the smaller central islands would create obvious harvest limitations in those areas. Dog Salmon (*Oncorhynchus keta*) and Cherry Salmon (*Oncorhynchus masou*) were harvested seasonally by the Ainu in the Fall and Summer, respectively, with groups moving between spawning grounds.

Research of the patterns of spawning in Dog and Cherry salmon, respectively, acknowledge that their runs are at opposite temporal ends of the year – Summer for *O. keta* and Fall for *O. masou* (Matsui 1996). This allows for a large window of opportunity in harvesting these species over the better part of a year. Additionally, the availability of spawning *O. keta* can last from July through August, and that of *O. masou*, which spawns over an even longer period from mid to late Fall until May, making it potentially available throughout the winter where it is present.

In the central islands where anadromous fish may not have been readily available in abundance due to geographical lack of riverine systems or similar circumstances, birds play a more important part in subsistence (Fitzhugh et al. 2004: 113). This theory is supported by the relative abundance of bird remains from the Vodopadnaya excavations as compared to those from Ainu Creek and Bolshoy and Baikova.

Shellfish:

Along with fish, shellfish played a valuable role in maritime Jomon subsistence as is evidenced from extensive shell middens throughout Jomon sites during virtually all occupation periods (Habu 2001). At Ainu Creek in the Kurils, very little shellfish remains were recovered, although much of the recovered faunal remains were located in thick lenses of urchin shell. Most of these shell remains were unidentifiable and further, undiagnostic as far as malocological analysis is concerned. Because of this, MNI and NISP are not measurable even though a significant abundance of urchin was evident.

At Vodopadnaya, sea urchin lenses also yielded an abundance of sea mammal, bird, and fish bones. Remains of shell within the midden lenses of this site were in much better preserved condition than those of Ainu Creek, likely due to the site's lofty position above sea level away from hydro-turbation and erosion. Sea urchin (*Echinoidea* sp.) dominates the represented shellfish at Vodopadnaya, but again, MNI and NISP are difficult to determine given the deteriorated condition of much of the bulk samples. Other shellfish include a number of *Littorina* species and *Natica* gastropods. Perriwinkle Univalves within the assemblage are likely any of four closely related *Littorina* species that co-exist in the area: *L. sitkana*, *L. subrotundata* and *L. kasatka* and a fourth, as yet unidentified species (Zaslavskayan 2005). Small samples of fragmentary *Limpet* remains were also identified.

Baikova and Bolshoy yielded the highest concentrations of shellfish from any of the sites examined here and show a marked change, not only as regards numbers, but in type also. Unlike Ainu Creek or Vodopadnaya, bulk midden samples from Bolshoy and Baikova were not dominated by sea urchin. *Littorina* species and mussels (*Mytilus* sp., likely *Mytilus edulis*, "Pacific Blue Mussel") make up the bulk of shellfish remains from both Shumshu sites.

Additional Considerations:

Sea otters (*Enhydra lutris*), sea urchin, and kelp occupy a strongly symbiotic biological relationship (Simenstad et al. 1978). Apparent lack of sea urchin at the Shumshu sites would almost certainly indicate a lack of sea otters in the area at the time of site occupation. However, at present, sea otters are bountiful in the local vicinity, with high concentrations in the waters between Simushir and Paramushir. Changes in climate during the late Holocene may be responsible for the modern profusion of sea otters in the area. It is quite possible that at the time of pre-historic site occupations, the local fauna was dissimilar to today's populations along the northwest coast of the island. Sample size and local geography may also be responsible for lack of urchin representation in the test pit excavations. Regardless of possible causes, it is possible that urchins were unavailable and were thus not utilized by humans at these sites. However, it is possible that this lack of urchin in the midden layers may indicate a cultural distinction on the part of the inhabitants of the northern islands. A further possibility is that cultural groups at these sites may have purposely gone out of their way to maintain urchin populations by exploiting other resources, to sustain otter populations, thus managing an extremely valuable hunting and trading commodity.

Preceding photographs show examples of pottery sherds from the 2006 KBP expedition.

Photo 1: Epi-Jomon pottery from Ainu Creek

Photo 2: close-ups of Epi-Jomon from Ainu Creek

Photo 3: Early Epi-Jomon pottery and bowl base showing both cord-marked style and incised style, and Middle Okhotsk sherd with incising from Aiekhina

Photo 4a, b: Middle Okhotsk pottery from Bolshoy – note the lack of markings

Photo 4b Additional examples of Middle Okhotsk pottery from Bolshoy

Photo 5: Late or Epi-Jomon pottery showing incised designs and example of how pottery can be refit

Photo 6: Late and Epi-Jomon pottery from Kuybyshevsky site – note repair holes in bottom center and middle right

Photo 7: Okhotsk pottery from Kuybyshevsky – note repair hole in top center piece

Pottery Analysis:

The peopling of the Kuril Islands during the Holocene is marked by the emergence of four basic cultural traditions roughly following a timeline from as early as ~5000 BP into the present. These periods can be divided into four basic groups: Jomon, which itself is demarcated into Insipient, Initial, Early, Middle, Late and Epi-Jomon, spaning from roughly 12,000 BP to ~1500 BP on the Japanese mainland (though in the Kurils a time lag is apparent and Jomon culture is not evident until around 4000 BP); Okhotsk; Ainu; and Historic. Stylistic changes to pottery designs in the Kurils follow temporally somewhat behind those from Hokkaido and the rest of Japan, likely due to geographical isolation resulting in subsequent delay in cultural transmission (Fitzhugh et al. 2002: 84; Habu 2001: 11). Below is a breakdown of basic cultural distinctions in the region and their relative timeframes. The majority of archaeological evidence collected during the KBP 2006 expedition dates within the Late Jomon, Epi-Jomon, and Okhotsk periods. What follows is a basic timeline of cultural presences in the region and represent as accurately as possible the timeline of each respective system of cultural adaptations. As such, these dates are approximate, and should be viewed as such.

Period **Time (years BP)**

Jomon……..12000-2000

Epi-Jomon……2000-1300

Okhotsk……1300-800

Ainu…….700-55

Historic……300-present

The Jomon cultures of Japan are designated as the earliest makers of pottery in the world. The word Jomon literally means "cord-marked," in reference to the technique of decorating commonly associated with their pottery. This technique, which involves repeatedly drawing a cord (likely fashioned of braided grass or similarly pliable materials) across the surface of a pot in a variety of patterns before firing, creates a distinct pattern. Some patterns and cord thicknesses and braid types were more or less prevalent at different time periods and thus can be used to identify certain sub-cultures within the Jomon through time. In addition to distinctive cord-marking and incising, basic shapes, sizes, and thicknesses of vessels prevailed at different times and in different places. These changes are also valuable indicators of change through time. While the Jomon cultural complex is identified namely through its pottery, a host of changing technologies were in use, and in flux, throughout the long period of Jomon history. Given the extremely long time-frame of the Jomon cultural complex it is necessary to understand that there are significant changes and innovations that mark regional and temporal boundaries. These changes are not only recognized in ceramics but in lithic technologies, mortuary and subsistence practices (from hunter-gatherers to agriculturists), social networks and dynamics, cultural migrations and assimilations (Befu & Chard 1964; Habu 2004; Hudson 2004). Here we are examining how resource availability, most distinctively in the form of access to viable prey species throughout the unique biogeographic environments of the islands. Ceramics serve as a helpful way of determining temporal context where other dating methods are unavailable. Similarly, because changes in ceramic styles and decoration are known to have taken place at specific identified intervals it is possible to infer migration between islands by different or later cultural groups.

Storage and Pottery Usage:

The use of storage is a hallmark of Jomon civilization (Habu 2004: ch. 6). In addition to storage use, pottery analysis of *Fukabachi*-style pots indicates that some pots were likely used for the production of salt through a process of dehydration of saltwater. Ethnographic evidence of Ainu storage techniques also indicate storage of marine resources, particularly salmon (*O. keta* and *O. masou*) by open-air drying methods not unlike those of Pacific Northwest and Alaskan natives. As noted above, these same salmon species have been found in association with Jomon cultures (Matsui 1996). A great deal of discussion has come about toward the reliance of maritime Jomon on seasonally available resources and techniques adapted to store them (Chard 1960; Habu 2001; 2004; Matsui 1996).

In an examination of native western Alaskan cooking pots and their uses, Karen Harry and Lisa Frink (2007) attest that flat-bottomed fiber-treated pots were common and would have been used for a variety of utilitarian purposes, most commonly, cooking. Harry and Frink contest that because of the lacking quality of some local clays, in addition to the added hardship of a relatively cold, humid climate, the role of pottery in food production may have been one of social contexts rather than purely utilitarian function. In the isolated Kurils, with their similar climate, this may also have been an important factor in choice of ceramics and the necessity of their repair when damaged as opposed to simple replacement. Pots like those analyzed in the western Alaskan experiments were also common further south-east along the north Pacific Rim in Japan and the Kurils (Habu & Hall, 1999). In the Jomon tradition, tall flat-bottomed pots, *Fukabachi*, and low, rounded, shallower pots, *Asabachi*, are the most frequently represented in the Late and Epi-Jomon throughout most of Japan, with *Fukabachi* representing the most

common type overall (Habu 2004, 203; Pearson 2000). In the Kurils the majority of Jomon and Epi-Jomon ceramics uncovered during the 2006 KBP field season were what can be defined as coarsely-made deep and shallow bowls (Habu 2004, 207). Both *Asabachi* and *Fukabachi* are represented; the dismantled nature of much of the recovered pottery remains is so fragmentary that very few pieces could be designated to one or the other styles. Some examples of finely-made bowls were found, but the overall distribution seems to indicate that more flamboyant types of design become less obvious in the archaeological record the farther north from Japan the tradition moves.

Harry and Frink (2007) also noted that brevity when cooking sea mammals in ceramic vessels acts to preserve vitamins and other nutritional contents. Therefore, it is quite possible that cooking vessels may not have been exposed to heat for extended periods of time in the Kurils as they may have been in the rest of Japan thanks to the budding reliance on rice and other cereal grains toward the Late Jomon (Habu 2004; Kobayashi 1997). However, pottery in the Kurils was clearly used over and in fires, as evidenced by soot-marking and burns both inside and outside of many pieces. Use-wear analysis of Kuril pottery samples is needed to determine which pottery styles were used for which purposes and whether those types and purposes match those of other Jomon peoples in Japan. By the time maritime hunter-gatherers moved into the Kuril Islands from the south their pottery traditions were already building on 6-8 millennia of stylistic and functional adaptations.

Firewood would have been a valuable commodity in the Kurils, with their lack of major forestation, especially in the central region. Catcher beaches would have played an important role in supplying ancient people with useful wood resources (Jenny Dio: 2006 personal communication). It is possible that where wood was not readily available, bone may have been

used as a wood alternative. Calcined bone, bone which has been burned at high temperatures leaving nothing but calcium, is not uncommon in many of the middens excavated in the 2006 test pits.

Habu (2001, 7) suggests that most Jomon people were relatively sedentary, while later maritime Okhotsk hunter-gatherers were much more mobile. Even later, the Ainu are seen as more or less sedentary or semi-sedentary at least into the historical phase and the introduction of limited agriculture in Hokkaido and possibly the southern Kurils.

Archaeologically, the Ainu are poorly represented in finds from the KBP 2006 expedition. AMS dates indicate more or less constant occupation from our earliest date of 3150BP in the far north on Shumshu to 750BP. This may be because the most noticeable diagnostic feature of Naiji pottery, identified by the internal lugs located inside the vessel rim, were not recovered. Without this, and without outward designs and with limited fragments to work with, small sherds of Ainu pottery can be virtually indistinguishable from earlier Okhotsk ceramics when the latter lack stylistic features.

Analysis of Pottery Data:

In the Kurils the earliest archaeological dates so far are from Iturup Island in the south of the chain and date from ~6980 ± 50 BP (Zaitseva et al.1993). Pottery from this occupation would thus fall into the Middle to Late Jomon period. The majority of ceramic finds from the 2006 KBP excavations are diagnostically Late Jomon, Epi-Jomon and Okhotsk, but many pieces exhibit stylistic variances reminiscent of earlier Middle Jomon types, as well as patterns that characterize later Final Jomon styles within the same provenience. Additionally, examples of Epi-Jomon styles are occasionally found associated with Okhotsk pieces. At the surface and

within level one of test pit one at the Ainu Creek site Epi-Jomon and Okhotsk pottery sherds were found in close proximity corresponding to an AMS Date ~1290 ± 30. This may be the product of mixing at the site given the disturbed nature of the area surrounding the excavation and the relatively shallow depth of the test pit, or could represent incorporation of older materials through human agency.

At test pit 5, profile 2 of Ainu Creek between 180-210cmbs Epi-Jomon pottery was discovered in association with faunal remains and charcoal dating to AMS Date ~ 2610 ± 25 and ~ 2170 ± 30. Again, the fairly large time discrepancy between these two dates may reflect mixing. This begs an interesting question: is this the result of stylistic change based on influences from outside sources that may have already graduated to new styles, or does it indicate innovation in technique and style?

Though the sample sizes are low, a preliminary examination of ceramic sherds (see Tables 2 and 3) found during the KBP 2006 field season indicates the presence of ceramic repair in all represented styles of pottery, with Middle to Late Jomon and Epi-Jomon styles showing the majority of repair as compared to Okhotsk and Ainu period pieces (identified Ainu pottery demonstrates a significantly large proportion of repair to total pieces, but this is likely due to exceedingly small sample size and the fact that many of the pieces were likely from the same vessel). This may be an indicator of increased availability of ceramic resources during the Okhotsk and Ainu phases as ability to acquire new replacement vessels would reduce the need to repair damaged vessels. Curiously, Omiko Ohnuki-Tierney (1976: 306, referencing Torii 1903: 177-200, 1919: 280-290) divulges that "It is well known that the Ainu in all regions once manufactured and used pottery, but had long forgotten both the manufacturing and use of

pottery; on the Kurile Ainu could recall its use in the recent past." This may give reason for how few Ainu or *naiji*-type ceramics were recovered.

CONCLUSION

While at first glance it seems that analysis of faunal remains and the analysis of pottery repair have little or no connection in the interpretation of archaeological remains, both represent resources utilized by ancient people in the Kurils. Throughout the islands, hunting of sea mammals and use of pottery both applied their own unique stresses on resource availability, biogeographically in the case of hunting, and material in the case of pottery. This thesis has attempted to examine the frequencies at which these two resources can appear to have been put through such pressure. In the southern and northern regions of the Kuril Islands it is likely that people living in these areas had access to more variable and readily available resources than those living in the isolated central region. This isolation is represented here by the differences in relative frequencies of prey species depended upon for subsistence in each respective region, and by the evident amounts of pottery repair necessitated by lack of access to non-local raw materials and/or access to new replacement vessels through trade or other social networks. The overlying point is that in the central Kurils, where trade with outlying neighbors would have been geographically difficult but necessary, changes are seen to occur in both utilized faunal species and frequencies of ceramics repair.

For the most part, hunters in the Kurils were utilizing the same species throughout the islands but in noticeably different proportions as regards local biogeographic isolation. Faunal data analyzed here indicates an environment wherein hunter-gatherers were relying heavily on sea mammal and fish resources, and in the case of the central islands especially, were

supplementing these with birds and occasionally cetaceans when they were acquirable. The inherent contradiction posed by the biogeography of island environments i.e., that there are simply fewer accessible species in such environments, is here countered by a foraging theory wherein hunter-gatherers merely adjusted their hunting strategies to rely more heavily on less optimal resources when faced with isolation induced stresses. Similar strategies have been proposed for similar island environment in the eastern north Pacific (Broughton et al. 2006). While the pottery analysis from the three sites specifically addressed here does not show evidence of pottery repair as a means of indicating availability of pottery as a valuable resource, examination of ceramic repair through the island chain as a whole does provide a temporal model of resource use. Evidence of pottery repair occurring most often in Late and Epi-Jomon contexts indicates the possibility of less access to materials and trade in those periods when compared to Okhotsk and Ainu periods. Further analyses and the acquisition of larger samples will reveal a clearer picture of resource limitations. The examination here provides an impetus for further study and offers a possible model of hunter-gatherer practices within the isolated and semi-isolated regions of the Kuril Islands.

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Additional Information:

International Kuril Island Project website: http://depts.washington.edu

Appendices:

Test Pits, Maps, Pictures & Data

Test Pit Descriptions

Ainu Creek Test Pits (see attached map):

AMS dates for Ainu Creek detailed in Appendix (B.P.):
2610 ± 25; 2170 ± 30; 2550 ± 25; 2430 ± 30; 1310 ± 25; 2050 ± 35; 2410 ± 30; 3230 ± 30; 880 ± 30; 2540 ± 30; 1290 ± 30; 1160 ± 25; 1120 ± 25

Five excavations were undertaken around the site of Ainu Creek at roughly 10 meters above sea level. The Ainu Creek site is located along a small creek of the same name where it empties into the Sea of Okhotsk. A road leading from the inland down onto the beach runs south through the site. The road cut revealed a significant midden containing a generous number of bones and cultural materials eroding out of its edge. Surface collections along the road and surrounding areas yielded Jomon and Okhotsk pottery and a number of lithic materials in addition to faunal remains. Bulk midden samples were collected from test pits 1 and 2, and additional samples were collected from each excavation.

Test Pit 1 was excavated along an erosion-exposed section of the midden to a depth of 170cmbd.

Test Pit 2 consisted of a 50cm X 100cm test pit to a depth of 170cmbd. Ceramics, lithics and bones were produced from the excavation, although some cultural materials were in obvious disassociation with cultural levels. Temporal context cannot be accurately assessed due to mixing and disturbance likely the result of the road construction cut.

Test Pit 3 was excavated about nine meters above sea level and consisted of a 200cm X 200cm excavation to 70cmbd. No faunal remains were recovered from the excavation but a small number of lithic flakes and ceramic sherds were collected. Charcoal was collected from what may have been a hearth feature.

Test Pit 4 was excavated along the road cut ~40 meters up the road from the beach. The test pit consisted of a 25cm X 50cm hole dug to a depth of 150cmbd and was later expanded to a 100cm X 100cm excavation halfway into the edge of the road cut and extending out roughly 50cm into the wheel track of the road toward the median. A thick midden of shell (predominantly sea urchin) interspersed with large sea mammal bone was encountered between 20 and 30cm below the sod layer. Shell and various animal bones (mostly sea mammal) were encountered throughout the excavation layers. In addition to numerous lithic, charcoal and faunal materials, Okhotsk and Epi-Jomon pottery sherds were found throughout. Levels 1-4 were essentially above road surface, partially exposed to weathering and erosion. Likely, this exposure, in addition to possible mixing during the clearing of the road, accounts for the integration of Okhotsk and Epi-Jomon ceramics. A hearth feature was uncovered at about 80cmbd in level 7, with associated burnt bird bones and some additional calcined bone. A wooden or bone spoon was uncovered next to the hearth feature at the bottom of level 7 along with a bone harpoon. An abundance of organic materials were revealed during excavation, mostly consisting of small (usually not longer than ~4-5cm) fragments of wood. All layers were processed using 6.4mm screens.

Test Pit 5 was located on the east face of an eroding midden feature facing out toward the Okhotsk Sea. The excavation consisted of a cut 100cm across along the erosion face to a depth of 210cmbd. Ceramics (likely post-dating Okhotsk and Epi-Jomon samples collected from lower levels) were collected from the sod layer at the top of the erosional face. Okhotsk and Epi-Jomon pottery were found throughout. An "Okhotsk midden" was identified at ~145-205cmbd and appeared to fill a concave feature, possibly a pit house or other similar feature. Epi-Jomon ceramics were found with other cultural materials below the Okhotsk layer and were associated with a number of stone flakes and sea mammal bones. Bulk samples collected below 200cmbd with divided using 6.4mm screens.

Vodopadnaya Test Pits (see attached site map):

AMS dates for Vodopadnaya detailed in Appendix (B.P.):
1700 ± 30; 1260 ± 30; 1650 ± 25; 1740 ± 30; 1300 ± 30; 1090 ± 25; 1600 ± 25; 1940 ± 40

The Vodopadnaya sites were divided into three related areas, Vodopadnaya 1, 2 and 3. Site 1 is centered on two successive terraces along the left bank of a stream on the Okhotsk side of the Island, roughly 6km from Broutona Bay, and two km north of Vodopadnaya 2. At Vodopadnaya 1 no test pits were excavated although a number of features were identified through impromptu survey and soul probe samples, which identified upwards of 27 housepits. Modern military instillation features were also located on the site.

Vodopadnaya 2 excavations consisted of five test pits. The site rests on a high terrace overlooking the NW Okhotsk Sea coast of the island and commands an extensive view of the surrounding area. Most of the terrace is roughly 35 meters above sea level, excluding of course,

where a streambed and waterfall cut into it. A waterfall cuts through the site separating test pits 2, 3 and 4 from test pit 1 to the NE across the stream and test pit 5 further north along the bluff roughly 500 meters. The site contains in excess of 59 identifiable house pit features.

Test pit 1 consisted of a 100cm X 100cm excavation to a depth of 50cmbd. A large number of stone flakes (495 pcs.) and charcoal samples were retrieved from the pit, along with a piece of bone from level three at a depth between 30-40cmbd. The excavated materials were screened on site using a 6.4mm mesh.

Test pit 2 consisted of a 100cm X 100cm pit. The excavation yielded lithic materials, charcoal, ceramics and bone. Excavated materials were screened on site using a 6.4mm mesh.

Test Pit 3 consisted of a 100cm X 100cm pit taken to a depth of 95cmbd. Stone flakes, ceramics, charcoal and bone were all recovered. This pit revealed an extensive midden and sea urchin lens at 31cmbd. A number of sea mammal and cetacean bones were unearthed in addition to the remains of fish and shellfish. Furthermore, an intricately incised bone disk (possibly an ornamental artifact called a "kukkurukesh," an ornament generally associated with Okhotsk and Satsumon groups, but possibly a spindle whorl) was recovered from the southwestern edge of the midden lens at 35cmbd. Similar objects have been found in association with Okhotsk burials on Hokkaido and sparsely throughout the Japanese mainland (Matsumura 2006). Additionally, a broken but nearly intact *Asabachi*-type ceramic vessel was recovered at the bottom of level two.

Test Pit 4 consisted of an 80cm X 70cm excavation to a depth of ~55cmbd. A cultural layer yielding ten stone flakes and some charcoal lay at ~25cmbd. Another cultural layer yielding similar results of seven stone flakes and some charcoal lay at a depth just above ~60cmbd.

Test Pit 5 consisted of a 100cm X 100cm pit excavated to 83cmbd. The pit was located a fair distance away from most of the other test pits at the site – around 500 meters north, at an elevation of ~35-40 meters above sea level. The depth was divided into four levels: L1 0-20cmbd; L2 20-40cmbd; L3 40-60cmbd; L4 60-83cmbd. None of the levels produced cultural materials.

Vodopadnaya 3 consisted of three test pits. The area was likely occupied during the historic Ainu period. Interpretation as to the occupation period is due to stratigraphical evidence - the occupation layer is beneath a layer of cinder identified by expedition geologists as historic. Additionally, no pottery or stone tools were discovered. Furthermore, all three house pit features identified at the site possessed horseshoe-shaped mounds enclosing their south, west, and east sides. These mounds have been associated with Ainu house enclosures and likely served as some manner of wind shelter or drainage feature (T. Amano, personal communication to Ben Fitzhugh 2006).

Test Pit 1 excavation consisted of a 60cm X 60cm pit to a depth of 90cmbd. This test pit did not result in archaeological samples of material culture.

Baikova Test Pits (see attached site map):

AMS dates for Baikova detailed in Appendix (B.P.):
1970 ± 35; 2010 ± 35; 2110 ± 25; 2190 ± 30

Four test pit excavations were undertaken at the Baikova site.

Test pit 1 was at an elevation of 31 meters above sea level. Excavation consisted of a test pit 75cm X 50cm to a depth of 100 centimeters below datum (cmbd). A bulk midden sample was collected between 87cmbd-94cmbd from a charcoal-rich midden lens resting above a compact orange-tan silty soil level consisting of various shells (bivalves and gastropods), sea mammal bones, as well as fish and bird bones. Level 4 may represent a hearth feature, as a number of fire-cracked rocks were uncovered along with charcoal and midden. Plain-ware pottery was collected from the surface level directly surrounding the pit excavation.

Test pit 2 consisted of a 100cm X 150cm test pit to a depth of 130cmbd. A bulk midden sample similar to that taken from test pit 1 was extracted from test pit 2 level 4 from a section trench within the pit between 80cm and 110cm. The midden sample from level 4 was also associated with charcoal deposits and some lithic materials and contained fish and marine mammal bones, gastropods and bivalves, including a relatively large amount of badly decomposed mussel shell (*mytilidae* sp.*)*.

Test pit 3 consisted of a 50cm X 50cm test pit to a depth of 100cmbd. Eight pieces of lithic material (including 2 obsidian flakes) and a charcoal sample were extracted from between 78cmbd-85cmbd just below a tephra lens at 78cmbd. No other samples were taken from this excavation.

Test pit 4 consisted of a 50cm X 10cm test pit cut to a depth of 130cmbd. 11 miscellaneous lithic flakes were collected from the exposed surface at the pit location. Charcoal, and two obsidian flakes were collected at ~120cmbd embedded above and below a tephra lens at 120cmbd.

Bolshoy 1 Test Pits (see attached map):

AMS dates from Bolshoy 1 detailed in Appendix (B.P.):
1180 ± 30; 3330 ± 35

Three test pits were excavated at the Bolshoy 1 site. Previous examinations of this area by Osama Baba (1939) estimated the presence of up to 200 house pits in the local vicinity.

Test pit 1 consisted of a 100cm X 150cm pit to a depth of 180cmbd. 16 fragments of pottery were collected from the surface of the erosion face from which the test pit was initialized. One charcoal sample was collected from inside a pottery sherd discovered between 104cmdb-110cmdb below a tephra lens at ~102cmdb-103cmdb.

Test pit 2 consisted of a pit 100cm X 150cm in horizontal dimension and was conducted to a depth of 180cmbd. A "grab-sample" of faunal remains was taken from the midden lens between 13cmbs-40cmbs consisting mostly of bird and fish bone, but also containing mammal bones and shellfish. Of particular interest from this sample is the presence of a well preserved male Steller Sea Lion (*Eumetopias jubatus)* skull which appears to have had a section along the right side of the skull removed.

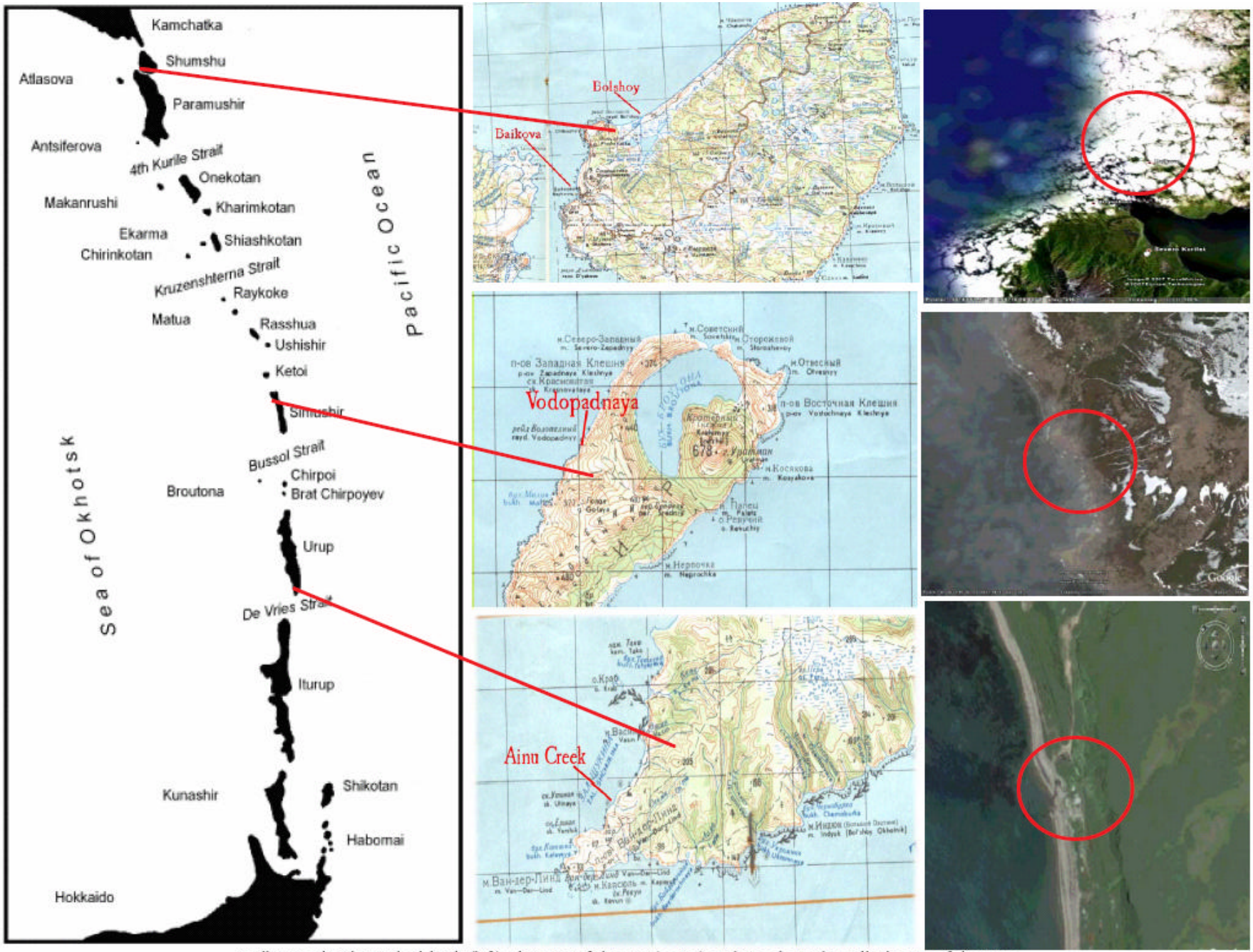
Test pit 3 consisted of a 100cm X 30cm pit to a depth of 75cmbd.

Bolshoy 2 Test Pits (see attached map):

Two test pits were excavated at the Bolshoy 2 site.

Test pit 1 consisted of a 100cm X 60cm cut into the profile of a dune deflation to a depth of ~285cm.

Test pit 2 was not fully documented and yielded no cultural materials. The horizontal dimensions of the excavation are currently unavailable, but the depth was recorded to 60cm.



Kuril Maps showing major islands (left), close-ups of site area (center), and Google Earth satalite images of site areas

Table 1.

Preliminary data from mammal identifications

Number of Identified Specimens from each site:

	Baikova	Ainu Creek	Ainu Cr., surface	Bol'Shoy	Vodopadnaya
Enhydra	17	1	4	6	0
Phoca	10	10	23	15	19
Eumetopias	1	10	19	7	1
Callorhinus	0	11	12	0	0
Total	28	32	58	28	20

Relative abundance of different taxa as percentage of NISP:

	Baikova	Ainu Creek	Ainu Cr., surface	Bol'Shoy	Vodopadnaya
Enhydra	60.7	3.1	6.9	21.4	0.0
Phoca	35.7	31.3	39.7	53.6	95.0
Otariidae	3.6	65.6	53.4	25.0	5.0
Total	100.000	100.000	100.000	100.000	100.000

Table 2. Pottery by Site and Type

ID	Site Name	Island	Description	QTY	Early Epi-Jomon	Epi-Jomon	Okhotsk	Middle Okhotsk	Niaji/Ainu	Repaired	Part	Type
0870	Baikova 1	Shumshu	TP 2, (probably) level 5, potsherd									
0908	Bakivoa 1	Shumshu	TP 2, sod layer, ceramics									
0915	Bakivoa 1	Shumshu	TP 2, level 2, ceramics	13				1		No	sherd	
0933	Bakivoa 1	Shumshu	Surface collected from near test pit 2, ceramics	2								
0935	Bakivoa 1	Shumshu	Surface collected, ceramics, TP 1	1								
0830	Bolshoi 1	Shumshu	TP1, ceramics from below tephra	1				1		No	sherd	
0840	Bolshoi 1	Shumshu	TP1, ceramics, surface collection from erosional face	16				1		No	sherd	
0461	Vodopadnaya 2	Simushir	TP 2, 15-23 cmbs, ceramics, level 1	1								
0464	Vodopadnaya 2	Simushir	TP 2, level 2, 23-30 cmbs, ceramics	10								
0469	Vodopadnaya 2	Simushir	TP 2, level 3, 30-45 cmbs, ceramics	2								
0481	Vodopadnaya 2	Simushir	Test Pit 3, Level 2, Ceramics	31								
0486	Vodopadnaya 2	Simushir	Test Pit 3, Level 3, Ceramics	108								
0494	Vodopadnaya 2	Simushir	Test Pit 3, Level 3, nearly complete ceramic vessel	63								
0497	Vodopadnaya 2	Simushir	Test Pit 3, Level 4, Ceramics	13								
0579	Vodopadnaya 2	Simushir	Test Pit 3, Level 6, Ceramics	1								
0588	Vodopadnaya 2	Simushir	Test Pit 3, Level 4, North 40 cm, ceramics	8								
0265	Ainu Creek	Urup	Test Pit 1, 64cmbs, 74cm N, ceramics	2								
0271	Ainu Creek	Urup	Test Pit 1, ceramic, 40 cmbs, 65 cm N	1				1		No	sherd	
0281	Ainu Creek	Urup	Test Pit 1, ceramic, 102 cmbs, 80 cm N	3				1		No	sherd	
0285	Ainu Creek	Urup	Test Pit 1, surface cleaning, ceramics	24	14		1			No	sherd	
0288	Ainu Creek	Urup	Test Pit 1, wall cleaning, ceramics	27		4	3			No	sherd	
0295	Ainu Creek	Urup	Test Pit 2, level 2, 21cmbs, 90 cm N, 25cm E, ceramics	1		1				No	sherd	
0299	Ainu Creek	Urup	Test Pit 2, level 3, ceramics	6	6					No	sherd	
0302	Ainu Creek	Urup	Test Pit 2, level 1, 8cmbs, 96 N, 9E, ceramic	1			1			No	sherd	
0306	Ainu Creek	Urup	Test Pit 2, level 1, ceramic, 15cmbs, 81N 6E	1	1					No	base	
0311	Ainu Creek	Urup	test pit 2, level 1, ceramic, 17cmbs, 34N 30E									
0314	Ainu Creek	Urup	Test Pit 2, level 1, ceramic, 16cmbs, 38E 65N	2	2					No	sherd	
0319	Ainu Creek	Urup	Test Pit 2, level 1, ceramics	7	7					No	sherd	
0320	Ainu Creek	Urup	Test pit 2, level 2, ceramic sample	19	11			7		No	sherd +2 rims	
0324	Ainu Creek	Urup	Test pit 2, level 3, 52cmbs, 36E 35N, ceramics	1	1					No	sherd	
0328	Ainu Creek	Urup	Test pit 3, level 1, ceramic	1								
0329	Ainu Creek	Urup	Test pit 3, level 2, ceramics	4			4			No	sherd	
0336	Ainu Creek	Urup	Test pit 3, level 2, ceramic sample	1			1			No	sherd	
0344	Ainu Creek	Urup	Test pit 4, level ? ceramicsS	5								
0360	Ainu Creek	Urup	Test pit 4, level 4, 56cm, ceramic	18	5			1		No	sherd	
0369	Ainu Creek	Urup	test pit 4, level 5, pottery 90 - 95cm	8	7					No	sherds +1 base, +1 rim	
0377	Ainu Creek	Urup	Test pit 4, level 5, ceramics	19	7					No	sherd	
0379	Ainu Creek	Urup	Test pit 4, level 5, pottery from near fireplace	2								
0385	Ainu Creek	Urup	Test pit 4, level 6, 110 - 128cm, pottery	2	2					No	sherd	
0396	Ainu Creek	Urup	Test pit 4, level 7, ceramics	2								
0441	Ainu Creek	Urup	TP5, profile 2, 40 - 80cmbs, ceramics									
0450	Ainu Creek	Urup	TP5, 145 - 205cm okhotsk ceramics				3			No	sherd	
0451	Ainu Creek	Urup	TP5, okhotsk (?) Epi-Jomon, 150 - 200cmbs, ceramics			7				No	sherd	
0458	Ainu Creek	Urup	TP5, Okhotsk pottery 145 - 205			3	18			No	sherd +9 ri fukabachi	
0526	Ainu Creek	Urup	Test Pit 5, Profile 2, pottery from 225-242 cmbs									
0532	Ainu Creek	Urup	Test Pit 5, Profile 2, pottery from 220-225 cmbs									
0540	Ainu Creek	Urup	Test Pit 5, Profile 2,pottery from 180-200 cmbs in Epi-Jomon layer			5				No	sherd	
0546	Ainu Creek	Urup	Test Pit 5, Profile 2, ceramics from 200-210 cmbs in Epi-Jomon layer			7				No	sherd	
0547	Ainu Creek	Urup	Test Pit 5, Profile 2, ceramics from 200 cmbs in Epi-Jomon layer									
0642	Ainu Creek 1	Urup	Surface collected ceramics									
0654	Ainu Creek 1	Urup	Test Pit 4, Jomon pottery from 75-90cmbs	2	2					No	sherd	varied Jomon designs
0675	Ainu Creek 1	Urup	Surface collection - Okhotsk(?) ceramic sherd	1			1			No	sherd	insiced Okhotsk

Table 3. Pottery by Type and Site Showing Percentages of Repair

Site Name	Middle/Late Jomon	Repaired	Epi-Jomon	Repaired	Okhotsk	Repaired	Middle Okhotsk	Repaired	Niaji/Ainu	Repaired
Ainu Creek			77		48					
Ainu Bay									13	4
Baikova					1					
Berezovka			7	3	60	1				
Bolshoye					2		4			
Danilova			5							
Drobnyye			23		4					
Glush	1		1							
Golovnino	2									
Kapsul					6					
Kharimkotan					8	1				
Kompanisky	76	9			13					
Kuybyshevskaya			29	4						
Olya			7		20					
Peschanoya	2									
Ryponkicha					11					
Semovodk			9							
Total	81	9	158	7	173	2	4	0	13	4
Percents		11.11111111		4.430379747		1.156069364		0		30.76923077

Note the high frequency of repair in Naiji/Ainu pottery is likely exaggerated due to small sample size.

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