# Spatial assignment of test sample

*December 13, 2016*

## Contents



## Input

Website Identifier: 93

### Isotope values of test sample

Table 1: Isotope values of test sample

| 13C/12C | 15N/14N | 18O/16O | 2H/1H | 34S/32S |
|---|---|---|---|---|
| -21.8 | 7.2 | 17.8 | -44 | 7.8 |

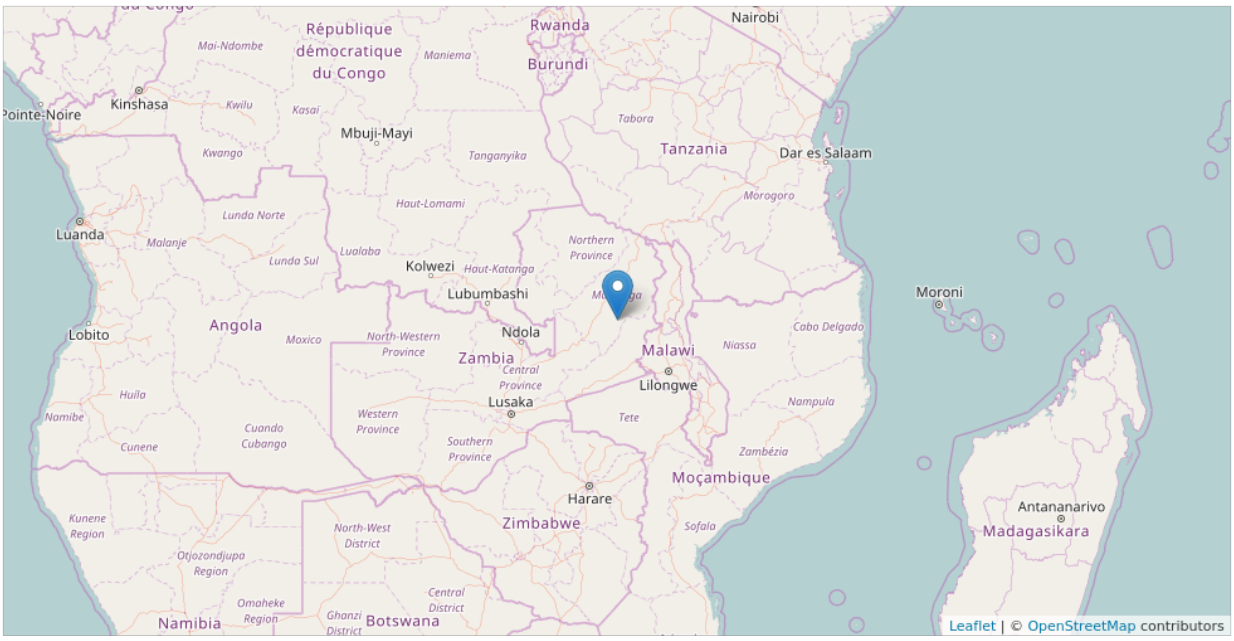
## Output

### 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
```

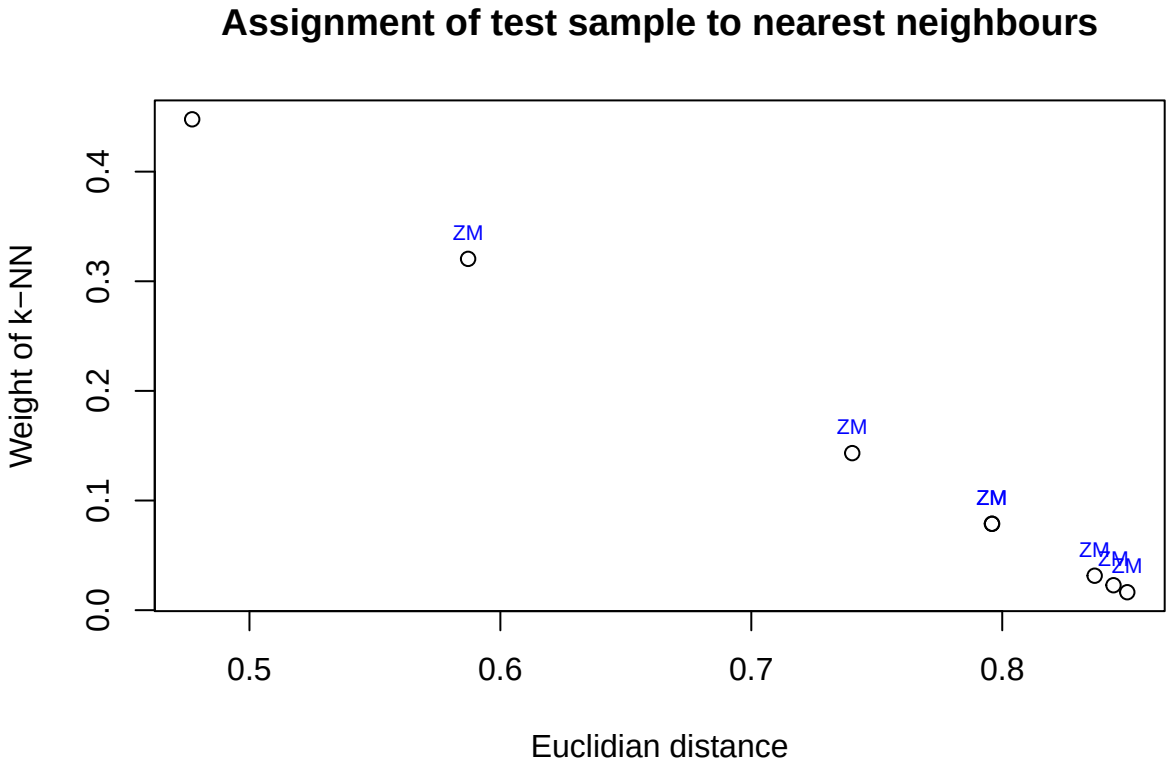
Classifier: **country_code**

## Map of best fitted reference sample




**Best fitted reference sample**:

- Site: East Zambia, North Luangwa National Park
- Country: ZM
- Region: Southern Africa
- CITES: Appendix I
- Lat: -12.252
- Lon: 32




## 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 |
|---|---|---|---|---|---|---|---|
| 32.00 | -12.25 | East Zambia, North Luangwa National Park | -21.6 | 6.7 | 18.3 | -43.1 | 8.8 |
| 32.02 | -11.55 | Southern Zambia | -21.6 | 7.8 | 18.4 | -45.1 | 9.1 |
| 32.19 | -11.41 | Southern Zambia | -20.6 | 7.2 | 18.4 | -46.4 | 7.3 |
| 32.46 | -11.08 | Southern Zambia | -22.1 | 8.1 | 18.3 | -42.0 | 9.7 |
| 26.71 | -14.96 | South Zambia, East of Kafue National Par | -21.9 | 7.7 | 18.6 | -50.8 | 8.1 |
| 25.45 | -16.52 | Southern Zambia | -21.3 | 7.1 | 18.8 | -49.7 | 8.9 |
| 32.32 | -11.27 | Southern Zambia | -21.5 | 7.9 | 17.4 | -51.6 | 8.3 |
| 26.21 | -14.38 | Southern Zambia | -23.0 | 7.9 | 18.2 | -43.4 | 9.2 |

**Country of prediction: ZM**

## 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**

"0.5907, 0.2703, 0.1718, 0.1023, 0.0105, 0.0091, 0.0068, 0.0059"

**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: "**good fit**"