

# STOCHASI

## Quick Start Guide

*Get up and running in 5 minutes*

### What is STOCHASI?

STOCHASI simulates how artifact assemblages change over time. Upload your market supply data, set parameters, and compare simulated spectra with excavation data to estimate settlement dates.

## Getting Started

### 1 Load Your Data

Upload a Market Data Excel file via the sidebar, or check "Use Demo Data" to explore with sample Terra Sigillata data.

### 2 Set Time Period

Choose your simulation Start Year and End Year using the sliders in the sidebar.

### 3 Adjust Parameters

Set Replacement Rate (typically 5-15%) and Monte Carlo Runs (100 is usually sufficient).

### 4 Run & Explore

The simulation runs automatically. Navigate through the tabs to view results.



**Tip:** Start with Demo Data to familiarize yourself with the interface before using your own data.

# Interface Overview

## Main Tabs

Tab	Purpose	Key Features
Market Data	View supply curves	Interactive timeline, category proportions over time
Year Spectrum	Snapshot at one year	Pie chart, slider to select year, 80% confidence intervals
Simulation	Full timeline results	Mean lines with uncertainty bands, statistics
Comparison	Match with excavation	Bar charts, deviation analysis, MAE/RMSE metrics
Export	Save your work	CSV data, JSON config, PNG/SVG graphics

## Sidebar Controls

Section	Controls
Load Configuration	Import JSON settings, URL parameters
Artifact Type & Data	Preset selection, Demo Data toggle, Excel upload
Simulation Parameters	Time period, replacement rate, noise, runs, seed
Initial Distribution	Starting spectrum percentages per category
Excavation Data	Upload comparison data (optional)
Display Options	Uncertainty opacity, line width

# Key Parameters Explained

Parameter	What it does	Recommended
Replacement Rate	Annual fraction of artifacts replaced	5-15%
Noise ( $\sigma$ )	Random variation per year	1-3
Monte Carlo Runs	Simulation iterations for statistics	100-200
Random Seed	Makes results reproducible (0 = random)	0 or any integer
Settlement Mode	First year = founding inventory (no exchange)	ON for new sites

## Understanding Replacement Rate

A 10% rate means each year, 10% of the assemblage is replaced with items from the current market. Higher rates make the spectrum adapt faster to market changes.

# Data Format Requirements

## Market Supply Excel

Your Excel file should have this structure:

Year	Cat1	Cat2	Cat3	...
50	0.80	0.15	0.05	...
60	0.70	0.25	0.05	...
70	0.55	0.35	0.10	...
...	...	...	...	...



**Tip:** Values can be proportions (0-1), percentages (0-100), or raw counts. STOCHASI auto-detects and normalizes.

## Excavation Spectrum Excel

Two supported formats:

- **Type/Count format:** Column 1 = category name, Column 2 = count
- **Wide format:** Categories as headers, counts in first data row

## Typical Workflow

- Upload or select market supply data
- Set simulation period (start/end years)
- Adjust replacement rate based on site type
- Review Market Data tab to verify input
- Check Simulation tab for predicted spectra
- Upload excavation data for comparison (optional)
- Use Comparison tab to find best-fit year
- Export results (CSV, JSON, graphics)

## Comparison Analysis

When you upload excavation data, STOCHASI provides statistical measures to evaluate the fit:

Metric	Interpretation	Good Value
MAE	Average absolute difference across categories	< 5%
RMSE	Emphasizes larger deviations	< 7%
Max Deviation	Worst-fitting category	< 10%

 **Note:** Low error values suggest a good temporal match, but always consider archaeological context and sample sizes.

## Export Options

Format	Contains	Use For
CSV (Full)	Mean, P10, P90, replacement rates	Statistical analysis, spreadsheets
CSV (Simple)	Year and mean values only	Quick data sharing
JSON	All parameters + data + settings	Save/restore complete sessions
PNG	Raster graphics (72-600 DPI)	Presentations, reports
SVG	Vector graphics	Publications, scaling

 **Tip:** Use JSON export to save your complete analysis state. You can reload it later to continue exactly where you left off.

## Tips & Tricks

- **Share via URL:** Parameters are encoded in the URL - share links with colleagues
- **Edit Market Data:** Use the Market Data Editor tab to modify values directly
- **Reproducibility:** Set a non-zero Random Seed for identical results across runs
- **Uncertainty bands:** Adjust opacity slider if bands obscure the mean lines
- **Category colors:** Terra Sigillata presets use standard archaeological color codes