Appendix I. Summary of important environmental variables and future range projections per species from previous studies. dem = digital elevation model. Bio 3 – 19 are defined in table 2.

|  |  |  |  |
| --- | --- | --- | --- |
| Class | Scientific Name | Environmental Variable | Distribution Range Prediction |
| Amphibia | *A. loloensis* |  | Range reduction (1) |
|  | *B. londongensis* | Bio 3, 8, 14, 15, 18 (2) | Species specific, scenario and model dependent (2) |
|  | *B. pinchonii* | Bio 3, 8, 14, 15, 18 (2) | Range expansion (1). Species specific, scenario and model dependent (2). |
|  | *B. tibetanus* | Bio 3, 8, 14, 15, 18 (2) | Range expansion (1). Species specific, scenario and model dependent (2) |
|  | *L. boringii* | Bio 3, 8, 14, 15, 18 (2) | Range reduction (1). Species specific, scenario and model dependent (2). |
|  | *M. nankiangensis* | Bio 3, 8, 14, 15, 18 (2) | Species specific, scenario and model dependent (2) |
|  | *O. multipunctatus* | Bio 3, 8, 14, 15, 18 (2) | Range loss (1). Species specific, scenario and model dependent (2). |
|  | *O. nanjiangensis* | Bio 3, 8, 14, 15, 18 (2) | Species specific, scenario and model dependent (2) |
|  | *O. puxiongensis* | Bio 3, 8, 14, 15, 18 (2) | Species specific, scenario and model dependent (2) |
|  | *S. liupanensis* | Elevation, humidity, water pH, water velocity, vegetation cover (3,4), water temperature (3), grass cover, distance to road (4)  |  |
|  | *S. muliensis* | Bio 3, 8, 14, 15, 18 (2) | Species specific, scenario and model dependent (2) |
|  | *S. pingwuensis* | Bio 3, 8, 14, 15, 18 (2) | Species specific, scenario and model dependent (2) |
|  | *S. tuberculatus* | Bio 3, 8, 14, 15, 18 (2) | Range loss (1). Species specific, scenario and model dependent (2).  |
|  | *T. taliangensis* | Bio 3, 8, 14, 15, 18 (2) | Species specific, scenario and model dependent (2) |
|  | *T. wenxianensis* | Bio 3, 8, 14, 15, 18 (2) | Species specific, scenario and model dependent (2) |
| Aves | *A. rufipectus* | Bio 4, dem (5,6), bio 1, 2, 8, 9, 12, 15, 18, 19 (6), 17 (5)  | Range reduction (1). RCP2.6 - shift northwest; RCP8.5 - shift northeast (6). No dispersal - range reduction and fragmentation, shift northwards; Full dispersal - range expansion (5).  |
|  | *G. sukatschewi* | Bio 3, 4, 9, 12, 14, 15, 19, dem (6) | Southeast shift (6) |
|  | *L. lhuysii* | Bio 5, dem (6,7), bio 2, 3, 4, 9, 12, 14, 15, 18, 19 (6), 17, annual maximum of EVI, base level values of EVI, slope, distances to residential locations and to roads (7) | Range expansion (1). RCP2.6 - southwest shift; RCP8.5 - southeast shift (6). Higher latitude and altitude, range reduction, fragmentation and degradation (8). |
|  | *L. omeiensis* | Bio 1, 2, 3, 4, 8, 9, 12, 14, 15, 18, 19, dem (6) | Northwest shift (6) |
|  | *P. internigrans* | Bio 12, dem (6,9), bio 2, 3, 4, 5, 9, 15, 18, 19 (6), 7, forest cover (9). | RCP2.6 - shift southeast; RCP8.5 - shift northeast. (6). Range reduction, northwards and upwards shift, further fragmentation (9). |
|  | *S. reevesii* | Bio 3, 4 (6,10), 2, 8, 9, 12, 14, 15, 18, dem (6), bio 5, 6, 16, 17 (10)  | Range reduction (1,10). RCP2.6 - shift slightly southeast; RCP8.5 - shift northeast (6). Shift northwest and upslopes (10).  |
|  | *S. zappeyi* | Bio 1, 2, 3, 4, 5, 9, 12, 14, 15, 18, 19, dem (6) | RCP2.6 - shift northeast; RCP8.5 - shift southeast. (6) |
| Mammalia | *A. melanoleuca* |   | Range reduction (1) |
|  | *R. rex* | Elevation, bio12 (11) |  |
|  | *R. roxellana* | Human footprint index, bio 10, 11, 15 (12) | Range reduction (1,12), upslope shift (12) |
| Reptilia | *E. perlacea* |   | Range reduction (1) |

Appendix II. Maxent Models and Model Statistics. For each species, three model fitting runs generated three series of models. One model per model fitting run was selected for projection. The three selected models from three model fitting runs must contain the same predictors which are listed as Environmental Variables. The most important variables (in bold) have “1- correlation” value > 20% across three model fitting runs. The correlation coefficients were evaluated based on Pearson correlation between the fitted values and the predictions when the focal variable was randomly permutated 5 times (13,14). The Average AUC is the mean of AUC values of the three selected models from three model fitting runs. The projections of the three selected models were visually checked to assess if species suitability maps for now and for the future are comparable.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Class | Scientific Name | SampleSize | Environmental Variables | AverageAUC | ComparableProjections |
| Amphibia | A. loloensis | 1188 | **secdf, secma**, bio4 | 0.83 | Yes |
|  | B. londongensis | 999 | **bio17, c4ann, bio7**, distance2road | 0.80 | Yes |
|  | B. pinchonii | 1193 | **bio6, secdn, bio15, distance2lake** | 0.77 | Yes |
|  | B. tibetanus | 1197 | **bio6, bio15**, secdf, lith | 0.81 | Yes |
|  | L. boringii | 1192 | **bio15, secma**, primn, lith, distance2lake | 0.84 | Yes |
|  | M. nankiangensis | 1107 | **bio11, bio17** | 0.85 | Yes |
|  | O. chuanbeiensis | 1078 | **primn**, c3ann, distance2lake, secdn | 0.83 | Yes |
|  | O. kuangwuensis | 930 | **bio17, bio18, lith, secma, distance2road** | 0.88 | Yes |
|  | O. liangbeiensis | 15 | **distance2road**, bio11, c3ann, bio13, bio15, primn, secdn, urban, c4per, range, lith | 0.61 | Yes |
|  | O. multipunctatus | 1080 | **c3nfx**, secma, bio17, bio7, range | 0.82 | No |
|  | O. nanjiangensis | 76 | bio17, bio11, bio4, c3per, aspect, slope, tpi | 0.61 | yes for future |
|  | O. omeimontis | 1023 | **distance2lake**, secdf | 0.83 | Yes |
|  | O. pingii | 982 | **c3nfx**, bio10, bio17, c4per, bio12, bio2, primn, secdn, urban, pastr, range, secmb, distance2road, distance2river, aspect, slope, tpi | 0.84 | yes for future |
|  | O. puxiongensis | 872 | **c3nfx**, bio11, bio17, secdf, primn, secdn, urban, c4per, range, distance2river, aspect, slope, tpi | 0.87 | No |
|  | P. puxiongensis | 23 | bio11, distance2lake, aspect | 0.49 | No |
|  | S. chintingensis | 1092 | **primf, c4per, lith, distance2lake,** bio17 | 0.86 | Yes |
|  | S. jiulongensis | 996 | **c4ann, pastr**, bio15 | 0.78 | Yes |
|  | S. liupanensis | 1003 | **pastr, c3nfx, bio11** | 0.83 | Yes |
|  | S. muliensis | 1034 | **secdf, range** | 0.83 | Yes |
|  | S. pingwuensis | 1071 | **bio9, urban**, primn, secdf, c4per, distance2road, distance2river, aspect, slope, tpi | 0.74 | Yes |
|  | S. tuberculatus | 1157 | **c3ann, c4per** | 0.81 | Yes |
|  | S. wanglangensis | 1051 | **bio11, secmb** | 0.83 | Yes |
|  | T. pseudoverrucosus | 480 | **secma, c4per** | 0.79 | yes |
|  | T. taliangensis | 1185 | **bio4, c4ann, secma** | 0.80 | No |
|  | T. wenxianensis | 1190 | **bio17, distance2lake, secma** | 0.84 | Yes |
| Aves | A. rufipectus | 1131 | **bio17, secma, lith** | 0.85 | Yes |
|  | G. sukatschewi | 52 | **c3nfx, lith** | 0.90 | No |
|  | L. lhuysii | 1194 | **bio6, bio15**, urban, secma, distance2lake | 0.84 | Yes |
|  | L. omeiensis | 1141 | **bio17, c3ann, secma**, lith | 0.86 | Yes |
|  | P. internigrans | 1195 | **bio17, c3per,** bio6 | 0.80 | Yes |
|  | S. przewalskii | 1185 | **primn, bio10** | 0.81 | no for future |
|  | S. reevesii | 1199 | **secmb**, bio6, c3per, bio15, secma, slope, distance2lake | 0.82 | Yes |
|  | S. variegaticeps | 1191 | **bio5**, bio7, bio16 | 0.87 | Yes |
|  | S. zappeyi | 1175 | **bio6, secmb, bio4** | 0.86 | Yes |
| Mammalia | A. melanoleuca | 1181 | **bio11**, c3per, bio15, c3nfx | 0.87 | Yes |
|  | P. bedfordi | 1121 | **primn, distance2lake**, bio17, urban, distance2road | 0.77 | Yes |
|  | R. rex | 1199 | **secmb**, bio6, c3per, secma,  | 0.67 | Yes |
|  | R. roxellana | 426 | **c3ann**, bio3 | 0.91 | Yes |
| Reptilia | E. perlacea | 1192 | **bio15, lith**, slope, bio17, secdf, pastr, range | 0.80 | Yes |
|   | H. metusium | 993 | **lith, distance2lake** | 0.84 | Yes |

Appendix III. Projection of future distribution ranges per species. Low-confidence projections are due to low AUC score (*O. liangbeiensis, O. nanjiangensis, P. puxiongensis, R. rex*) and less consistent projections from three simulation runs (*O. multipunctatus, O. puxiongensis, P. puxiongensis, T. taliangensis, G. sukatschewi, S. przewalskii*). Range losses > 80% are in red and range losses between 15% and 80% are in amber.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Class | Scientific Name | Range size change under SSP2-4.5 (%) | Range size change under SSP3-7.0 (%) | Range size change under SSP5-8.5 (%) | Confidence level |
| Amphibia | A. loloensis | 50 | 87 | 95 | High |
|  | B. londongensis | -100 | -100 | -99 | High |
|  | B. pinchonii | -100 | -100 | -100 | High |
|  | B. tibetanus | -100 | -100 | -100 | High |
|  | L. boringii | -90 | -88 | -83 | High |
|  | M. nankiangensis | -100 | -100 | -100 | High |
|  | O. chuanbeiensis | -95 | -94 | -100 | High |
|  | O. kuangwuensis | -99 | -99 | -100 | High |
|  | O. liangbeiensis | -100 | -100 | -100 | Low |
|  | O. multipunctatus | 528 | 1,766 | 191 | Low |
|  | O. nanjiangensis | -100 | -100 | -100 | Low |
|  | O. omeimontis | 59 | 76 | 52 | High |
|  | O. pingii | -100 | -100 | -100 | High |
|  | O. puxiongensis | -82 | -100 | -96 | Low |
|  | P. puxiongensis | -39 | -17 | 51 | Low |
|  | S. chintingensis | 5 | 6 | 22 | High |
|  | S. jiulongensis | -100 | -100 | -100 | High |
|  | S. liupanensis | 137 | 50 | 111 | High |
|  | S. muliensis | 39 | 51 | 26 | High |
|  | S. pingwuensis | -100 | -100 | -100 | High |
|  | S. tuberculatus | 3 | -3 | 9 | High |
|  | S. wanglangensis | 48 | 49 | 50 | High |
|  | T. pseudoverrucosus | -14 | -67 | -100 | High |
|  | T. taliangensis | -71 | -57 | -50 | Low |
|   | T. wenxianensis | -8 | -15 | 3 | High |
| Aves | A. rufipectus | -98 | -99 | -96 | High |
|  | G. sukatschewi | -8 | -29 | 34 | Low |
|  | L. lhuysii | -100 | -100 | -100 | High |
|  | L. omeiensis | -60 | -60 | -61 | High |
|  | P. internigrans | -99 | -98 | -100 | High |
|  | S. przewalskii | -100 | -100 | -100 | Low |
|  | S. reevesii | -100 | -100 | -100 | High |
|  | S. variegaticeps | -100 | -100 | -100 | High |
|  | S. zappeyi | -90 | -100 | -98 | High |
| Mammalia | A. melanoleuca | -100 | -100 | -100 | High |
|  | P. bedfordi | -51 | -36 | -55 | High |
|  | R. rex | -71 | -69 | -78 | Low |
|   | R. roxellana | -100 | -100 | -100 |  High |
| Reptilia | E. perlacea | -100 | -100 | -100 | High |
|   | H. metusium | 0 | 0 | 0 |  High |

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