

# Spatial assignment of test sample

November 24, 2016

## Contents

<b>Input</b>	<b>1</b>
Isotope values of test sample . . . . .	1
<b>Output</b>	<b>1</b>
Model . . . . .	1
Map of best fitted reference sample . . . . .	2
Best fitted reference entries . . . . .	3
Testing robustness of assignment: Wilcoxon signed rank test . . . . .	3
P-values for the k nearest neighbours in Wilcoxon Test . . . . .	4
Goodness of fit of test sample: . . . . .	4

## Input

Website Identifier: T2\_6cm

## Isotope values of test sample

Table 1: Isotope values of test sample

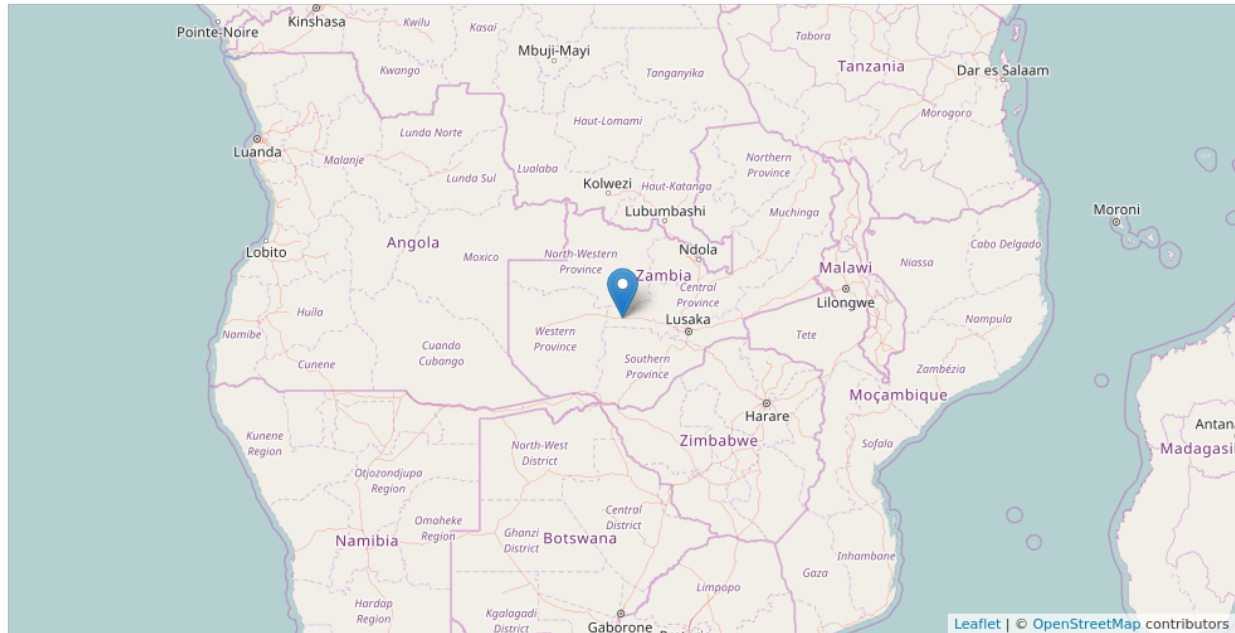
13C/12C	15N/14N	18O/16O	2H/1H	34S/32S
-19.3	6.4	19.9	-52.4	8.4

## Output

### Model

```
##
## Call:
## train.kknn(formula = fmla, data = ivory.train, kmax = 15, distance = 2, kernel = knl)
##
## Type of response variable: nominal
## Minimal misclassification: 0.3765867
## Best kernel: triangular
## Best k: 15
Classifier: country_code
```

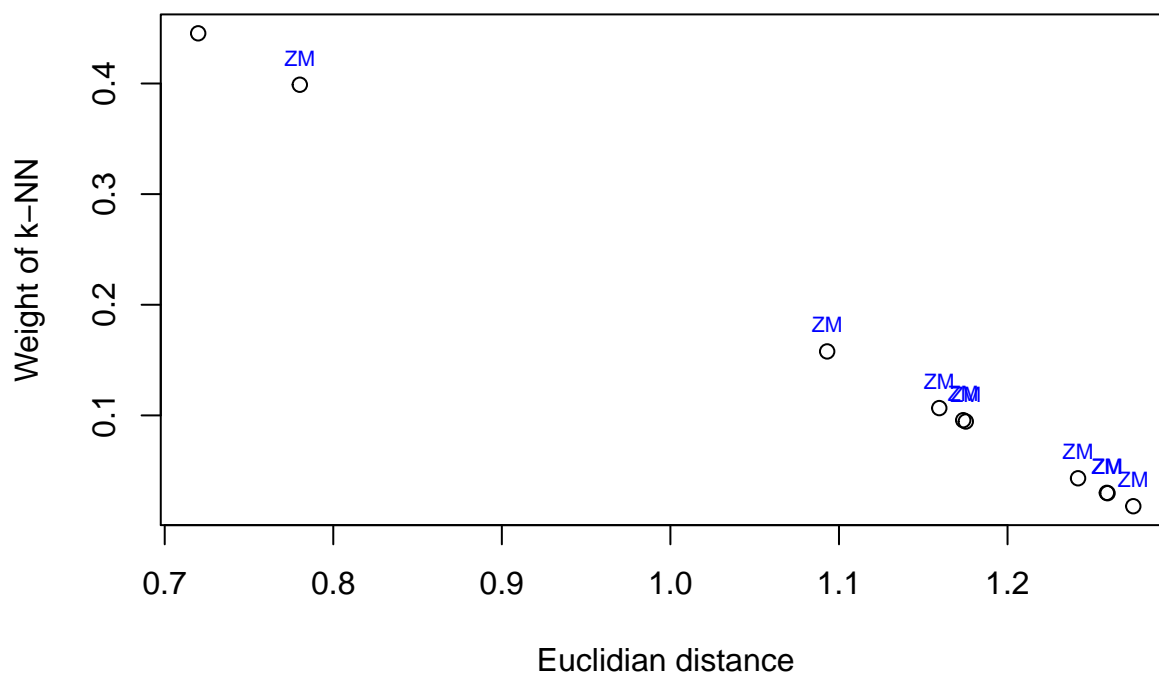
## Map of best fitted reference sample



### Best fitted reference sample:

- Site: Southern Zambia
- Country: ZM
- Region: Southern Africa
- CITES: Appendix I
- Lat: -14.972185
- Lon: 25.957587

## Assignment of test sample to nearest neighbours



### Best fitted reference entries

Table 2: Details of best fitted reference entry (row 1) and other fitted entries within best classifier

lon	lat	location	13C/12C	15N/14N	18O/16O	2H/1H	34S/32S
25.96	-14.97	Southern Zambia	-20.4	7.0	20.1	-49.2	8.5
25.96	-14.97	Southern Zambia	-20.6	7.1	19.6	-51.9	8.2
31.44	-12.12	Northeastern Zambia, near Chilonga	-20.9	6.9	18.7	-53.0	7.4
31.21	-13.62	Zambia, Luangwa River, western of Chipat	-18.7	7.5	19.3	-43.7	9.9
32.30	-11.37	Southern Zambia	-20.8	7.3	18.6	-54.2	9.6
32.10	-12.05	Southern Zambia	-19.6	7.3	18.3	-45.3	7.4
31.40	-12.24	Southern Zambia	-19.9	8.0	18.5	-48.0	7.1
25.45	-16.52	Southern Zambia	-21.3	7.1	18.8	-49.7	8.9
32.19	-11.41	Southern Zambia	-20.6	7.2	18.4	-46.4	7.3
32.09	-11.48	Southern Zambia	-19.9	7.2	17.8	-57.2	7.4

Country of prediction: ZM

### Testing robustness of assignment: Wilcoxon signed rank test

If  $p\text{-value} > 0.05$ , the test concludes that the isotope signature of the test sample is similar to the respective nearest neighbour reference sample.

### P-values for the k nearest neighbours in Wilcoxon Test

“0.003704417, 0.001906090, 0.000764607, 0.000068155, 0.000068155, 0.000040640, 0.000013100, 0.000013100, 0.000009619, 0.000000026”

### Goodness of fit of test sample:

- good fit: if  $p > 0.05$  for at least two tested nearest neighbour reference samples;
- moderate fit: if  $p > 0.05$  for at least one tested nearest neighbour reference samples;
- uncertain: if  $p > 0.05$  for none of the tested nearest neighbour reference samples.

Assumption: At least two nearest reference samples are available.

Overall goodness of fit of test sample: “**uncertain**”