Spatial assignment of test sample

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Input

Website Identifier: 130

Isotope values of test sample

Table 1: Isotope values of test sample

<table>
<thead>
<tr>
<th></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></td>
<td>-19</td>
<td>10.4</td>
<td>18</td>
<td>-26.4</td>
<td>8.3</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: Botswana, Mathathane area
- Country: BW
- Region: Southern Africa
- CITES: Appendix II
- Lat: -22.2
- Lon: 28.91
Assignment of test sample to nearest neighbours

![Graph showing Euclidian distance vs Weight of k-NN with points marked for BW locations]

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>28.91</td>
<td>-22.20</td>
<td>Botswana, Mathathane area</td>
<td>-18.9</td>
<td>10.8</td>
<td>18.5</td>
<td>-21.8</td>
<td>10.3</td>
</tr>
<tr>
<td>28.91</td>
<td>-22.20</td>
<td>Botswana, Mathathane area</td>
<td>-18.5</td>
<td>11.0</td>
<td>19.4</td>
<td>-25.9</td>
<td>10.2</td>
</tr>
<tr>
<td>28.91</td>
<td>-22.20</td>
<td>Botswana, Mathathane area</td>
<td>-19.9</td>
<td>11.6</td>
<td>18.9</td>
<td>-27.9</td>
<td>10.7</td>
</tr>
<tr>
<td>28.91</td>
<td>-22.20</td>
<td>Botswana, Mathathane area</td>
<td>-19.1</td>
<td>12.2</td>
<td>17.2</td>
<td>-30.8</td>
<td>10.1</td>
</tr>
<tr>
<td>28.91</td>
<td>-22.20</td>
<td>Botswana, Mathathane area</td>
<td>-19.6</td>
<td>9.6</td>
<td>16.9</td>
<td>-33.7</td>
<td>11.0</td>
</tr>
<tr>
<td>27.73</td>
<td>-21.89</td>
<td>Botswana, Mmadinare area</td>
<td>-21.4</td>
<td>10.2</td>
<td>17.1</td>
<td>-27.7</td>
<td>8.0</td>
</tr>
</tbody>
</table>

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

“0.9829, 0.1583, 0.0769, 0.0292, 0.0202, 0.0023”
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”