

## 台灣鐵器時代早期玻璃珠的區域與時間分佈

王冠文<sup>1</sup>、飯塚義之<sup>2</sup>、謝易恭<sup>3</sup>、Caroline Jackson<sup>4</sup>

<sup>1</sup> 中央研究院歷史語言研究所 <sup>2</sup> 中央研究院地球科學研究所 <sup>3</sup> 國立清華大學生醫  
工程與環境科學系 <sup>4</sup> 英國雪菲爾大學考古系

Email: [kwn.wang@gmail.com](mailto:kwn.wang@gmail.com)

進入鐵器時代後，台灣的考古遺址開始出現許多玻璃珠。這些珠子大多是單色珠，直徑約 1mm。他們的出現引發了許多討論，特別是關於他們與東南亞的關聯性，以及當時玻璃珠在台灣島內的交易的議題。因此，此研究透過分析這些鐵器時代早期出土的玻璃珠的異同，討論這些珠子與環南海交易圈的關係，以及所反映的台灣島內的玻璃珠交易與互動。

此研究分析了 5 個遺址的玻璃珠樣本，包含淇武蘭下文化層、舊香蘭、龜山、道爺以及五間厝，此外，西寮遺址和十三行遺址已發表的資料，也將納入討論。除了形制分析之外，也使用了 SEM-EDS、EPMA 以及 LA-ICP-MS 進行科學分析。這些遺址涵蓋了廣大的地理區域，以及約西元一千紀左右的年代範圍。

研究結果顯示玻璃珠的形制或化學成份都存在區域或年代的差異。由化學成份來看，礦物鈉鋁玻璃和植物灰玻璃是最常見的兩種化學成份，整體而言，比較早期的遺址(如：舊香蘭、道爺)的礦物鈉鋁玻璃的比例較高，比較晚期的遺址(如：西寮、淇武蘭)的植物灰玻璃的比例比較高。這個結果與環南海一帶的玻璃化學成份的年代趨勢是相符的：在西元一千紀早期，主要是礦物鈉鋁玻璃，在晚期則主要是植物灰玻璃。然而，微結構分析的結果，卻顯示不同遺址的玻璃珠來源可能不盡相同，特別是此次分析的台灣東南部的玻璃珠樣本。

研究結果也顯示，在台灣北部與東北部的玻璃珠，顏色分布與形制有明顯的不同，特別是其中一類有橘色玻璃外皮的珠子(坯體為玻璃或陶土)，目前僅在這個區域發現，並且這個地區的玻璃珠顏色以橘色和藍色為主。在東南部和南部的遺址，玻璃珠的顏色比較多元，包含紅、橘、黃、綠、藍等，珠子的外形比較圓。在西南部的遺址，珠子的邊角比較明顯，而顏色分布隨著年代有所差別，這些差別可能同時也反映了不同年代之間，玻璃珠顏色與化學成份存在一定的關聯性。

整體而言，這些結果顯示在西元一千紀時，台灣鐵器時代的玻璃珠來源與環南海交易圈有密切的關係。但是，此次分析所見的區域性分布，可能也說明當時台灣島內並沒有頻繁且大區域的玻璃珠交易。這可能進一步顯示當時台灣島內以及與環南海之間的多尺度的區域互動，同時也為不同區域與社會之間的經濟與社會政治互動的研究，提供更多的研究空間。

# **The regional and temporal distribution of glass beads in early Iron Age Taiwan**

Kuan-Wen Wang<sup>1</sup>, Yoshiyuki Iizuka<sup>2</sup>, Yi-Kong Hsieh<sup>3</sup> and Caroline Jackson<sup>4</sup>

<sup>1</sup>Institute of Philology and History, Academia Sinica, Taipei, Taiwan

<sup>2</sup> Institute of Earth Sciences, Academia Sinica, Taipei, Taiwan

<sup>3</sup> Department of Biomedical Engineering and Environmental Sciences, NTHU, Hsinchu, Taiwan

<sup>4</sup> Department of Archaeology, University of Sheffield, Sheffield, UK

During the turn of the Common Era, the early Iron Age Taiwan witnessed the emergence of glass beads in archaeological record. These beads are mostly monochrome, with a size of around 1 mm in diameter. The presence of these tiny beads has raised the discussion in terms of their connections to Southeast Asia and the exchanges in Taiwan. This research therefore aims to understand the differences and similarities of glass beads in early Iron Age Taiwan and to investigate the exchange within Taiwan and the relationship to the South China Sea network.

This research analysed glass beads from five Iron Age sites, Kiwulan, Jiuxianglan, Guishan, Daoye and Wujiancuo in Taiwan, and the published data from two sites Shisanhang and Xiliao were also included for comparison. This covers a wide geographic range of northern, northeastern, southeastern, southern and southwestern Taiwan, and a chronology spanning over the 1<sup>st</sup> millennium AD. Typological studies were firstly carried out, followed by SEM-EDS, EPMA and LA-ICP-MS to understand the chemical composition and microstructure.

The results have revealed the temporal and regional distribution of glass beads, in terms of both typology and chemical composition, in Taiwan in the 1<sup>st</sup> millennium AD. m-Na-Al glass and v-Na-Ca glass (plant ash glass) are the two common chemical groups. In general, higher proportion of m-Na-Al glass was found in early dating site such as Jiuxianglan and Daoye, and an increasing proportion of v-Na-Ca glass is seen in later sites such as Xiliao and Kiwulan. This result echo the temporal transition seen in the South China Sea network, with the dominance of m-Na-Al glass in early 1<sup>st</sup> millennium AD and the v-Na-Ca glass in late 1<sup>st</sup> millennium AD. However, microstructural investigation of the m-Na-Al glass has further revealed that the glass beads might not be imported from a single source, in particular those from southeastern Taiwan.

It is noted that the colour and typology of glass beads from northern and northeastern Taiwan show distinct differences. In particular, a type of bead with

orange surface and clay/glass-made body is only found in northern and northeastern Taiwan, and the common colours of glass bead are orange and blue in this region. Glass beads from southern and southeastern Taiwan display a diverse range of colour including red, orange, yellow, green and blue, with a more rounded shape. Beads from southwestern Taiwan exhibit a more tapered edge, and a differentiated colour distribution between sites, possibly associated with the chronological transition of chemical composition mentioned above.

Taken together, these results suggest that the import of glass beads in Taiwan in the 1<sup>st</sup> millennium AD is highly associated with the South China Sea network. However, the regional differences seen in the chemical composition and typology do not show intensive bead exchange between different regions in Taiwan. This suggests a multi-scalar interaction within Taiwan and between Taiwan and the South China Sea network, and highlights further research potential of economic and socio-political interaction between regions and societies.