

Toki Database V.1 (November 9th, 2016)

The *toki* database was created by Dale F. Simpson Jr. through 11 months of archaeological and geological fieldwork on Easter Island, museum research at the Padre Sebastián Englert Anthropological Museum (MAPSE), and geochemical analyses conducted at The Field Museum of Natural History (TFM). Research was made possible by the University of Queensland's (UQ) Centennial Scholarship, International Postgraduate Research Scholarship, a School of Social Science Research Bursary, and a Strategic Planning Fund to UQ's Archaeology Department.

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The database is for public use, and even more, for public update. While the database is extensive, it is not meant to be an exhaustive or complete effort to document the basalt tools of Rapa Nui. To update/contribute to the database, please email terevaka.net@gmail.com. Feel free to use the data, but please remember to cite the author accordingly:

Simpson Jr., D.F.

2016 “*Toki* database: portable X-ray fluorescence (pXRF) analysis of MAPSE's basalt artifacts – Rapa Nui” <http://www.terevaka.net/toki/>

Fieldwork was conducted on Rapa Nui during the following dates:

April – September (2014)

January – February (2015)

March – May (2015)

RNGC- NUMBER

Stands for the Rapa Nui Geochemistry Project and relates to the individual ID of MAPSE artifacts in central database.

LOCATION

The first information tab is the name of where each specimen was found in the archaeological record. The accompanied map, highlights the spatial location on the island.

BOX

This number correlates to MAPSE's general box number for artifact housing.

MAPSE

This number correlates to MAPSE's individual ID of artifacts.

INVESTIGATOR

Indicates which Rapa Nui archaeologist/investigator was responsible for recovering the item and storing it within MAPSE.

COLOR

A subjective indication to highlight general artifact color.

MAX-LENGTH

This is a metric measurement of the longest length of the artifact.

MAX-WIDTH

This metric measurement is of the widest girth of the artifact.

WEIGHT

Total metric weight of artifact.

ELEMENTAL DATA

All pXRF analysis was conducted at the Elemental Analysis Facility at TFM. Prior to pXRF analysis, all samples were scrubbed clean under hot water and placed in an ultrasonic bath with distilled water for 20 minutes and later dried for 30 minutes. Three relatively flat, homogenous points (void of phenocryst, inclusions, and decomposition) on each geological and archaeological sample were selected and noted in the specimen's documentation photo. These points were then analyzed using a top-of-the-line non-destructive ThermoFisher Scientific Niton XL3t GOLDD+ portable X-ray Fluorescence Spectrometer, equipped with a high-performance Geometrically Optimized Large Area Drift Detector (GOLDD). Per radiation safety protocol, the Niton was connected to a stationary fully-shielded benchtop test stand, where the unit was securely mounted underneath, shooting four beams upward to the specimen platform. Between days of use, we performed a Total Machine Calibration, while between every 20 samples run, we analyzed two Field Museum "in house" standards (CRB2005 and ELC001) to evaluate the pXRF's elemental readings, precision and accuracy. The XL3t GLODD+ is fitted with an Ag anode (50 kV and 200 μ A) tube and boasts an analytical range of 30 elements from magnesium (Mg) to uranium (U). However, adding a helium (He) vacuum purge allows the recognition of even lighter elements that escape older silicon drift detectors (SSD). There are three program Application Modes including alloy, plastic and bulk, where each analysis varies in: 1) the elements that are targeted and detected; 2) beam frequency; and 3) length of run time. Samples were run for 120 seconds live time per sample under the Total Geology Mode, as longer run-times offer no measurable improvement in performance. In total, we performed 459 individual analyses for 153 objects (57 archaeological and 96 geological). Elemental data was downloaded using the Niton Data Transfer (NDT) PC program through a USB cable (although it is possible for Bluetooth connection also) into Microsoft Excel for data visualization, assessment and quantification. After purging elements (n=8) that were registered under the limits of detection these are the results reported in parts per million (ppm).
