**Notes on constructing a chronology for ornaments recovered from archaeological excavations at Kiwulan, Taiwan.**

This document provides guidance for reading spreadsheets included in the Supplementary Online Materials for our paper "Ornaments as indicators of social changes in northeastern Taiwan before and after the European colonial period". The purpose is to provide details about our methods used for assigning ornaments into one of three phases: pre-European period, 17th century European presence, and 19th century Chinese period. We have included four spreadsheets that provide detailed information about the stratigraphic data, soil color, layer depth, diagnostic artifacts, radiocarbon dates, descriptive observations for artifacts in general, judgements for assigning, and the final decision for the chronology of each excavation unit. The information assembled here was collected from the original field notes and excavation report.

**KWL\_excavation\_depth.xlsx** provides the depth in centimeters for each layer. L1 means first layer and so forth. The depth was recorded based on the sea level. Some units are recorded based on sections A, B, C, D, these are 2x2 m subunits in each 4x4 m unit.

**KWL\_soil\_color.xls provides.xlsx** provides the soil color we identified from original field notes for each layer. L1 means first layer and so forth. The color was recorded according to Mansell color chart. Some units are recorded based on sections A, B, C, D, these are 2x2 m subunits in each 4x4 m unit.

**KWL\_layer\_assign\_details.xlsx** provides detailed information of the archaeological contents of each unit that we used for assigning chronology. L1 means first layer and so forth. We listed the diagnostic items, including pipes, jars (An-ping jars), stonewares for the European period, and tiles, bricks for the Chinese period for the enclosing layer. The European period indicators are indicated with number after \* to present their frequency.

The column, “radiocarbon dates (tree rings)”, includes the layers where charcoals were collected for radiocarbon dating. The original radiocarbon dates were corrected by the original excavators using tree rings data, these are represented in the parenthesis. Some charcoals were collected from features: H represents middens and M represents burials.

The column, “stratigraphic analysis based on field note”, describes the changes in soil color and distribution of potsherds. Those two variables are highly correlated to the depth between 20 cm to -20 cm that is around 17th century.

The column, “assessment (1: excellent, 2: good, 3: fair)”, is our assessment for the overall reliability of our chronological determination of the unit.

The column, “observations on artifacts & features based on field notes”, presents our judgment of possible post-depositional issues based on the description in the original field notes.

The column, “previous studies indicating 17th layer” and “previous studies indicating 19th layer” are based on the chronology used by previous studies on Kiwulan site, Hsieh 2009 and Wang 2011.

The column, “assigning the layer indicating the start of European phase” is our judgment for the European period. First, we determined the artificial layer (mostly 10 cm) based on the higher frequency of time indicators. Second, we identified the archaeological context (normally consists of 2-3 layers) where the layer belongs to according to the description of soil color, soil texture, and the distribution of potsherds and charcoals using original strategrphic data. Third, we checked if there are radiocarbon ages associated with the context as a cross validation. Since we noted that the radiocarbon ages normally represent long time ranges, the ages are not considered if they cannot provide useful information. Fourth, we examined the original fieldwork notes to identify any post-depositional issues that might affect the deposition of time indicators to ensure an appropriate assignment. Fifth, we cross evaluated all adjacent squares to confirm a consistent, and continuous context between them. Sixth, we compared our chronology with six analytic units classified by previous studies to make a final decision.

The column, “assigning the layer indicating the start of Chinese phase” is our judgment for the Chinese period. First, we determined the layer based on the presence of time indicators. Second, we identified the complete context (normally consists of 2-3 layers) where the layer belongs to according to the description of soil color and texture. Third, we checked if there are any post-depositional issues or disturbance based on original field notes. Forth, we cross evaluated all adjacent squares to confirm a consistent, and continuous context between them. Fifth, we compared our chronology with six analytic units classified by previous studies to make a final decision.

The columns, “The start of European phase (17th)” and “The start of Chinese phase (19th)”, are our final decision for the layer that represents start of each contact period.

**KWL\_reassigned\_chronology.xlsx** provides our final assignment of three phases. L1 means first layer and so forth. Some units are recorded based on sections A, B, C, D, these are 2x2 m subunits in each 4x4 m unit.