Spatial assignment of test sample

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Input

Website Identifier: 157

Isotope values of test sample

Table 1: Isotope values of test sample

<table>
<thead>
<tr>
<th>13C/12C</th>
<th>15N/14N</th>
<th>18O/16O</th>
<th>2H/1H</th>
<th>34S/32S</th>
</tr>
</thead>
<tbody>
<tr>
<td>-20.3</td>
<td>7</td>
<td>16.4</td>
<td>-43.2</td>
<td>5.8</td>
</tr>
</tbody>
</table>

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: Mozambique, Chipupa / Rovuma
- Country: MZ
- Region: Southern Africa
- CITES: Appendix I
- Lat: -11.26
- Lon: 38.91
Assignment of test sample to nearest neighbours

![Graph showing Euclidian distance and weight of k-NN for MZ entries.]

Best fitted reference entries

Table 2: Details of best fitted reference entry (row 1) and other fitted entries within best classifier

<table>
<thead>
<tr>
<th>lon</th>
<th>lat</th>
<th>location</th>
<th>13C/12C</th>
<th>15N/14N</th>
<th>18O/16O</th>
<th>2H/1H</th>
<th>34S/32S</th>
</tr>
</thead>
<tbody>
<tr>
<td>38.91</td>
<td>-11.26</td>
<td>Mozambique, Chipupa / Rovuma</td>
<td>-21.1</td>
<td>7.4</td>
<td>16.1</td>
<td>-44.6</td>
<td>4.5</td>
</tr>
<tr>
<td>37.15</td>
<td>-12.29</td>
<td>Mozambique, Naulala village</td>
<td>-20.2</td>
<td>8.1</td>
<td>16.6</td>
<td>-38.9</td>
<td>5.6</td>
</tr>
<tr>
<td>39.00</td>
<td>-11.18</td>
<td>Mozambique, Rovuma river area</td>
<td>-20.8</td>
<td>7.0</td>
<td>15.4</td>
<td>-40.0</td>
<td>7.5</td>
</tr>
<tr>
<td>31.15</td>
<td>-14.86</td>
<td>Mozambique, Bairro Gebeuza village</td>
<td>-19.7</td>
<td>7.3</td>
<td>16.4</td>
<td>-46.3</td>
<td>8.9</td>
</tr>
<tr>
<td>37.55</td>
<td>-13.30</td>
<td>Mozambique, Niassa Nature Reserve</td>
<td>-20.8</td>
<td>5.7</td>
<td>15.0</td>
<td>-43.6</td>
<td>6.9</td>
</tr>
</tbody>
</table>

Country of prediction: MZ

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

“0.425262, 0.234007, 0.145619, 0.022923, 0.000018”
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”