

A late prehistoric copper production in central Laos: The Vilabouly complex -technological reconstruction and exchanges

Mélissa Cadet, Viengkeo Souksavatdy, Thonglith Luangkhoth, Nigel Chang, Paolo Piccardo, Justine Vernet, Philippe Dillmann, Thomas Pryce

▶ **To cite this version:**

Mélissa Cadet, Viengkeo Souksavatdy, Thonglith Luangkhoth, Nigel Chang, Paolo Piccardo, et al.. A late prehistoric copper production in central Laos: The Vilabouly complex -technological reconstruction and exchanges. Archaeometallurgy in Europe 2019, Jun 2019, Miskolc, Hungary. cea-02328253

HAL Id: cea-02328253
https://cea.hal.science/cea-02328253

Submitted on 23 Oct 2019

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

A LATE PREHISTORIC COPPER PRODUCTION IN CENTRAL LAOS: THE VILABOULY COMPLEX – TECHNOLOGICAL RECONSTRUCTION AND EXCHANGES

MÉLISSA CADET[1,2,a], VIENGKEO SOUKSAVATDY[3,b], THONGLITH LUANGKHOTH[3,b], NIGEL CHANG[4,c], PAOLO PICCARDO[5,d], JUSTINE VERNET[5,d], PHILIPPE DILLMANN[1,a], THOMAS OLIVER PRYCE[1,2,a]

[1]LAPA-IRAMAT, NIMBE, CEA, CNRS, Paris-Saclay, Gif-sur-Yvette, France, [2]UMR 7055 Prétech, MAE, CNRS, Université de Paris-Nanterre, Paris X, France, [3]Department of Museums, Historic Buildings and Archaeology, Ministry of information and Culture, Vientiane, Lao Democratic People's Republic, [4]Department of Anthropology, Archaeology and Sociology, James Cook University, Townsville QLD 4811, Australia, [5]Chemical and Industrial Department, Genova University, 16146 Genova, Italy

[a]melissa.cadet@cea.fr/ phillippe.dillmann@cea .fr / topryce@gmail.com, [b]viengkaev@hotmail.com, [c]nigel.chang@gmail.com, [d]paolo.piccardo@gmail.com

Evolving from purely 'origins'-based research, significant advances have been made in our understanding of early Southeast Asian metallurgy in the last decade, partly through new excavations of metal production sites, and partly through the application of established provenance methodologies to assemblages covering almost two millennia. On the fieldwork front, ancient copper mining and smelting sites at the Vilabouly Complex (VC, formerly known as Sepon) in Savannakhet Province, Central Laos, have been excavated by a Lao-Australian team led by Dr. Nigel Chang and Viengkeo Souksavatdy since 2008, in conjunction with the owners of the LXML concession. The VC, with a radiocarbon sequence from the early Bronze Age (c. 1000 BC) to the late Iron Age (c. 500 AD), is one of only three prehistoric copper production sites physically known in Southeast Asia, the other two being in Thailand. The VC lead isotope signature has been identified in the copper exchange networks across Southeast Asia, involving metal consumers from Myanmar, Thailand, Cambodia, and potentially as far as Indonesia.

The Vilabouly Complex displayed evidence of a copper production with artefacts linked to the smelting of copper (ores, slags, crucibles, molds, and scorched clay) along with copper and copper-alloyed artefacts (ingots, drums, axes etc.). In conjunction with ongoing studies of production materials, analyses of the different types of metal artefacts (OM, SEM-EDS, Raman Spectroscopy, pXRF) permit the reconstitution of the copper production techniques involved at the VC. One of the main questions to resolve is the type of ore used during smelting. According to local geological evidence, oxidic ores are to be mainly expected but recent results have shown the presence of matte in some types of artefacts. Ergo, based upon the metal artefacts, do we have real matte smelting or an intentional/unintentional co-smelting? These observations can then be compared to those previously proposed for early Thai copper production to see if any correspondences can be deduced.

A second main objective is to understand VC copper production at the scale of regional and inter-regional metal exchange networks, with the lead isotope analysis of 59 VC metal artefacts within the scope of the Southeast Asian Lead Isotope Project. This is the first ever study of prehistoric Lao copper-alloy artefacts, and will play a significant role in developing our understanding of material and technological transmissions around Southeast Asia, and beyond.