

# 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:

### Isotope values of test sample

Table 1: Isotope values of test sample

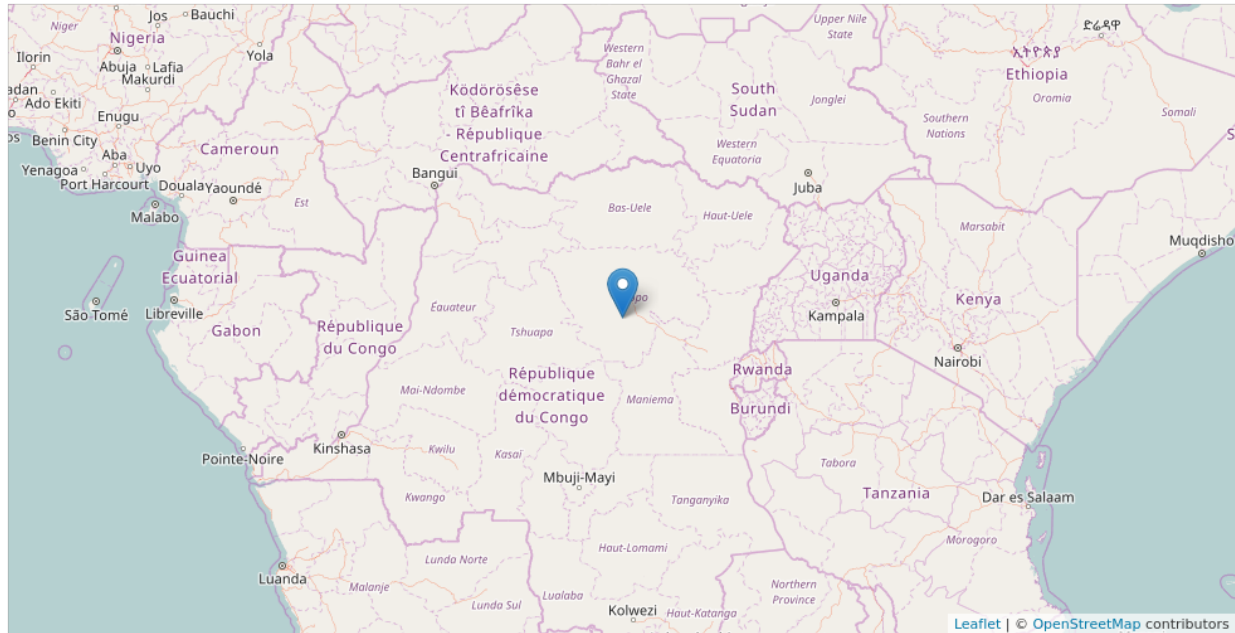
13C/12C	15N/14N	18O/16O	2H/1H	34S/32S
-24.4	10.1	18	-50.6	2.8

## 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
```

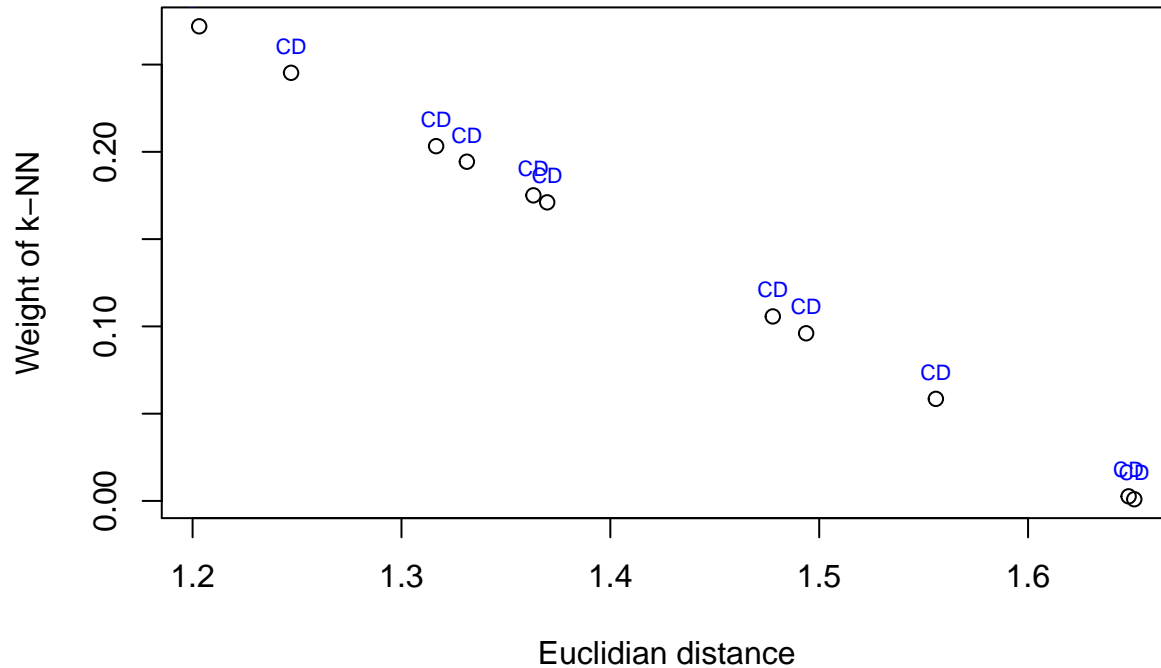
## Map of best fitted reference sample



### Best fitted reference sample:

- Site: Dem. Rep. Congo, Loyo
- Country: CD
- Region: Central Africa
- CITES: Appendix I
- Lat: -0.28
- Lon: 25.09

## 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
25.09	-0.28	Dem. Rep. Congo, Loyo	-24.6	10.7	16.8	-42.7	5.1
25.09	-0.28	Dem. Rep. Congo, Loyo	-23.9	9.2	16.8	-45.1	5.6
23.55	-1.35	Dem. Rep. Congo, Moma	-24.9	11.1	16.3	-48.5	5.6
22.90	3.89	Dem. Rep. Congo, Uele	-22.8	10.2	17.9	-39.5	3.0
23.55	-1.35	Dem. Rep. Congo, Moma	-25.6	10.8	16.9	-44.4	5.7
18.20	-1.55	Dem. Rep. Congo, Leopold ii meer	-24.3	11.2	16.0	-43.3	4.0
21.45	-1.00	Dem. Rep. Congo, Itoko	-24.2	10.2	16.9	-42.9	6.8
30.03	1.56	Dem. Rep. Congo, Mongbwalu	-23.3	9.0	16.9	-38.4	2.6
29.51	1.32	Dem. Rep. Congo, Irumu	-24.5	10.1	16.3	-39.9	5.7
26.23	1.52	Dem. Rep. Congo, Panga	-24.6	12.1	17.1	-39.9	5.2
29.29	0.29	Dem. Rep. Congo, Beni	-24.7	11.4	17.1	-37.3	5.3

Country of prediction: CD

### 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

“0.015683593, 0.000001160, 0.000000052, 0.000000026, 0.000000026, 0.000000026, 0.000000026, 0.000000026, 0.000000026, 0.000000026, 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**”