

# Spatial assignment of test sample

December 10, 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: 111

### Isotope values of test sample

Table 1: Isotope values of test sample

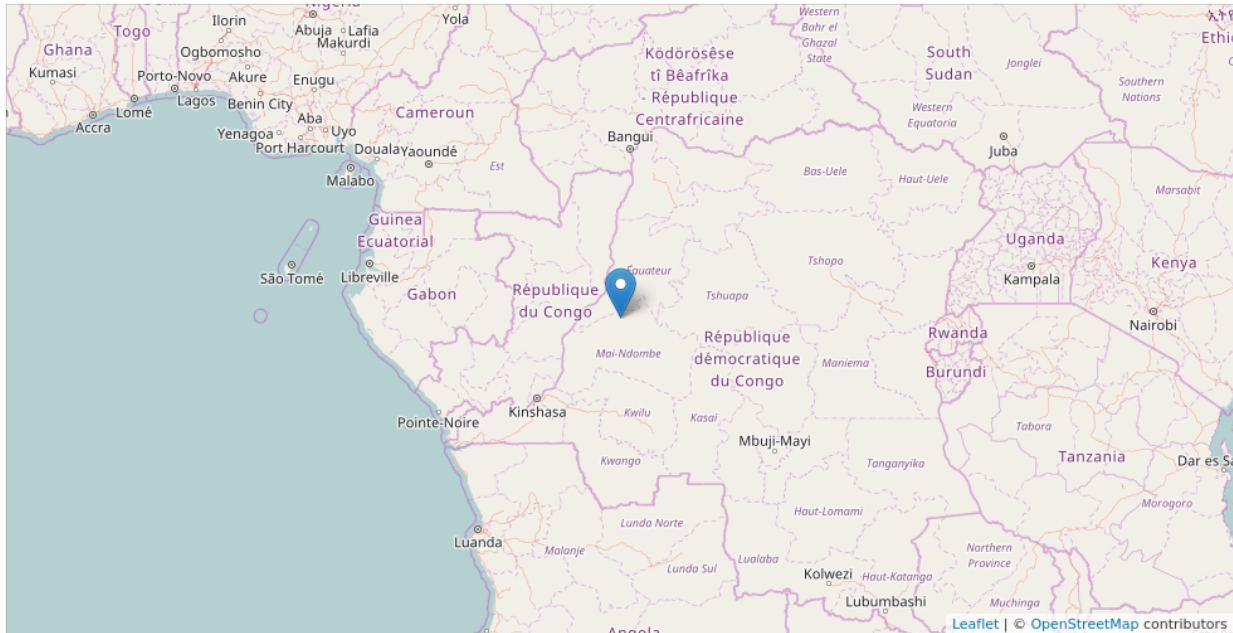
13C/12C	15N/14N	18O/16O	2H/1H	34S/32S
-26.4	11.2	17.6	-43.8	8.7

## 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
```

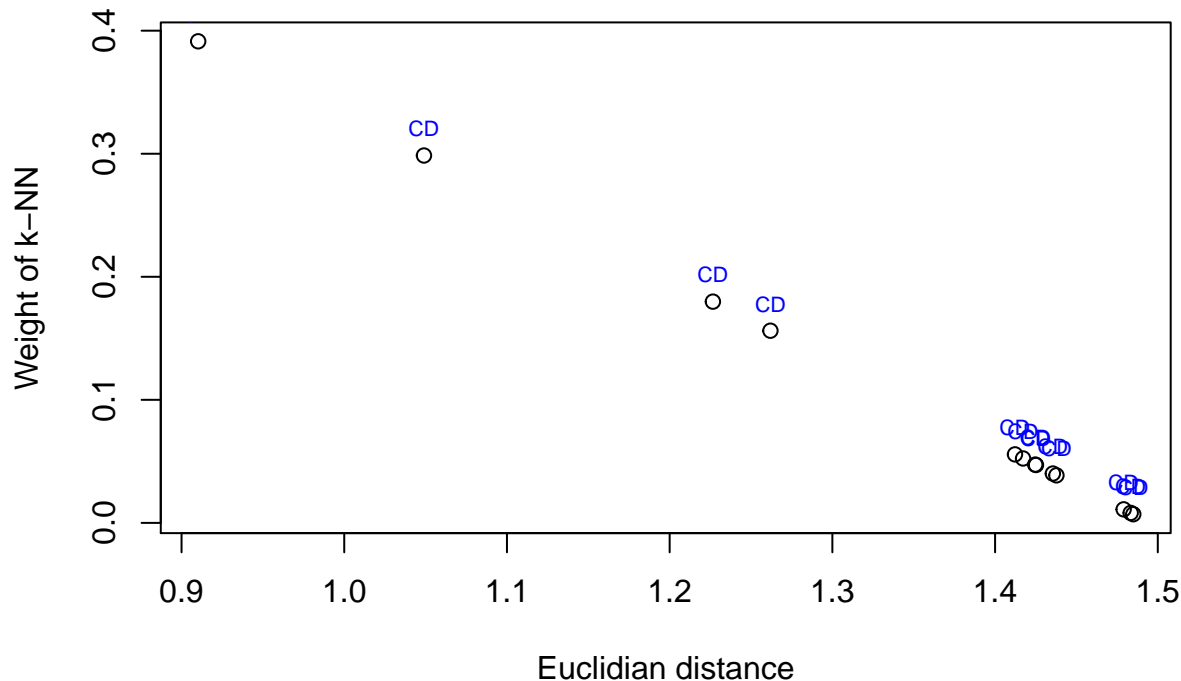
## Map of best fitted reference sample



### Best fitted reference sample:

- Site: Dem. Rep. Congo, Leopold ii meer
- Country: CD
- Region: Central Africa
- CITES: Appendix I
- Lat: -1.55
- Lon: 18.2

## 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
18.20	-1.55	Dem. Rep. Congo, Leopold ii meer	-25.9	10.9	17.1	-39.7	6.2
23.55	-1.35	Dem. Rep. Congo, Moma	-25.6	10.8	16.9	-44.4	5.7
23.20	-1.00	Dem. Rep. Congo, Tshuapa	-26.4	12.1	16.2	-46.3	5.7
14.57	-0.08	Dem. Rep. Congo	-24.9	10.3	16.4	-49.5	10.0
21.45	-1.00	Dem. Rep. Congo, Itoko	-24.2	10.2	16.9	-42.9	6.8
17.11	-1.10	Dem. Rep. Congo, Lukolela	-24.8	10.5	15.4	-43.4	8.4
13.02	-1.43	Dem. Rep. Congo, Itoko	-24.2	10.4	18.1	-38.4	7.0
23.55	-1.35	Dem. Rep. Congo, Moma	-24.9	11.1	16.3	-48.5	5.6
27.18	2.25	Dem. Rep. Congo, Medje	-24.2	11.9	17.4	-37.8	6.8
14.47	-0.01	Dem. Rep. Congo	-25.0	10.2	15.8	-49.9	10.1
27.37	1.40	Dem. Rep. Congo, Nepoko	-24.3	10.5	18.0	-34.9	7.4
29.29	0.29	Dem. Rep. Congo, Beni	-24.7	11.4	17.1	-37.3	5.3
25.09	-0.28	Dem. Rep. Congo, Loyo	-24.6	10.7	16.8	-42.7	5.1

Country of prediction: CD

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

If  $p$ -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

“0.006833116, 0.002675546, 0.000925286, 0.000177079, 0.000023492, 0.000017612, 0.000013100, 0.000007014, 0.000003584, 0.000000309, 0.000000181, 0.000000103, 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**”