Obsidian from the Huluga Open Site and its Implications

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Introduction

Obsidian is a natural glass produced by the extrusive action of a volcano. It is formed by the extremely rapid cooling of the molten rock that prevents the formation of distinct crystals. This natural rock is 60-80% rich in silica (SiO_2) content.

Obsidian has a perfect conchoidal fracture due to its homogeneity and the near absence of mineral crystals in the glass. It is ideal for making stone tools and other ornamental purposes shaping them into the desired form. It is in this light that obsidian, as a raw material, was considered a precious commodity in prehistoric times. Dixon *et al* (1968) and Rapp and Hill (1998) ranked obsidian as one of the widely exchanged raw materials used for tools, decoration, jewelry, and even surgical instruments. It is reported that the utilization of obsidian still occurs and continues in Papua New Guinea (Watson 1986).

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In archaeology, obsidian plays an important role in understanding the interaction of the community as well as their exchange activities. This material exhibits a distinct chemical "signature" so that obsidian materials recovered in an archaeological context can be traced back to its source, hence, understanding the movement and exchange pattern of the early people (see Summerhayes 2000; Chia 2001; Bellwood 1989; Motohashi 1996; Anderson 1998)

The Archaeological Studies Program of the University of the Philippines, in coordination with the National Museum of the Philippines, conducted thorough and extensive archaeological explorations and excavations at the Huluga Open Site from October 29 to November 12, 2004 (Neri *et al* 2004). A number of obsidian materials were recovered from the said site. Some were used and others were waste flakes or debitage.

This paper will discuss the implications of the obsidian materials recovered from the Huluga Open Site based on the geochemical analysis conducted by the different laboratories. It will also summarize the different archaeological sites in the Philippines where obsidian materials were recovered.

The Huluga Open Site

Huluga is situated in Barangay Indahag, Cagayan de Oro City, Mindanao. It is composed of an Open Site and a Cave Site. They are both situated at the eastern bank of the Cagayan River and has a distance of 8.5 km south from the poblacion area and 200 meters north from the Huluga Cave Site. It has geographic coordinates of 124° 37′ 57" east longitude and 8° 25′ 19" north latitude and has an elevation of 30 masl.

The Huluga Open Site is bounded on the north by Barangay Macasandig, in the east by Mt. Moloypoloy, Barangay Indahag. In the south by Bukidnon Plateau, province of Bukidnon and in the west by Barangay Lumbia. The open site is part of the Indahag limestone formation. Currently, the area is scarcely vegetated due to frequent cultivation and plantation of crops.

Archaeological research in the Huluga Open Site has been conducted for the past three decades. Previous researches conducted by Cabanilla (1970), Burton (1975), Bautista (1992) and Neri (2003) yielded obsidian materials (see Neri *et al* in this volume).

Obsidian Materials Recovered in the Philippines

Obsidian materials recovered from Philippine archaeological sites are scarce when compared with other artifacts such as chert and andesite (Figure 1). H. Otley Beyer (1947) made a compilation of archaeological finds and sites from the different islands in the Philippines and recorded obsidian materials in the Luzon area only. During his archaeological explorations from 1926-1941, Beyer found obsidian in Rizal, Cavite, Batangas, and Bulacan Provinces. Others were just presented to him by his colleagues with provenance from Ilocos Norte and Laguna Provinces.

In Rizal Province, Beyer (1947) recovered obsidian from different areas which he divided into different districts. The first was the Novaliches-Marilao District, where he recovered obsidian and flint microliths and dated this to the Mesolithic Era. In the Lake District, he recovered the same lithic materials. The Central District and Special Sites were divided by Beyer into subdistricts such as San Juan River Valley, Pasig-Tagig, Marikina-Puray, Special Santa Ana Site and Special Manila Site. San Juan River Valley and Pasig-Tagig Subdistricts yielded obsidian materials associated with flint flakes, stone adzes, chisels, and tektites. Beyer (1947) believed that these materials belong to the Late Neolithic Period.

In the province of Cavite, Beyer (1947) recovered obsidian and flint microliths in plowed areas particularly along the main road to Tagaytay and nearby Indang area. In the province of Bulacan, particularly in Pugad-Baboy and Maysan areas, he found a concentration of natural tektites associated with Mesolithic obsidian and flint microliths.

The province of Batangas was considered "to be the most important archaeological area yet discovered in the Philippines, and, as regards its uniquely rich Late Neolithic remains, one of the most remarkable Late Stone-

Age sites found anywhere in the world" (Beyer 1947:243). In 1934, Beyer made an exploration in Lipa particularly in Balite Barrio, where he recovered 25 pieces of flaked obsidian implements.

Ronquillo and Ogawa (1996) also undertook archaeological explorations and conducted systematic excavations in the municipalities of Calatagan and Lian in Batangas Province. They identified six important archaeological sites. From the six sites only two sites yielded obsidian materials particularly in the De los Reyes Property I and II Sites located in Sitio Dayap, Barangay Tanagan, southeast from the town proper of Calatagan. In De los Reyes Property I, earthenware sherds, four types of beads, net weights, animal remains and lithic materials such as quartz, vesicular basalt and andesite and obsidian flakes were recovered. Artifacts, ecofacts and archaeological features provided information that the area was utilized for habitation. "This is deemed significant since all sites worked and reported on at Calatagan were burial areas and no actual habitation sites have been documented to date" (Ronquillo and Ogawa 1996:142). The De los Reyes Property II is located 800 meters southeast of the De los Reyes Property I. The area was heavily planted with corn and the archaeological materials recovered were obsidian flakes, earthenware sherds, celadon sherds, blue/white porcelain sherds, seeds, bone fragments, and animal teeth remains.

Obsidian flakes were also recovered by Angel Bautista (1995) when he excavated the Ulilang Bundoc Site in Sitio Dayap, Barangay Tanagan, Calatagan, Batangas. Materials recovered include human skeletal remains (adult and young), stone adzes, stone flakes, and beads. No tradeware ceramics were found.

De la Torre (1997) also conducted archaeological exploration and systematic excavations in Ulilang Bundoc. The excavations yielded obsidian flakes associated with secondary earthenware burial jars. Other materials recovered from the jars, aside from the disarticulated skeletal remains, were beads, polished stone adzes, and edible shells. The associated cultural materials indicate the site to be a Late Metal Age Period (500 BC - AD 500).

Other provinces in Luzon which also yielded obsidian materials, but were not personally explored by Beyer, are Ilocos Norte and Laguna. Obsidian

microliths were sent to Beyer by a local geologist who claimed it was found near Pasuquin, Ilocos Norte. Beyer suggested that "the area should be further explored, as no other obsidian implement has yet been reliably reported north of Bulakan Province" (Beyer 1947:215). In 1945, a Dutch archaeologist, H.R. Van Heekeren, found 25 to 30 pieces of obsidian flakes and flint semi-microliths in the foothill of Mt. Makiling, Laguna Province. This site was noted also by Beyer. Scott (1968) also reported obsidian microliths from Bulacan Province to the Bicol Region. Scott (1968) and Fox (1959) said that the only possible source of obsidian is located at Mount Banahaw, Central Luzon. Scott (1968:23) also claimed that "if indeed, only this one source, this wide distribution bespeaks a considerable commercial mobility among Mesolithic Filipinos."

In Laguna Province, particularly in Pila and Talim Island, obsidian flakes were recovered *in situ* (Fernandez and Rogel 1968). They believe that these materials date back to the Pleistocene Epoch. According to Beyer, the source of these material came from Mt. Banahaw in Laguna.

Obsidian flakes were also recovered in context in the rockshelter of the Ille limestone tower in the valley of Dewil, New Ibajay, El Nido, Palawan, Luzon (Paz and Ronquillo 2004). This excavation is part of the palaeohistoric research project conducted by the Archaeological Studies Program (ASP). These flakes were recovered 180 – 190 cm from the surface located at the "treasure hunters' pit" and were associated with other lithic flaked materials. These obsidian flakes are believe to date to the Palaeolithic Period that goes beyond 10,000 BP.

Obsidian materials have earlier been recovered in Mindanao. Archaeological surveys and excavations were conducted by the South East Asian Institute of Culture and Environment (SEA-ICE) in Bukidnon Province in 1995. In compliance with the requirements for the Environmental Impact Assessment, agreements were entered to conduct both archaeological and ethnographic assessments for the proposed Pulangi V Hydroelectric Project (SEA-ICE 1995). Eleven sites were systematically explored and excavated; two yielded obsidian materials. The sites were in Barangays Sanipon and Bukang Liwayway.

The archaeological survey at Barangay Sanipon, Kibawe Municipality, was conducted at the floodplain area of Pulangi River (SEA-ICE 1995). A variety of cultural materials were recovered. These include obsidian flakes, chert flakes, Chinese tradeware ceramics, earthenware sherds and contemporary materials were likewise recovered such as rusted nails and other metal objects. Aside from the archaeological explorations they also excavated three test pits which measured 1 x 1 meter square. SEA-ICE also made an archaeological exploration at the left bank of the Pulangi River located in Barangay Bukang Liwayway in the municipality of Kibawe, Bukidnon. Surface finds recovered were obsidian flakes, chert flakes, sherds of ceramic tradeware and other contemporary materials such as rusted metal objects among others.

Another obsidian-rich archaeological site in Mindanao is Bungiao Rockshelter, barrio of Bungiao, Manicahan Municipality, Zamboanga (Coutts and Wesson 1980; Spoehr 1973). Seven obsidian flakes were recovered both outside and inside the rockshelter. These obsidian flakes vary from circular flakes (14mm to 18 mm in diameter and from 1mm to 4 mm thick) to irregular shaped flakes (19mm to 29mm long and 2 mm to 8 mm thick). Obsidian flakes collected were unretouched and possessed sharp edges for scraping and cutting purposes. Spoehr (1973:77) believed that the rock shelter "was first used at a time somewhere prior to the introduction of trade ceramics, though how much earlier cannot be determined." In the same province, an obsidian flake was also recovered in Sanga Sanga Rockshelter (Coutts and Wesson 1980; Spoehr 1973). The flake measures 20 mm in length and 1 mm in thickness with no retouching at the edge.

Sourcing of Obsidian at the Huluga Open Site

The obsidian materials recovered from the Huluga Open Site is important for the archaeology of Mindanao. To date, there are only three archaeological sites in Mindanao where obsidian has been recovered; by the Pulangi River in Kibawe, at Bukidnon Province, Bungiao Rockshelter, Zamboanga Province, and at the Huluga Open Site, Cagayan de Oro City,

Misamis Oriental Province. The potential of Huluga as an important archaeological site for obsidian-sourcing studies cannot be underestimated.

The obsidians from the Huluga Open Site were chemically analyzed using X-Ray Fluorescence Spectroscopy (XRF) and Proton Induced X-Ray Emission/Proton Induced Gamma-Ray Emission (PIXE/PIGME) at the Northwest Research Obsidian Studies Laboratory in Corvallis, Oregon and at the Australian Atomic Research Establishment, Lucas Heights Research Laboratories in Sutherland, Australia, respectively (Neri 2003).

Based on the results of the chemical analyses conducted at the above laboratories, the chemical "signatures" are very distinctive in their chemical range, which strongly indicate their origin as coming from a single source. The trace chemical elements generated from the Huluga Open Site obsidian materials were compared to known obsidian finds whose sources are in Luzon, the Pacific and other neighboring areas. The obsidian finds from the Huluga Open Site did not fit any of the known obsidian sources. To date, the source of the obsidian finds recovered from the Huluga Open Site is unknown.

The principle of geochemical sourcing of the different volcanoes in Mindanao was used, as a proxy data set, to further the search for possible obsidian sources. The differences in the elemental values of Rubidium (Rb) and Strontium (Sr) of the different volcanoes in Mindanao and in the chemical elemental values of the obsidians from the Huluga Open Site manifest that the obsidians from the Huluga area were unlikely to be byproducts of the different volcanoes in Mindanao. It is improbable that the volcanoes in Mindanao produced the Huluga-type of obsidian, hence, negating the idea that the obsidian finds from the Huluga Open Site were of local origin, locally available and/or quarried. The Visayas area is likewise the least possible source of the Huluga Open Site obsidians due to the absence of sources and also from data in the archaeological records.

Implications of the Obsidian from the Huluga Open Site

Based on the geochemical analysis conducted by the said laboratories, the obsidian materials recovered from the Huluga Open Site were acquired

through external exchange. Direct exchange could have occurred between a source community outside the islands of the Philippines with the people then living in Huluga. The obsidian raw materials were possibly brought directly to Huluga as seen in the presence of the obsidian cortex. The primary reduction was done on the cortex using the simple percussion technique.

Before the coming of the Spaniards, early people were already involved in material exchange with neighboring communities outside the Philippines. Huluga possibly belongs to the cultural diversity and engaged in social interaction in the past. The presence of obsidian at the Huluga Open Site indicates the possibility that people already knew the value of obsidian as a sharp and usable cutting tool and considered this glassy material as valuable commodities during those times.

The method of obsidian sourcing could really be of great help in understanding the provenance of the obsidian materials recovered from known archaeological context, hence, gaining information about the mobility and movement of early people and how they interacted with each other. Obsidian finds can also serve as indicators of how the materials may have been acquired and/or transported, and as potential "markers" that may help us infer ancient activities in the past. The primary study of obsidian sourcing in the Philippines, particularly at the Huluga Open Site, may help us understand how early Filipinos migrated from one place to the other. Using obsidian as a "marker" we may be able to reconstruct the ancient routes of our early ancestors. This will also help us make inferences about their social interaction within their community and how they related with communities outside their own.

In general, sourcing of obsidian is widely used in the Pacific, America, and in the Mediterranean. Obsidian plays a vital role in reconstructing the movement of early people. It is a potential indicator of how ancient people conducted exchange in the past. Based on geochemical analysis, we may be able to reconstruct the possible trade route and how they interacted with the source community. This has a great impact on the archaeology of Southeast Asia, especially since obsidian sources are very scanty, and can easily be pointed or sourced from its origin.

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Abstract

Obsidian sourcing has great potential for providing information about mobility and exchange patterns in ancient times. The Huluga Open Site produced a considerable amount of obsidian artifacts and they were subsequently analyzed through X-ray Flourescence Spectroscopy (XRF) and Proton Induced X-ray Emmission/Proton Induced Gamma-ray Emmision (PIXE/PIGME). The chemical signature of the Huluga obsidian does not fit any known obsidian sources in the Philippines. It is therefore hypothesized that the obsidian materials from the Huluga Open Site were acquired through exchange with a source community outside of the Philippines.

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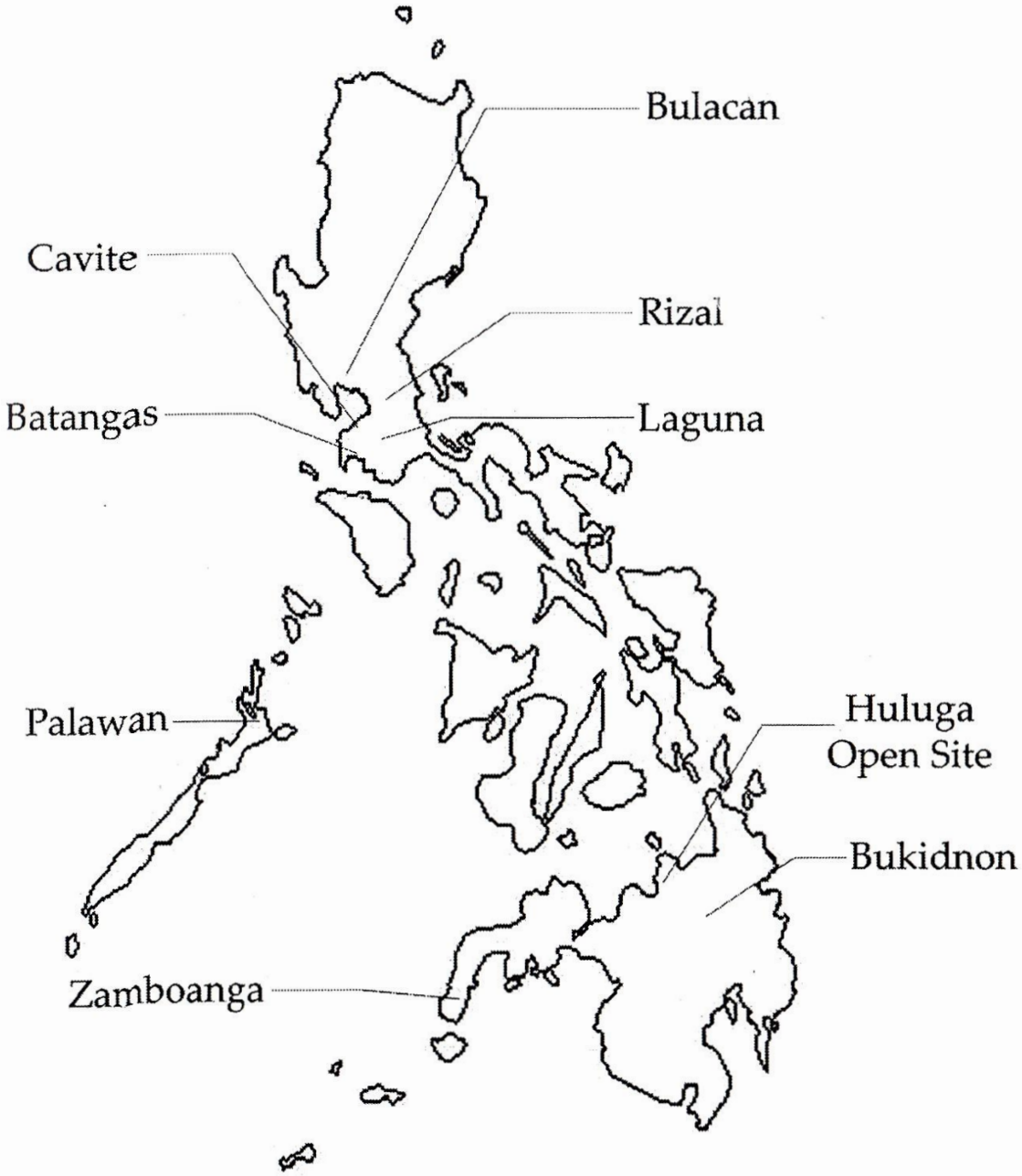

Figure 1

Map of the Philippines showing the different areas where obsidian materials were recovered from an archaeological context.