

# Spatial assignment of test sample

December 09, 2016

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## Input

Website Identifier: 005p562-39

### Isotope values of test sample

Table 1: Isotope values of test sample

| 13C/12C | 15N/14N | 18O/16O | 2H/1H | 34S/32S |
|---------|---------|---------|-------|---------|
| -25.7   | 11.4    | 13.5    | -54.7 | 13.8    |

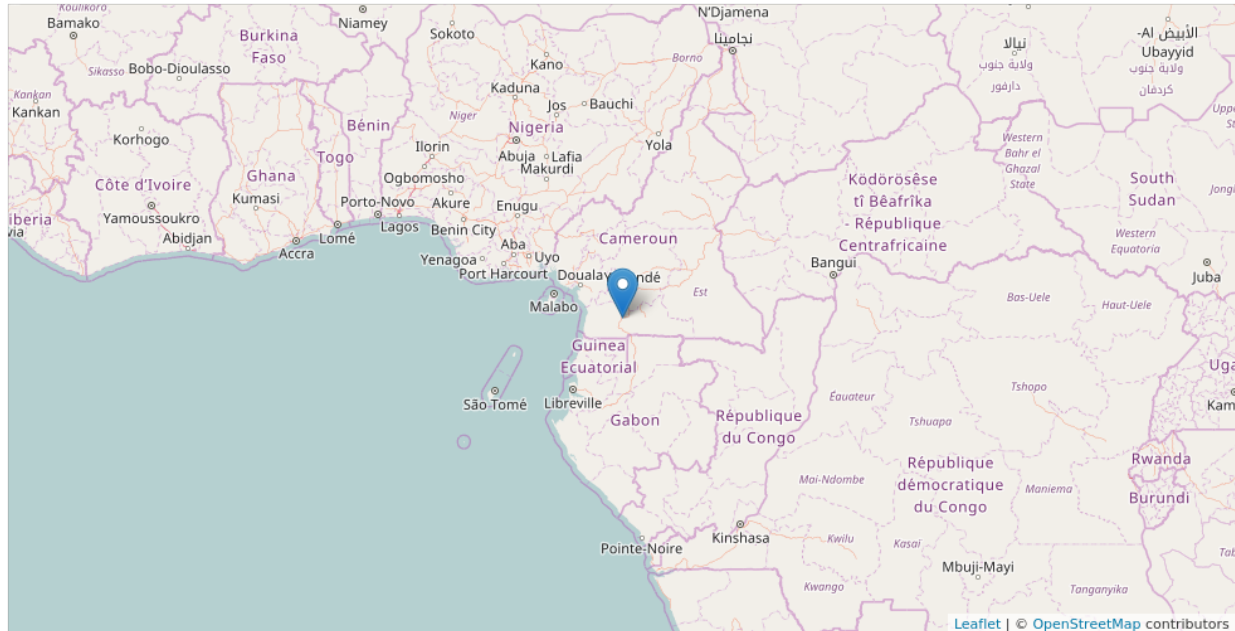
## Output

### Model

```
##
## Call:
## train.kknn(formula = fmla, data = ivory.train, kmax = 15, distance = 2, kernel = knl)
##
## Type of response variable: nominal
## Minimal misclassification: 0.1889986
## Best kernel: triangular
## Best k: 14
```

Classifier: **region**

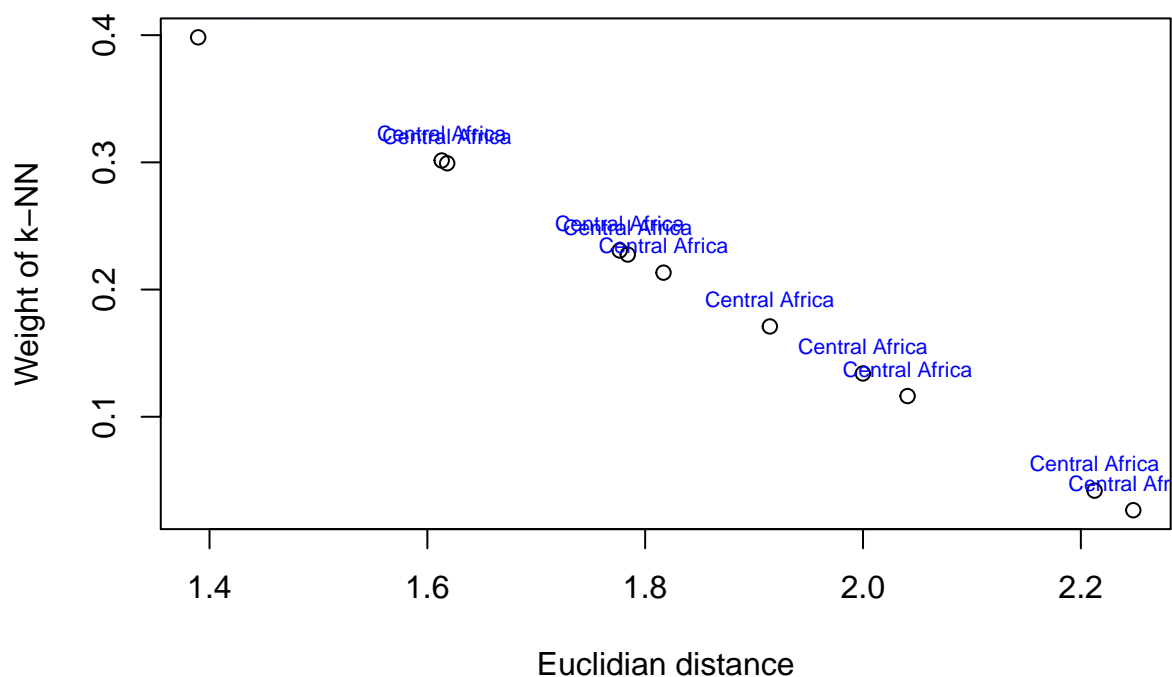
## Map of best fitted reference sample



### Best fitted reference sample:

- Site: Cameroon, near Ebolowa
- Country: CM
- Region: Central Africa
- CITES: Appendix I
- Lat: 2.86
- Lon: 11.15

## 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 |
|-------|-------|--|---------|---------|---------|-------|---------|
| 11.15 | 2.86  | Cameroon, near Ebolowa                   | -25.0   | 11.7    | 15.0    | -52.0 | 10.1    |
| 12.76 | -1.18 | Gabon                                    | -26.6   | 10.0    | 15.0    | -56.9 | 9.9     |
| 11.27 | -3.78 | Congo, Shot in Southern Congo, on the At | -24.7   | 11.6    | 15.8    | -48.1 | 11.0    |
| 14.47 | -0.01 | Dem. Rep. Congo                          | -25.0   | 10.2    | 15.8    | -49.9 | 10.1    |
| 11.64 | -4.13 | Congo, Shot in Southern Congo, 50km from | -25.0   | 8.5     | 14.7    | -49.4 | 11.9    |
| 12.79 | -3.01 | Congo, Litsandou village, 8km southeast  | -23.5   | 10.2    | 13.3    | -64.6 | 10.8    |
| 12.76 | -1.18 | Gabon                                    | -26.6   | 10.4    | 14.9    | -57.1 | 8.2     |
| 14.57 | -0.08 | Dem. Rep. Congo                          | -24.9   | 10.3    | 16.4    | -49.5 | 10.0    |
| 20.96 | -1.44 | Congo                                    | -23.7   | 9.2     | 13.6    | -62.2 | 9.8     |
| 17.11 | -1.10 | Dem. Rep. Congo, Lukolela                | -24.8   | 10.5    | 15.4    | -43.4 | 8.4     |
| 21.31 | -2.34 | Dem. Rep. Congo                          | -27.1   | 11.2    | 13.7    | -62.0 | 6.9     |

Region of prediction: Central Africa

### 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

“0.1278587, 0.0004189, 0.0000067, 0.0000030, 0.0000030, 0.0000019, 0.0000019, 0.0000012, 0.0000001, 0.0000001, 0.0000001”

### 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**”