**Korolevo**

**P-PINI - Guide**

To obtain the P-PINI results for Layer VII at Korolevo, you need to execute the three Matlab codes associated with the P-PINI model in the correct order. These are: “*MC\_AlBe\_source\_Korolevo\_final.m*”, “*MC\_AlBe\_sink\_Korolevo\_final.m*” and “*PPINI\_analysis\_Korolevo\_final.m*”.

To run the P-PINI model, you need to download the three files listed above along with the folders “code” and “samples”. To run the P-PINI model you need to have a Matlab license. The P-PINI Matlab files associated with the Korolevo study has been tested on Matlab version R2021b.

1. **Note that the Korolevo 10Be-26Al data are located in a folder named “samples”.**
2. **Open “*MC\_AlBe\_source\_Korolevo\_final.m*”**

Enter name of output file containing simulation results. (Line 19)

Enter number of simulations. More than 1e7 simulations should rarely be necessary. (Line 20)

Enter all the parameter ranges of the source region. (Line 23-39)

Run code.

Expected run time on a normal desktop computer: 3-4 minutes.

1. **Open “*MC\_AlBe\_sink \_Korolevo\_final.m*”**

Enter name of source output file to load. (Line 20)

Enter desired name for sink output file. (Line 21)

Consider whether the sampling site has experienced primarily accumulation or erosion since the sampled unit was deposited.

If another unit is overlying the sampled unit, most likely some accumulation has taken place post-deposition.

Set “ero = 0” in the MATLAB code. (Line 25)

If no other units are present above the sampled layers, most likely the layer has been eroding since deposition.

Set “ero = 1” in the MATLAB code. (Line 25)

Enter all parameter ranges of the sink region. (Line 28-38)

Run code.

Expected run time on a normal desktop computer: 4-5 minutes.

1. **Open “*PPINI\_analysis\_Korolevo\_final*”**

Enter site name, library name and excel file name. (Lines 3-5)

Run code.

Expected run time on a normal desktop computer: 2-3 minutes.

Expected output:

Figure with measured and simulated 10Be-26Al concentrations.

Figure with distribution of accepted burial ages and accumulation rates for each individual sample.

Figure with distribution of accepted pre-burial erosion rates for each individual sample.

Figure with distribution of accepted source elevation for each individual sample.

Figure with the burial age and accumulation rate distribution for the site, i.e. based on all samples.

Your results should be displayed if parameter ranges were chosen correctly. If not:

* 1. Check the individual probability plots, did you chose the correct burial age ranges and/or accumulation/erosion ranges? Is the uncertainty of your samples realistic?
  2. Check library plot (orange on black dots). Does the distribution look correct? Does the samples concentrations fall within the simulation space? Otherwise try to rewise model inputs. Did you input with the correct units? yr or Ma, g/cm2/yr or m/yr. Check green comments in the Matlab code to see what the correct unit is.
  3. If you are still not able to produce results after *a* and *b*, consider the probability plots and library plot again. Consider if any samples are outliers are not compatible with the rest of the samples.