

# Spatial assignment of test sample

December 13, 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: 214

### Isotope values of test sample

Table 1: Isotope values of test sample

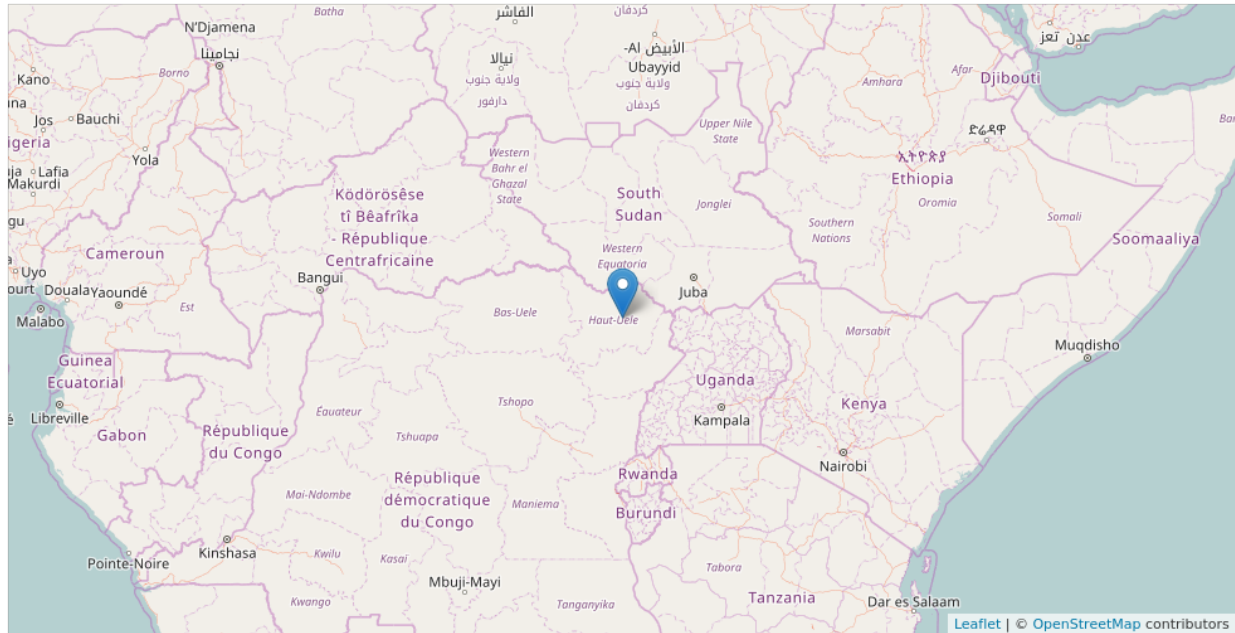
13C/12C	15N/14N	18O/16O	2H/1H	34S/32S
-18.9	7.6	17.3	-28.3	8

## 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
```

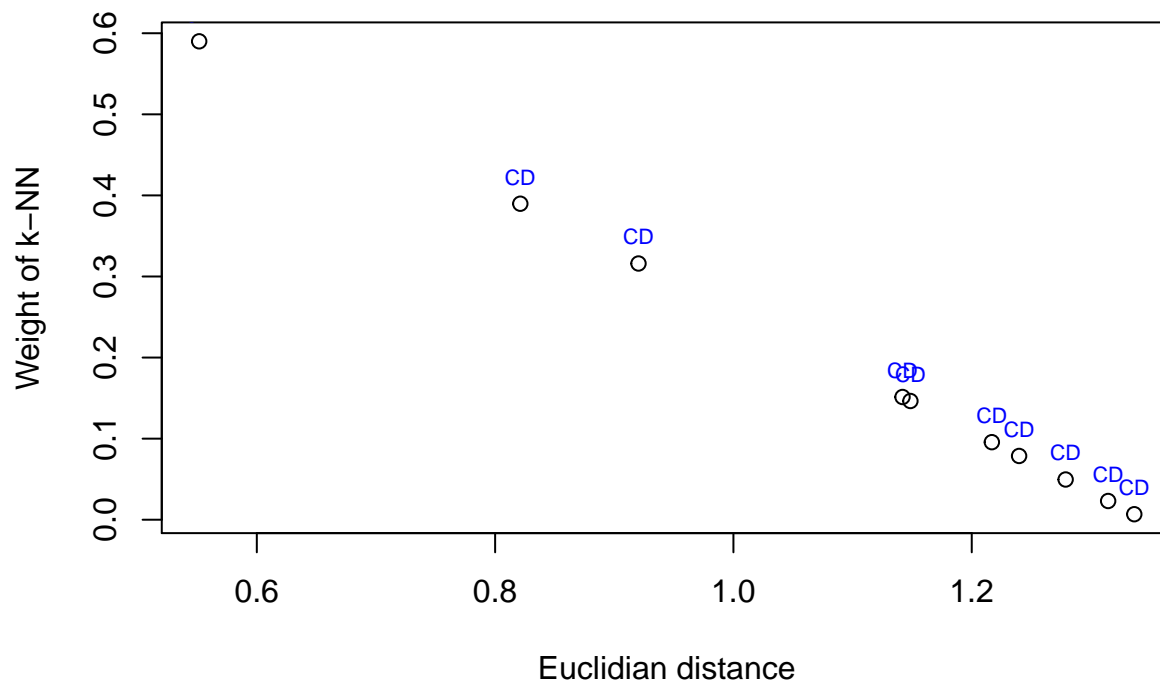
## Map of best fitted reference sample



### Best fitted reference sample:

- Site: Dem. Rep. Congo, Gangala na Bodio
- Country: CD
- Region: Central Africa
- CITES: Appendix I
- Lat: 3.4
- Lon: 29.09

## 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
29.09	3.40	Dem. Rep. Congo, Gangala na Bodio	-19.7	8.2	17.5	-29.9	7.7
29.12	3.71	Dem. Rep. Congo, Gangala	-20.1	7.5	17.0	-33.0	7.1
29.50	0.45	Dem. Rep. Congo, Beni	-18.2	8.6	17.4	-34.3	6.7
27.20	-2.40	Dem. Rep. Congo, Shabunda terr	-20.0	9.5	16.9	-27.7	8.4
23.05	-7.19	Dem. Rep. Congo, Lula riv	-20.9	6.9	17.8	-30.6	7.7
25.26	3.40	Dem. Rep. Congo, Api	-20.2	8.1	17.4	-33.6	5.1
19.52	4.14	Dem. Rep. Congo, Bosobolo	-20.0	7.9	17.5	-38.8	6.4
23.00	4.00	Dem. Rep. Congo, Bas Uele	-20.8	7.9	18.0	-35.6	8.8
29.09	3.40	Dem. Rep. Congo, Gangala na Bodio	-20.6	8.2	16.7	-29.0	5.0
29.31	3.45	Dem. Rep. Congo, Dungu	-20.5	7.9	18.3	-37.8	8.7

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

“0.3314047, 0.0120212, 0.0091146, 0.0009253, 0.0006293, 0.0002757, 0.0001112, 0.0000310, 0.0000176, 0.0000096”

### 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: “**moderate fit**”