

## Interdisciplinary Research

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This fiscal year saw several journals publishing featured articles on related fields. First, results of the 19<sup>th</sup> INQUA Congress were featured as “Emergence of the World’s Oldest Pottery” in *Quaternary International* 441B and “Human Behavioral Variability in Prehistoric Eurasia” in *Quaternary International* 442B. *Journal of Archaeological Science: Reports* 17 had a featured article “Archaeometric Approaches to the Archaeology of Northern Hunter-Gatherers” that contained achievements by Japanese researchers. As for domestic journals, *Kokogaku to Shizen Kagaku (Archaeology and Natural Science)* is continuously featuring the latest trends of each field commemorating the 30<sup>th</sup> anniversary of the academic society, and its 76<sup>th</sup> issue featured dating measurements. *Archaeological Journal* No. 709 had “Tokushu‘Nendai’wo Do Hakaruka (Featured Article: How to Measure ‘Dating’).”

### 1. Dating Measurement and Paleoclimate

Comparison of cultural phenomena such as the emergence of pottery or climate change in wide areas is even more active due to accumulation of high precision dating measurements. Sato and Natsuki discussed radiocarbon dating of archaeological sites in the pottery emergence period in northeast/east Asia and indicated that the emergence of pottery in each area took place in a different climate stage in *Quaternary International* 441B. Also, issues on dating, climate change and manufacturing techniques were discussed in the same journal on pottery emergence period in China, the Japanese Archipelago, and far eastern Russia. Other than the above, outstanding results were: detection and accurate dating of widespread tephra in cryptotephra layers in Lake Suigetsu in Fukushima Prefecture (McLean *et al.* *Quaternary Science Reviews* Vol. 183), reviews on reconstruction of long-term paleotemperature change by analysis on growth lines and oxygen isotope ratios of marine clam shells (Kitamura: *Daiyonki Kenkyu* 57-1), and actual dating of each pottery typology from Incipient to Final Jomon using C-14 dating measurements and data calibration (Kobayashi: *Jomon Jidai no Jitsunendai (Actual Dating of Jomon Period)*. Tokyo: Doseisha).

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## 2. Paleoenvironment and Dietary Habit

Dietary habits in the Yayoi period from varied natural artifacts from Ikego site in Kanagawa Prefecture were reconstructed from multiple aspects such as components of animal remains, forms of human bones, human and animal carbon/nitrogen isotope ratios, pressed seed marks, carbon adhered to pottery, and starch remains [Sugiyama ed. *Yayoi Jidaishoku no Takakuteki Kenkyu (Diverse Research on Yayoi Period Diet)* Tokyo: Rokuichi Shobo]. In the field of paleobotany/botanic archaeology, Sasaki and Noshiro discussed vegetation and plant utilization from Early to Final Jomon in the Kanto region and revealed that there was no change in plant utilization of mainly chestnut and lacquer with evidence of human management since Early Jomon, and the plant utilization showed diversity including Japanese horse chestnut and konara oak after Late Jomon (*Quaternary International* 471). In relation to farming, Crawford organized excavated examples and dating of cultivated plants such as cereals, rice, and legumes in East Asia (Japan, China, South Korea), and pointed out that each region had a unique historical path in cultivation (“Plant Domestication in East Asia” in *Handbook of East and Southeast Asian Archaeology*). Other than the above, analysis of Jomon period pressed seed marks were active. As for starch remain analysis, SHIBUTANI Ayako discussed present states and problems (*Japanese Journal of Archaeology* 5).

As for animal archaeology KOIKE Hiroko compiled the research history of Japanese animal remains studies that introduced many new methods such as analysis of shell and mammal teeth growth-lines, and further synthetic research like subsistence dynamics analysis (*Daiyonki Kenkyu* 56-4). As for animal domestication, excavated examples and research history in Japan was compiled on dogs, pigs, horses, cows, and chickens, and characteristics of domesticated animal utilization in Japan were discussed (Hongo “Introduction of Domestic Animals to the Japanese Archipelago” in *The Oxford Handbook of Zooarchaeology*).

The importance of isotope analysis and lipid analysis is increasing in order to discuss dietary habits of the past. Itahashi *et al.* revealed dietary differences of each household in a Neolithic village in northwest Syria by grasping consumption ratios down to spices that were not possible to detect in the past by analyzing nitrogen isotopes of individual amino acids (*Journal of Archaeological Science: Reports* 17). Also, they indicated that there were differences in the frequency of freshwater fish utilization among Neolithic hunter-gatherer groups, depending on burial locations and burial period (*Journal of Archaeological Science* 82). As for lipid analysis, it was revealed that early Korean pottery was oriented toward processing marine resources and division of vessel function was already established, by analysis of pottery and substances adhered to pottery (Shoda *et al.* *Quaternary Science Reviews* 170).

### 3. Anthropology

There were publications on research results on human bones excavated from Shiraho-saonetabaru cave in Ishigaki Island. *Cultura Antiqua* had a featured article “Ryukyuko ni Okeru Senshi Jidai Kenkyu no Shintenkai (New Development on Prehistoric Study in Ryukyu Islands)” in which discussions were made on burial methods, minimum burials, physical traits, and pathology of human bones excavated from Shiraho-saonetabaru cave (Doi: *Cultura Antiqua* 69-4). *Kagaku* Vol. 87, No. 6 had a featured article “Tokushu Yomigaeru Senshi Okinawa no Hitobito (Prehistoric Okinawans)” and results of carbon/nitrogen isotope analysis mainly on human bones excavated from Shiraho-saonetabaru cave were published for fields such as dietary habits (Yoneda *et al.*), physical traits (Kono *et al.*) and mitochondrial DNA (Shinoda *et al.*).

Reorganization was conducted for human bones excavated from Iwashita and Shimomotoyama cave sites in Nagasaki Prefecture, and results were indicated for physical traits (Kaifu *et al.*), mitochondrial DNA (Shinoda *et al.*), and carbon/nitrogen isotope analysis (Yoneda *et al.*) (*Anthropological Science [Japanese Series]* 125-1). Other than the above, there were studies on formation processes of Jomon regional groups (Kondo: *Anthropological Science* 125-2), as well as the relationship between the mismatch of limb and body proportions of the Jomon people, gene flow, and cultural factors (such as nutrition) (Seguchi *et al.* *American Journal of Human Biology* Vol. 29, No. 5).

### 4. Material and Quarry Analysis

There was a publication of a complication of obsidian source analysis data in a large area of northeast Asia using high-accuracy chronology (Kuzumin *et al.* *Quaternary International* 442). Also, there was a study that discussed changes in stone tool manufacturing techniques, mining methods, and group reorganization in a limited area, by comparing paleoclimate and obsidian sources in the Last Glacial Maximum (Shimada *et al.* *Quaternary International* 442). Suda *et al.* discussed the location of sources using non-destructive Energy Dispersive X-ray Fluorescence Spectrometer (EDXRF) on excavated artifacts in Hokkaido (*Journal of Archaeological Science: Reports* 17) and in Nagano Prefecture (*Quaternary International* 468). Lynch, *et al.* examined long-term changes in sources of obsidian excavated from Rebun Island, Hokkaido, and discussed that significant changes in sources are connected with cultural changes (*Journal of Archaeological Science: Reports* 17). As for pottery clay analysis, there was a study that discussed population moves from the western to the eastern part of Tokai region and the relation with environmental degradation due to falling volcanic ashes from Akahoya eruption (Iketani: *Quaternary International* 442).