

# Spatial assignment of test sample

December 01, 2016

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## Input

Website Identifier: 005p562-2

## Isotope values of test sample

Table 1: Isotope values of test sample

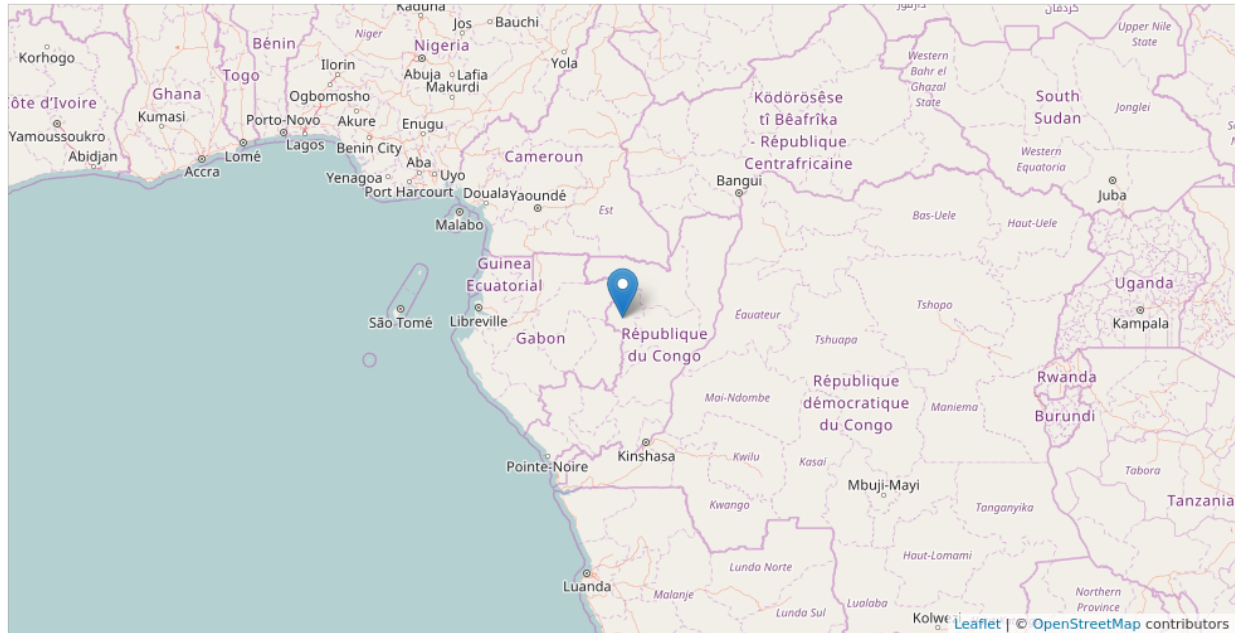
| 13C/12C | 15N/14N | 18O/16O | 2H/1H | 34S/32S |
|---------|---------|---------|-------|---------|
| -26.1   | 12.2    | 13.7    | -49.4 | 11.2    |

## 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
```

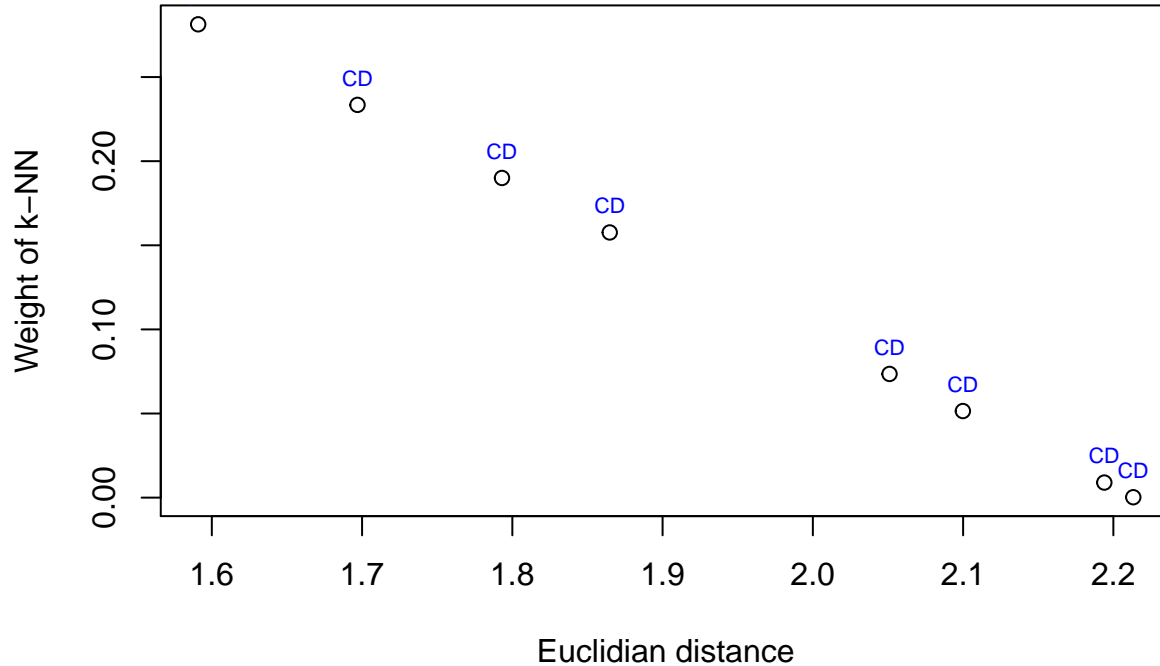
## Map of best fitted reference sample



### Best fitted reference sample:

- Site: Dem. Rep. Congo
- Country: CD
- Region: Central Africa
- CITES: Appendix I
- Lat: -0.006244
- Lon: 14.471917

## 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 |
|-------|-------|---------------------------|---------|---------|---------|-------|---------|
| 14.47 | -0.01 | Dem. Rep. Congo           | -25.0   | 10.2    | 15.8    | -49.9 | 10.1    |
| 17.11 | -1.10 | Dem. Rep. Congo, Lukolela | -24.8   | 10.5    | 15.4    | -43.4 | 8.4     |
| 14.57 | -0.08 | Dem. Rep. Congo           | -24.9   | 10.3    | 16.4    | -49.5 | 10.0    |
| 21.31 | -2.34 | Dem. Rep. Congo           | -27.1   | 11.2    | 13.7    | -62.0 | 6.9     |
| 23.20 | -1.00 | Dem. Rep. Congo, Tshuapa  | -26.4   | 12.1    | 16.2    | -46.3 | 5.7     |
| 16.20 | -2.06 | Dem. Rep. Congo, Mongende | -25.0   | 11.4    | 15.2    | -49.2 | 4.9     |
| 29.50 | 0.45  | Dem. Rep. Congo, Beni     | -23.5   | 10.9    | 15.9    | -43.2 | 7.7     |
| 16.20 | -3.40 | Dem. Rep. Congo, Tua      | -22.8   | 10.2    | 14.8    | -42.0 | 9.8     |

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

“0.65161872, 0.00002349, 0.00002349, 0.00000701, 0.00000701, 0.00000173, 0.00000116, 0.00000077”

**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**”