

Spatial assignment of test sample

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Input

Website Identifier: 30

Isotope values of test sample

Table 1: Isotope values of test sample

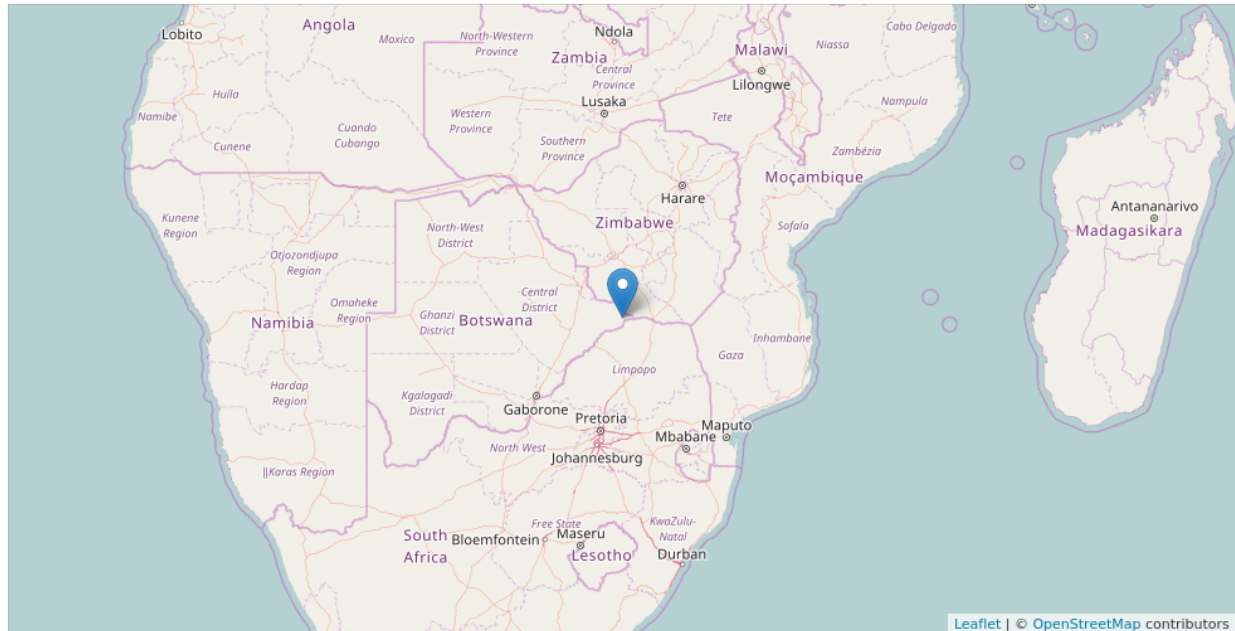
| 13C/12C | 15N/14N | 18O/16O | 2H/1H | 34S/32S |
|---------|---------|---------|-------|---------|
| -19.7 | 11.8 | 19.2 | -24.3 | 12.4 |

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
```

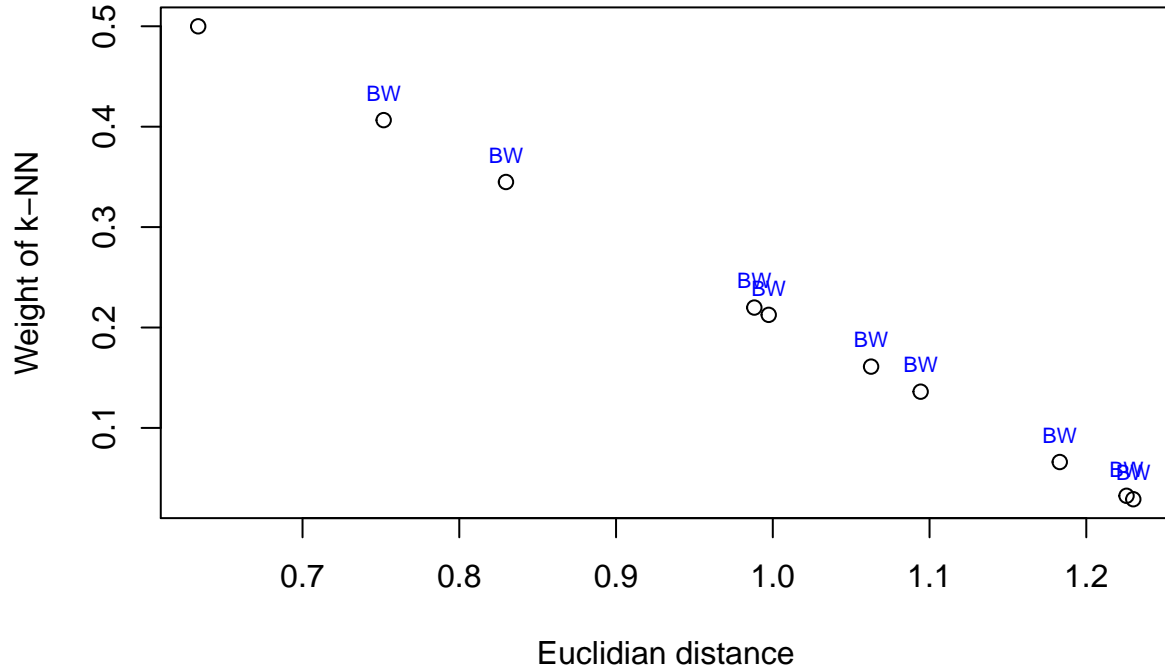
Map of best fitted reference sample



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 | -19.9 | 11.6 | 18.9 | -27.9 | 10.7 |
| 23.34 | -19.80 | Botswana, Maun area | -19.5 | 11.5 | 19.2 | -31.7 | 11.6 |
| 23.34 | -19.80 | Botswana, Maun area | -18.9 | 11.6 | 20.0 | -30.6 | 12.6 |
| 28.91 | -22.20 | Botswana, Mathathane area | -18.9 | 10.8 | 18.5 | -21.8 | 10.3 |
| 28.91 | -22.20 | Botswana, Mathathane area | -18.5 | 11.0 | 19.4 | -25.9 | 10.2 |
| 28.91 | -22.20 | Botswana, Mathathane area | -18.6 | 11.8 | 18.4 | -16.4 | 11.3 |
| 28.91 | -22.20 | Botswana, Mathathane area | -19.9 | 10.9 | 17.5 | -29.9 | 12.4 |
| 25.81 | -24.72 | Botswana, Gaborone | -20.6 | 11.2 | 20.0 | -27.0 | 15.6 |
| 23.34 | -19.80 | Botswana, Maun area | -20.8 | 10.3 | 19.7 | -29.1 | 14.4 |
| 25.13 | -17.84 | Botswana, Kasane / Chobe area | -19.4 | 10.2 | 20.7 | -29.8 | 12.9 |

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

“0.98286, 0.81318, 0.56129, 0.25171, 0.15831, 0.11207, 0.09322, 0.06966, 0.03674, 0.00076”

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**”