

# Spatial assignment of test sample

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## Input

Website Identifier: 141-O

## Isotope values of test sample

Table 1: Isotope values of test sample

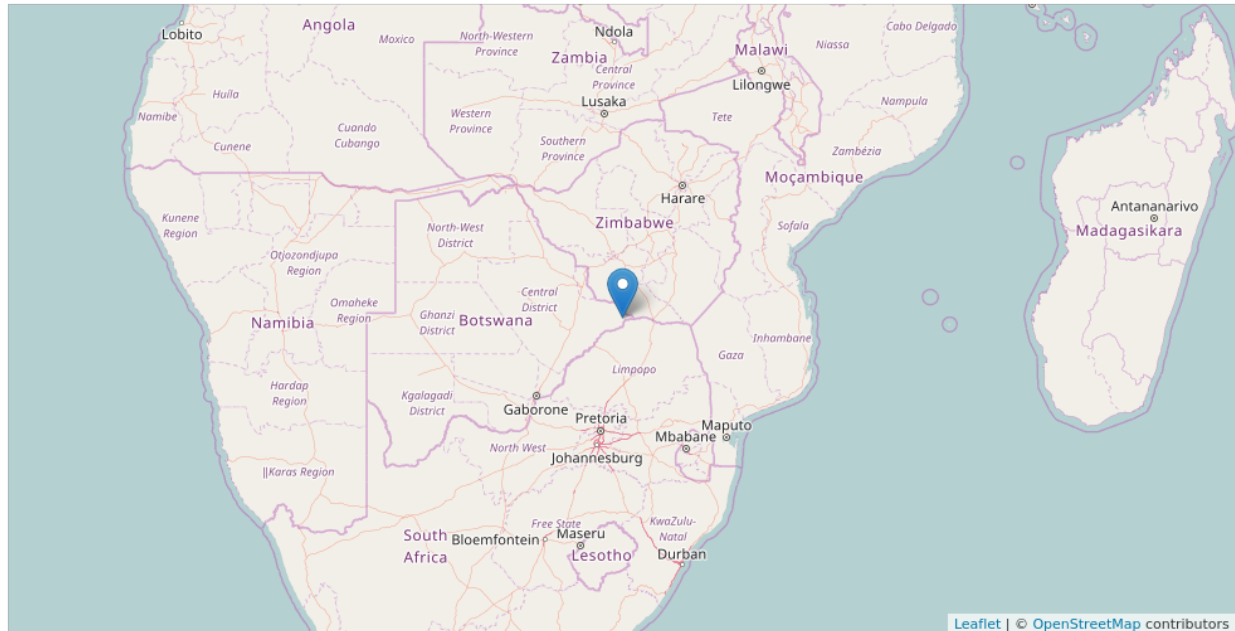
13C/12C	15N/14N	18O/16O	2H/1H	34S/32S
-21.9	10.8	19.6	-23.6	10.3

## 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
```

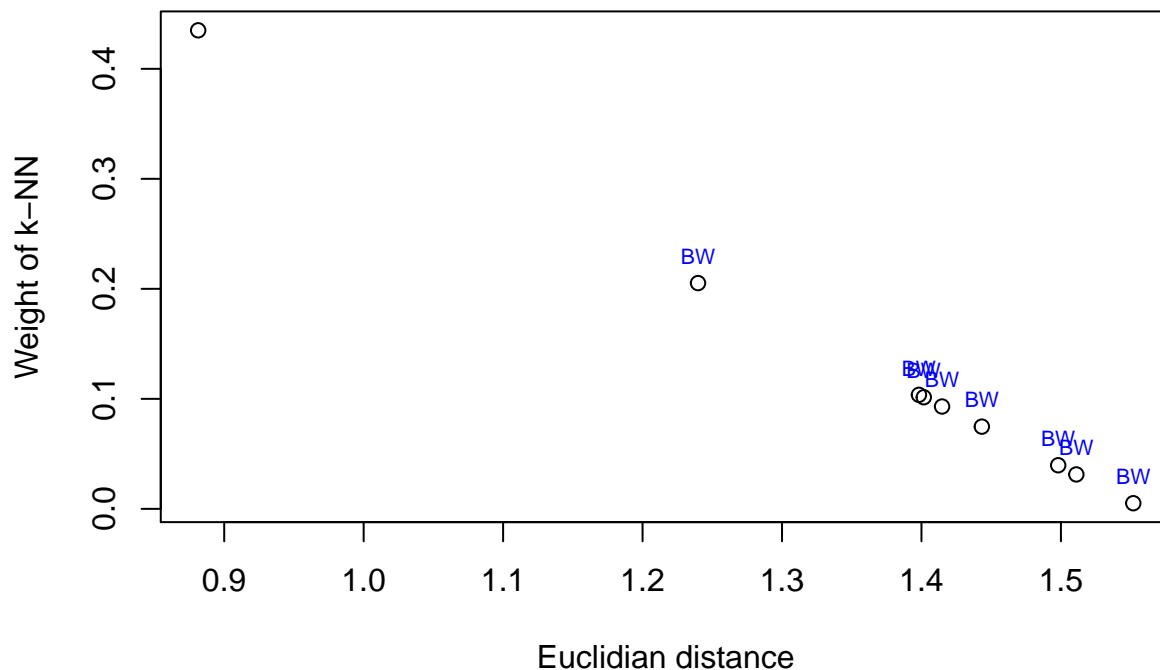
## Map of best fitted reference sample



### Best fitted reference sample:

- Site: Botswana, Mathathane area
- Country: BW
- Region: Southern Africa
- CITES: Appendix II
- Lat: -22.2
- Lon: 28.91

## 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
28.91	-22.20	Botswana, Mathathane area	-21.7	10.6	18.2	-24.0	8.5
28.91	-22.20	Botswana, Mathathane area	-19.9	11.6	18.9	-27.9	10.7
28.91	-22.20	Botswana, Mathathane area	-21.8	9.3	17.9	-32.1	9.6
28.91	-22.20	Botswana, Mathathane area	-20.4	10.3	18.7	-34.6	11.0
25.13	-17.84	Botswana, Kasane/Chobe area	-21.8	10.2	18.7	-36.8	11.8
23.34	-19.80	Botswana, Maun area	-20.8	10.3	19.7	-29.1	14.4
27.57	-21.65	Botswana, Francistown area	-21.3	9.5	19.4	-30.5	14.2
27.73	-21.89	Botswana, Mmadinare area	-21.4	10.2	17.1	-27.7	8.0
27.73	-21.89	Botswana, Mmadinare area	-21.1	10.3	17.1	-27.2	12.8

Country of prediction: BW

### 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

“0.0229225, 0.0000176, 0.0000131, 0.0000070, 0.0000025, 0.0000025, 0.0000017, 0.0000017, 0.0000012”

**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**”