13 Terrestrial Biodiversity

13.1 Experiments

Table 34: provides an overview of all experiments to be run in the terrestrial-biodiversity sector in ISIMIP2a.

Table 34: Experiment summary for terrestrial-biodiversity models.

<table>
<thead>
<tr>
<th>Climate Data</th>
<th>Scenario</th>
<th>Human influences, land use (LU)</th>
<th>Other settings (sens-scenario)</th>
<th># runs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Historical runs</td>
<td>EWEMBI</td>
<td>hist</td>
<td>nat</td>
<td>no CO2</td>
</tr>
</tbody>
</table>

13.2 Sector-specific input

Table 35: Biodiversity-specific input data used for building our models.

<table>
<thead>
<tr>
<th>Dataset</th>
<th>Description</th>
<th>More info</th>
<th>Dates</th>
<th>Scale</th>
<th>Variables included</th>
</tr>
</thead>
<tbody>
<tr>
<td>EWEMBI</td>
<td>Bioclimatic variables</td>
<td>30-year monthly means of minimum temperature (tasmin), maximum temperature (tasmax) and total precipitation (pr) were calculated and used to derive 19 bioclimatic variables; see (Hijmans, Cameron, Parra, Jones, &amp; Jarvis, 2005)</td>
<td>30-yr averages of 1980 - 2009 (1995)</td>
<td>global, 0.5° (EWEMBI)</td>
<td>Bio4 (temperature seasonality), Bio5 (max temperature of warmest month), Bio12 (annual precipitation) and Bio15 (precipitation seasonality), Bio18 (precipitation of warmest quarter) and Bio19 (precipitation of coldest quarter)</td>
</tr>
</tbody>
</table>

13.3 Output data

Table 36: Output variables to be reported by terrestrial-biodiversity sector models.
<table>
<thead>
<tr>
<th>Variable (long name)</th>
<th>Variable name</th>
<th>Units (NetCDF format)</th>
<th>Frequency</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Essential outputs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Species probability of occurrence</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amphibian species probability of occurrence</td>
<td>amphibianprob</td>
<td>Probability of occurrence per cell(^1)</td>
<td>30-year period centered around 1995 (1980 – 2009)</td>
<td>Results from individual SDMs assuming no dispersal.(^2)</td>
</tr>
<tr>
<td>Terrestrial bird species probability of occurrence</td>
<td>birdprob</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Terrestrial mammal species probability of occurrence</td>
<td>mammalprob</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Summed probability of occurrence</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amphibian summed probability of occurrence</td>
<td>amphibiansumprob</td>
<td>Summed probability of occurrence per cell(^1)</td>
<td>30-year period centered around 1995 (1980 – 2009)</td>
<td>Aggregated results from individual SDMs assuming no dispersal.(^2)</td>
</tr>
<tr>
<td>Terrestrial bird summed probability of occurrence</td>
<td>birdsumprob</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Terrestrial mammal summed probability of occurrence</td>
<td>mammalsumprob</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Endemic summed probability of occurrence</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Summed probability of endemic amphibian species(^3)</td>
<td>endamphibiansumprob</td>
<td>Summed probability of occurrence per cell(^1)</td>
<td>30-year period centered around 1995 (1980 – 2009)</td>
<td>Aggregated results from individual SDMs assuming no dispersal.(^2)</td>
</tr>
<tr>
<td>Summed probability of endemic terrestrial bird species(^3)</td>
<td>endbirdsumprob</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Summed probability of endemic terrestrial mammal species(^3)</td>
<td>endmammalsumprob</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Threatened summed probability of occurrence</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Summed probability of threatened amphibian species(^4)</td>
<td>thramphibiansumprob</td>
<td>Summed probability of occurrence per cell(^1)</td>
<td>30-year period centered around</td>
<td>Aggregated results from individual SDMs assuming</td>
</tr>
<tr>
<td>Species richness</td>
<td>Estimated number of species (species richness) per cell</td>
<td>30-year period centered around 1995 (1980 – 2009)</td>
<td>Results from macroecological richness models</td>
<td></td>
</tr>
<tr>
<td>-------------------------------------------------------</td>
<td>--------------------------------------------------------</td>
<td>-------------------------------------------------</td>
<td>---------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Amphibian species richness</td>
<td>amphibiansr</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Terrestrial bird species richness</td>
<td>birdsr</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Terrestrial mammal species richness</td>
<td>mammalsr</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 For the Maximum Entropy (MaxEnt) model algorithm the output is not probability, but habitat suitability/relative occurrence probability. Values also range between 0 and 1.

2 No dispersal assumes that species can only be present where they are actually present according to the IUCN and BirdLife range maps.

3 Endemic (range-restricted) species are the smallest ranging 15% of all species.

4 Threatened species are all species that are either (i) critically endangered, (ii) endangered or (iii) vulnerable according to their IUCN red list status.


Hurtt, G., Chini, L., Sahajpal, R., Frolking, S., & et al. (In prep.). Harmonization of global land-use change and management for the period 850-2100. *Geoscientific Model Development*.


Lange, S. (2019a). WFDE5 over land merged with ERA5 over the ocean (W5E5). V. 1.0. doi:10.5880/pik.2019.023


high-resolution data set for agricultural and hydrological modeling. *Global Biogeochemical Cycles, 24*(1).


