**Supporting Information**

**Table S1.** Dataset of species and traits used in the analysis. In the case of snout-vent length (SVL), tail length (TL) and body length we used the maximum measure, prioritizing measures of one individual, when possible. For the size of the eyes, we compared the size of the supralabial just below the eye and his relations with the head, the eye size/diameter was classified in small = 1, medium = 2 and large = 3, body mass was log10 transform. Mass values were taken from (Feldman *et al.*, 2016). For habitat use, we reclassify the categories into a range of 1 to 3: fossorial = 1, semifossorial = 1.5, aquatic and terrestrial = 2, semiarboreal = 2.5, arboreal = 3 (see Oliveira & Scheffers, 2019). Tail proportion was calculated in relation to total length. Measures are in millimeters and mass in grams. A total of 184 studies were compiled, including papers, book chapters, books, thesis, and unpublish data. Unpublish data of species measurements were taken from the first author's personal database and are marked with an asterisk (\*).

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| --- | --- | --- | --- | --- | --- | --- | --- |
| Binomial | Habitat | BodyLength | SVL | TL | BodyMass | EyeSize | References |
| *Amerotyphlops brongersmianus* | Fossorial | 325 | 207 | 7 | 18.4 | Small | (Adalsteinsson et al., 2009; Avila et al., 2006; J. R. Dixon & Hendricks, 1979; J. R. Dixon & Kofron, 2009; Graboski et al., 2019; Hedges et al., 2014; Reis Martins et al., 2010; Vanzolini, 1968) |
| *Amerotyphlops reticulatus* | Fossorial | 522 | 496 | 22 | 105.8 | Small | (J. R. Dixon & Hendricks, 1979; J. R. Dixon & Kofron, 2009; Graboski et al., 2019; Hedges et al., 2014; Vanzolini, 1968) |
| *Anilius scytale* | Fossorial | 904 | 869 | 35 | 340.1 | Small | (Marcio Martins et al., 2008; Marcio Martins & Oliveira, 1998; Maschio et al., 2007) |
| *Apostolepis ambiniger* | Fossorial | 500 | 460 | 40 | 50.2 | Small | (de Lema, 2001; França et al., 2018; Nogueira et al., 2012) |
| *Apostolepis assimilis* | Fossorial | 200 | 186 | 14 | 29.1 | Small | (Cabral & Perez, 2015; Cei, 1993; Alejandro R. Giraudo & Scrocchi, 1998; M. Harvey, 1999) |
| *Apostolepis breviceps* | Fossorial | 419 | 387 | 32 | 9.3 | Small | (M. B. Harvey, 2008) |
| *Apostolepis dimidiata*\* | Fossorial | 571 | 518 | 53 | 90.6 | Small | (Cabral, De Lema, et al., 2017; Cei, 1993; Alejandro R. Giraudo & Scrocchi, 1998; M. Harvey, 1999; M. B. Harvey et al., 2008) |
| *Apostolepis dorbignyi* | Fossorial | 411 | 362 | 49 | 37.4 | Small | (M. Harvey, 1999; Loebmann & de Lema, 2012) |
| *Apostolepis intermedia* | Fossorial | 351 | 319 | 32 | 6.6 | Small | (Nelson Rufino De Albuquerque & De Lema, 2012; Entiauspe-Neto et al., 2014) |
| *Apostolepis multicincta* | Fossorial | 384 | 333 | 51 | 40.7 | Small | (Embert & Reichle, 2003; França et al., 2018; M. Harvey, 1999) |
| *Apostolepis nigroterminata* | Fossorial | 387 | 370 | 17 | 22.8 | Small | (F. M. Dos Santos et al., 2018; M. Harvey, 1999) |
| *Apostolepis vittata* | Fossorial | 493 | 460 | 33 | 39.8 | Small | (França et al., 2018; M. Harvey, 1999; Peters & Orejas-Miranda, 1972) |
| *Atractus bocki* | Fossorial | 447 | 370 | 77 | 18.4 | Small | (Cei, 1993; Paulo Passos et al., 2009) |
| *Atractus latifrons* | Fossorial | 613 | 521 | 92 | 52.5 | Small | (Almeida et al., 2014; Hoogmoed, 1980; M Martins & Oliveira, 1993) |
| *Atractus paraguayensis*\* | Fossorial | 502 | 490 | 12.7 | 37.9 | Small | (Cabral, 2014; A. R. Giraudo & Scrocchi, 2000; P Passos et al., 2010) |
| *Atractus reticulatus* | Fossorial | 346 | 295 | 51 | 20.7 | Small | (Balestrin & Di-Bernardo, 2005; A. R. Giraudo & Scrocchi, 2000; P Passos et al., 2010; Pizzatto, Jordão, et al., 2008) |
| *Boa constrictor* | Semiarboreal | 4000 | 3777 | 223 | 35283.8 | Large | (Bertona & Chiaraviglio, 2003; Boback, 2005, 2006) |
| *Boiruna maculata* | Terrestrial | 1640 | 1340 | 300 | 748.8 | Medium | (Cei, 1993; Pizzatto, 2005; Scott et al., 2006; H Zaher, 1996) |
| *Bothrops alternatus* | Terrestrial | 1216 | 1114 | 102 | 2399.7 | Medium | (Cabral, Rojas, et al., 2017; Cei, 1993) |
| *Bothrops ammodytoides* | Terrestrial | 712 | 570 | 80 | 521.2 | Medium | (Carrasco et al., 2010; Cei, 1993) |
| *Bothrops diporus* | Terrestrial | 1000 | 860 | 140 | 687.8 | Medium | (V. X. da Silva & Rodrigues, 2008; M. B. Harvey et al., 2005) |
| *Bothrops itapetiningae* | Terrestrial | 576 | 510 | 66 | 141.9 | Medium | (Leão et al., 2014) |
| *Bothrops jararacussu* | Terrestrial | 2000 | 1800 | 200 | 5169.5 | Medium | (Cei, 1993; A. Giraudo, 2002; M. B. Harvey et al., 2005) |
| *Bothrops matogrossensis* | Semiarboreal | 1001 | 878 | 123 | 1118.3 | Medium | (V. X. da Silva & Rodrigues, 2008; M. B. Harvey et al., 2005; Monteiro et al., 2006) |
| *Bothrops moojeni* | Terrestrial | 1060 | 954 | 106 | 5883.4 | Médium | (Cei, 1993; M. B. Harvey et al., 2005; Nogueira et al., 2003) |
| *Bothrops pauloensis* | Terrestrial | 1001 | 878 | 123 | 470 | Médium | (V. X. da Silva & Rodrigues, 2008; Valdujo et al., 2002) |
| *Chironius bicarinatus* | Arboreal | 1390 | 890 | 500 | 521.4 | Large | (Almeida-Santos & Marques, 2002; R. J. Bailey, 1955; Cacciali & Cabral, 2015; J. Dixon et al., 1993; O. A. V. Marques et al., 2009) |
| *Chironius exoletus* | Arboreal | 1531 | 973 | 558 | 353.7 | Large | (R. J. Bailey, 1955; Cacciali & Cabral, 2015; J. Dixon et al., 1993; Hamdan & Fernandes, 2015; Torres-Carvajal et al., 2019) |
| *Chironius flavolineatus* | Arboreal | 1404 | 880 | 524 | 186.2 | Large | (Cacciali & Cabral, 2015; J. Dixon et al., 1993; Hamdan & Fernandes, 2015; Hamdan et al., 2014) |
| *Chironius fuscus* | Arboreal | 1597 | 1095 | 502 | 384.8 | Large | (de Souza Filho et al., 2012; J. Dixon et al., 1993; Hollis, 2006; Torres-Carvajal et al., 2019) |
| *Chironius laurenti* | Arboreal | 2152 | 1445 | 707 | 820.5 | Large | (J. Dixon et al., 1993; Torres-Carvajal et al., 2019) |
| *Chironius maculoventris* | Semiarboreal | 1155 | 785 | 370 | 183.5 | Large | (Cacciali & Cabral, 2015; J. Dixon et al., 1993; Hollis, 2006) |
| *Chironius quadricarinatus* | Semiarboreal | 1067 | 1444 | 377 | 186.2 | Large | (Cacciali & Cabral, 2015; J. Dixon et al., 1993; Hollis, 2006) |
| *Chironius scurrulus* | Arboreal | 2243 | 1515 | 728 | 1117 | Large | (J. Dixon et al., 1993) |
| *Clelia clelia* | Terrestrial | 2240 | 1840 | 400 | 1722.6 | Medium | (Gaiarsa et al., 2013; Scott et al., 2006; G. Scrocchi & Viñas, 1990) |
| *Corallus hortulanus* | Arboreal | 1700 | 1241 | 459 | 3922.3 | Large | (Henderson & Pauers, 2012; Henderson et al., 2013; Pizzatto et al., 2007) |
| *Crotalus durissus* | Terrestrial | 1800 | 1674 | 126 | 2883 | Medium | (Cei, 1993; M. B. Harvey et al., 2005) |
| *Dipsas bucephala* | Arboreal | 571 | 426 | 145 | 49.6 | Large | (M. B. Harvey & Embert, 2008; Hoge & Romano, 1975; Lions et al., 2000; Torello-Viera et al., 2012) |
| *Dipsas catesbyi* | Arboreal | 777 | 542 | 235 | 69.5 | Large | (M. B. Harvey & Embert, 2008) |
| *Dipsas lavillai* | Terrestrial | 534 | 405 | 129 | 36.7 | Large | (Ferreira & Ávila, 2009; G. Scrocchi et al., 1993) |
| *Dipsas mikanii* | Terrestrial | 400 | 322 | 78 | 72.1 | Large | (Braz et al., 2008; Pizzatto, Cantor, et al., 2008; Torello-Viera & Marques, 2017) |
| *Dipsas turgida* | Terrestrial | 515 | 415 | 100 | 48.2 | Large | (Cei, 1993; G. Scrocchi et al., 1993) |
| *Dipsas ventrimaculata* | Terrestrial | 509 | 393 | 116 | 71.2 | Large | (Cei, 1993; G. Scrocchi et al., 1993) |
| *Drymarchon corais* | Semiarboreal | 2406 | 2005 | 401 | 1365.4 | Medium | (Bernarde & Abe, 2006; Cei, 1993; Marcio Martins & Oliveira, 1998) |
| *Epicrates alvarezi* | Semiarboreal | 1613 | 1443 | 170 | 1883.7 | Large | (Cei, 1993; Paulo Passos & Fernandes, 2008; Pizzatto & Marques, 2007) |
| *Epictia albipuncta* | Fossorial | 340 | 316 | 24 | 8 | Small | (Francisco et al., 2012; Kretzschmar, 2006; Laurent, 1984; Pinto et al., 2010) |
| *Epictia australis* | Fossorial | 160 | 153 | 7 | 1.4 | Small | (Cei, 1993; Laurent, 1984; G. Scrocchi, 1990a) |
| *Epictia vellardi* | Fossorial | 155 | 149 | 6 | 2.3 | Small | (Cabral & Netto, 2016; Cei, 1993; Laurent, 1984) |
| *Erythrolamprus aesculapii* | Terrestrial | 1130 | 1005 | 125 | 139.2 | Large | (Curcio et al., 2015; Otávio Augusto Vuolo Marques & Puorto, 1994; Torello-Viera & Marques, 2017) |
| *Erythrolamprus albertguentheri* | Terrestrial | 655 | 545 | 110 | 74.1 | Medium | (Cei, 1993; J. R. Dixon, 1987) |
| *Erythrolamprus almadensis* | Terrestrial | 524 | 392 | 132 | 58.8 | Large | (Cei, 1993; J. R. Dixon, 1987; A. Giraudo, 2002) |
| *Erythrolamprus ceii* | Terrestrial | 524 | 430 | 94 | 32.8 | Medium | (Cei, 1993; J. R. Dixon, 1987) |
| *Erythrolamprus jaegeri* | Aquatic | 539 | 395 | 144 | 62.5 | Large | (Carreira et al., 2005; J. R. Dixon, 1987; A. Giraudo, 2002) |
| *Erythrolamprus miliaris* | Terrestrial | 798 | 644 | 154 | 110 | Medium | (Cei, 1993; J. R. Dixon & Tipton, 2003; Alejandro R. Giraudo et al., 2006; Pizzatto & Marques, 2006) |
| *Erythrolamprus poecilogyrus* | Terrestrial | 793 | 616 | 177 | 68.3 | Medium | (Andrade et al., 2020; Cabral, Bueno-Villafañe, et al., 2017; J. Dixon & Markezich, 1992; Prieto et al., 2012) |
| *Erythrolamprus reginae* | Terrestrial | 960 | 698 | 262 | 98.8 | Large | (Ascenso et al., 2019; Cei, 1993; A. Giraudo, 2002) |
| *Erythrolamprus sagittifer* | Terrestrial | 925 | 648 | 277 | 177.3 | Large | (Cei, 1993; J. Dixon & Thomas, 1982) |
| *Erythrolamprus semiaureus* | Aquatic | 1457 | 1259 | 220 | 168.7 | Medium | (J. R. Dixon, 1983; Alejandro R. Giraudo et al., 2006; Pizzatto, Jordão, et al., 2008; Torello-Viera & Marques, 2017) |
| *Erythrolamprus typhlus* | Terrestrial | 740 | 590 | 150 | 112.7 | Large | (Cei, 1993; J. R. Dixon, 1987) |
| *Eunectes notaeus* | Aquatic | 2550 | 2,180 | 370 | 25204.8 | Medium | (Cacciali, 2009; Cei, 1993; Pizzatto & Marques, 2007; Strussmann & Sazima, 1993) |
| *Helicops angulatus* | Aquatic | 795 | 560 | 235 | 179.6 | Medium | (Henrique C. Costa et al., 2016; Kawashita-Ribeiro et al., 2013; Rossman, 1973) |
| *Helicops infrataeniatus* | Aquatic | 693 | 500 | 193 | 168.7 | Medium | (Cei, 1993; Henrique C. Costa et al., 2016; Kawashita-Ribeiro et al., 2013; Rossman, 1973) |
| *Helicops leopardinus* | Aquatic | 731 | 530 | 201 | 98.8 | Medium | (Cei, 1993; Henrique C. Costa et al., 2016; A. Giraudo, 2002; Kawashita-Ribeiro et al., 2013; Rossman, 1973) |
| *Helicops polylepis* | Aquatic | 1052 | 767 | 285 | 191.8 | Medium | (Henrique C. Costa et al., 2016; Kawashita-Ribeiro et al., 2013; Rossman, 1973) |
| *Hydrodynastes gigas* | Aquatic | 2009 | 1439 | 530 | 2193.6 | Medium | (Cei, 1993; F. Franco et al., 2007; A. Giraudo, 2002) |
| *Hydrops caesurus* | Aquatic | 663 | 570 | 93 | 80 | Small | (Cei, 1993; A. Giraudo, 2002; G. J. Scrocchi et al., 2005) |
| *Imantodes cenchoa* | Arboreal | 1170 | 825 | 345 | 515.8 | Large | (Cei, 1993; de Sousa et al., 2014; Donnelly & Myers, 1991; Pizzatto, Cantor, et al., 2008) |
| *Leptodeira annulata* | Semiarboreal | 655 | 485 | 170 | 185.4 | Large | (Ávila & Morais, 2007; Cei, 1993; Pizzatto, Cantor, et al., 2008) |
| *Leptophis ahaetulla* | Arboreal | 1440 | 956 | 484 | 918.7 | Large | (Cacciali, 2009; Cei, 1993; Nelson R. De Albuquerque et al., 2007, 2012; Nelson Rufino de Albuquerque, 2009; A. Giraudo, 2002) |
| *Liotyphlops beui* | Fossorial | 326 | 321 | 5 | 21 | Small | (Cei, 1993; Centeno et al., 2010; J. R. Dixon & Kofron, 2009; Freire et al., 2007; Parpinelli & Marques, 2008; F. J. M. Santos & Reis, 2018) |
| *Liotyphlops ternetzii* | Fossorial | 413 | 400 | 13 | 18.4 | Small | (Cei, 1993; Centeno et al., 2010; J. R. Dixon & Kofron, 2009; Freire et al., 2007; A. Giraudo, 2002; F. J. M. Santos & Reis, 2018) |
| *Lygophis anomalus* | Terrestrial | 713 | 529 | 184 | 84.1 | Medium | (Carreira et al., 2005; Cei, 1993; J. R. Dixon, 1985) |
| *Lygophis dilepis* | Terrestrial | 690 | 531 | 159 | 44.9 | Medium | (Cacciali, 2009; Cei, 1993) |
| *Lygophis flavifrenatus* | Terrestrial | 746 | 627 | 206 | 82.7 | Medium | (Cacciali, 2009; Carreira, 2002; Carreira et al., 2005; Cei, 1993) |
| *Lygophis meridionalis* | Terrestrial | 598 | 606 | 221 | 96.2 | Medium | (Cacciali, 2009; Cei, 1993) |
| *Lygophis vanzolinii* | Terrestrial | 748 | 545 | 203 | 81.3 | Medium | (Cei, 1993; J. R. Dixon, 1985) |
| *Mastigodryas boddaerti* | Terrestrial | 1800 | 895 | 305 | 331 | Large | (Montingelli et al., 2019; Siqueira et al., 2012) |
| *Micrurus altirostris* | Semifossorial | 783 | 732 | 51 | 483.4 | Small | (N. da Silva, 2016; N. da Silva & Sites, 1999; M. B. Harvey et al., 2003; G. Scrocchi, 1990b) |
| *Micrurus baliocoryphus* | Semifossorial | 1449 | 1374 | 75 | 616.2 | Small | (N. da Silva, 2016; N. da Silva & Sites, 1999; M. B. Harvey et al., 2003; G. Scrocchi, 1990b) |
| *Micrurus diana* | Semifossorial | 1052 | 954 | 54 | 257.2 | Small | (N. da Silva, 2016; N. da Silva & Sites, 1999) |
| *Micrurus frontalis* | Semifossorial | 1794 | 1728 | 66 | 584.9 | Small | (N. da Silva, 2016; N. da Silva & Sites, 1999; G. Scrocchi, 1990b) |
| *Micrurus lemniscatus* | Semifossorial | 1650 | 1550 | 100 | 557.5 | Small | (M. B. Harvey et al., 2003; O. A. V. Marques et al., 2006; Pires et al., 2014) |
| *Micrurus pyrrhocryptus*\* | Semifossorial | 1747 | 1666 | 81 | 966.5 | Small | (Cei, 1993; N. da Silva, 2016; N. da Silva & Sites, 1999; G. Scrocchi, 1990b) |
| *Micrurus silviae*\* | Semifossorial | 1113 | 1050 | 63 | 676.1 | Small | (N. da Silva, 2016; Di-Bernardo et al., 2007) |
| *Micrurus surinamensis* | Semifossorial | 1378 | 1198 | 180 | 496.8 | Small | (N. da Silva, 2016; Roze, 1996) |
| *Mussurana bicolor* | Semifossorial | 870 | 710 | 160 | 177.8 | Medium | (Gaiarsa et al., 2013; Gouturier & Faivovich, 1996; Pizzatto, 2005; Scott et al., 2006; G. Scrocchi & Viñas, 1990; H Zaher, 1996) |
| *Mussurana quimi* | Terrestrial | 1090 | 860 | 230 | 352.8 | Medium | (F. Franco et al., 1997; Scott et al., 2006; Silveira & Cotta, 2006) |
| *Oxybelis aeneus* | Arboreal | 1138 | 838 | 300 | 341.7 | Large | (Jadin et al., 2019, 2020, 2021) |
| *Oxyrhopus guibei* | Terrestrial | 955 | 745 | 210 | 354.5 | Large | (Pizzatto, 2005; Torello-Viera & Marques, 2017; Hussam Zaher & Caramaschi, 1992) |
| *Oxyrhopus petolarius* | Terrestrial | 910 | 690 | 220 | 1245.6 | Large | (Cabral & Scott, 2014; Cei, 1993; A. Giraudo, 2002; MacCulloch et al., 2009) |
| *Oxyrhopus rhombifer*\* | Terrestrial | 712 | 596 | 116 | 129.1 | Large | (Cei, 1993; A. Giraudo, 2002; Torello-Viera & Marques, 2017) |
| *Palusophis\_bifossatus* | Terrestrial | 2007 | 1520 | 487 | 450.9 | Large | (Cei, 1993; A. Giraudo, 2002; Leite, 2006; Otavio A.V. Marques & Muriel, 2007; Montingelli et al., 2019) |
| *Paraphimophis rusticus* | Terrestrial | 890 | 800 | 190 | 1406.8 | Medium | (Cei, 1993; Scott et al., 2006; G. Scrocchi & Viñas, 1990; H Zaher, 1996) |
| *Phalotris bilineatus* | Semifossorial | 320 | 290 | 30 | 13.6 | Small | (Cabral & Cacciali, 2015; Carreira et al., 2005; Cei, 1993; A. Giraudo, 2002; Puorto & Ferrarezzi, 1993) |
| *Phalotris lemniscatus* | Semifossorial | 368 | 338 | 30 | 40.5 | Small | (Cabral & Cacciali, 2015; Carreira et al., 2005; Cei, 1993; A. Giraudo, 2002; Puorto & Ferrarezzi, 1993) |
| *Phalotris matogrossensis* | Semifossorial | 495 | 463 | 32 | 30.1 | Small | (Cacciali & Motte, 2007; Lema et al., 2005; Leynaud et al., 2005) |
| *Phalotris sansebastiani* | Semifossorial | 524 | 475 | 49 | 49.4 | Small | (Jansen & Köhler, 2008; G. J. Scrocchi & Giraudo, 2012) |
| *Phalotris tricolor* | Semifossorial | 770 | 725 | 45 | 121.1 | Small | (Cacciali & Motte, 2007; Cei, 1993; Jansen & Köhler, 2008; Lema et al., 2005; Leynaud et al., 2005) |
| *Philodryas aestiva*\* | Terrestrial | 929 | 628 | 301 | 168.7 | Large | (Carreira et al., 2005; Cei, 1993; Celsi et al., 2008; A. Giraudo, 2002; R. Thomas, 1976) |
| *Philodryas agassizii* | Terrestrial | 307 | 297 | 10 | 29.1 | Medium | (Cei, 1993; Di Pietro et al., 2012; Otavio A.V. Marques et al., 2006) |
| *Philodryas baroni*\* | Semiarboreal | 1500 | 1211 | 499 | 471.6 | Large | (Briguera et al., 2006; Cacciali, 2009; Cei, 1993) |
| *Philodryas livida*\* | Terrestrial | 693 | 530 | 163 | 113.8 | Medium | (Smith et al., 2014; Robert Thomas & Fernandes, 1996) |
| *Philodryas mattogrossensis*\* | Terrestrial | 1522 | 1039 | 483 | 471.6 | Large | (Cacciali et al., 2016; R. Thomas, 1976) |
| *Philodryas olfersii*\* | Semiarboreal | 1400 | 718 | 354 | 452.7 | Large | (Carreira et al., 2005; Cei, 1993; A. Giraudo, 2002; Hartmann & Marques, 2005; R. Thomas, 1976) |
| *Philodryas patagoniensis*\* | Terrestrial | 1500 | 860 | 311 | 512.5 | Large | (Cei, 1993; Hartmann & Marques, 2005; López & Giraudo, 2008) |
| *Philodryas psammophidea*\* | Terrestrial | 1285 | 1015 | 270 | 168.7 | Large | (Cei, 1993; Quinteros-Muñoz et al., 2010; R. Thomas, 1976) |
| *Philodryas trilineata* | Arboreal | 1304 | 908 | 396 | 647.8 | Large | (Cei, 1993; R. Thomas, 1976) |
| *Philodryas varia* | Arboreal | 1151 | 861 | 290 | 361 | Large | (Cei, 1993; R. Thomas, 1976) |
| *Phimophis guerini* | Terrestrial | 1161 | 965 | 196 | 320.2 | Medium | (Cei, 1993; Filho et al., 2012; A. Giraudo, 2002; O. A. V Marques et al., 2001) |
| *Phimophis vittatus* | Semifossorial | 700 | 600 | 100 | 68.3 | Medium | (Alencar et al., 2013; Cei, 1993) |
| *Pseudoboa coronata* | Terrestrial | 723 | 644 | 179 | 203.1 | Medium | (Alencar et al., 2013; Marcio Martins & Oliveira, 1998) |
| *Pseudoboa nigra* | Terrestrial | 1215 | 930 | 285 | 527.1 | Medium | (Cacciali, 2009; Cei, 1993; De Paula Orofno et al., 2010; A. Giraudo, 2002) |
| *Pseudoeryx plicatilis* | Aquatic | 826 | 655 | 171 | 200.2 | Small | (Cabral & Caballero, 2012; Cei, 1993; Scartozzoni et al., 2010) |
| *Pseudotomodon trigonatus* | Terrestrial | 400 | 355 | 45 | 22.3 | Medium | (Cei, 1993; M. B. Harvey & Muñoz, 2004) |
| *Psomophis genimaculatus* | Terrestrial | 387 | 302 | 85 | 22.3 | Large | (O. Marques et al., 2015, 2005; S. Nenda, 2007) |
| *Psomophis obtusus* | Terrestrial | 359 | 300 | 95 | 22.9 | Large | (Cei, 1993; O. Marques et al., 2015) |
| *Rena unguirostris* | Fossorial | 103 | 101 | 2 | 2 | Small | (Cei, 1993; Laurent, 1984; Pinto et al., 2010) |
| *Simophis rhinostoma* | Terrestrial | 887 | 691 | 196 | 112.3 | Medium | (Cacciali et al., 2009; O. Marques et al., 2005) |
| *Siphlophis compressus* | Arboreal | 1420 | 1136 | 284 | 418.5 | Large | (Guedes et al., 2011; Sheehy et al., 2014) |
| *Siphlophis worontzowi* | Arboreal | 1107 | 885 | 222 | 137.4 | Large | (Henrique Caldeira Costa et al., 2010; Dal Vechio et al., 2015; Prudente et al., 2017) |
| *Spilotes pullatus* | Arboreal | 2100 | 1200 | 900 | 3030.1 | Medium | (Cei, 1993; A. Giraudo, 2002; Hauzman et al., 2005) |
| *Taeniophallus occipitalis* | Terrestrial | 504 | 379 | 125 | 40.5 | Large | (C. Myers & Cadle, 1994; C. W. Myers, 1974) |
| *Taeniophallus poecilopogon* | Terrestrial | 390 | 278 | 112 | 21.4 | Large | (Carreira et al., 2005; Cei, 1993; C. Myers & Cadle, 1994; C. W. Myers, 1974) |
| *Tantilla melanocephala* | Semifossorial | 370 | 290 | 80 | 15.4 | Medium | (Burgos Gallardo et al., 2012; Cei, 1993; Sawaya & Sazima, 2003; Wilson, 1999) |
| *Thamnodynastes chaquensis* | Terrestrial | 793 | 619 | 174 | 95.8 | Large | (J. R. Bailey et al., 2005; Bellini et al., 2014; Bergna & Alvarez, 1993) |
| *Thamnodynastes hypoconia* | Aquatic | 730 | 537 | 193 | 56.6 | Large | (J. R. Bailey et al., 2005; Bellini et al., 2014; F. L. Franco et al., 2003) |
| *Thamnodynastes lanei* | Terrestrial | 648 | 479 | 169 | 56.1 | Large | (J. R. Bailey et al., 2005) |
| *Thamnodynastes pallidus* | Terrestrial | 764 | 600 | 164 | 22.3 | Large | (J. R. Bailey et al., 2005; Bellini et al., 2014) |
| *Thamnodynastes strigatus* | Semiarboreal | 860 | 640 | 220 | 95.8 | Large | (J. R. Bailey et al., 2005; Bellini et al., 2014; Cei, 1993) |
| *Tomodon dorsatum* | Terrestrial | 707 | 532 | 175 | 94.7 | Medium | (Bizerra et al., 2005; Cei, 1993; M. B. Harvey & Muñoz, 2004) |
| *Tomodon ocellatus* | Terrestrial | 377 | 334 | 43 | 35.3 | Medium | (Cei, 1993; M. B. Harvey & Muñoz, 2004) |
| *Tomodon orestes* | Terrestrial | 515 | 448 | 67 | 31.3 | Medium | (M. B. Harvey & Muñoz, 2004) |
| *Xenodon dorbignyi* | Semifossorial | 443 | 372 | 71 | 95.8 | Medium | (Carreira et al., 2005; Cei, 1993; S. J. Nenda & Cacivio, 2007; Tozetti et al., 2009; Yanosky & Chani, 1988) |
| *Xenodon histricus* | Semifossorial | 333 | 282 | 51 | 11.3 | Medium | (Alves et al., 2013; Carreira et al., 2005; Cei, 1993) |
| *Xenodon matogrossensis*\* | Semifossorial | 462 | 395 | 67 | 21.1 | Medium | (Cabral et al., 2020) |
| *Xenodon merremi* | Terrestrial | 783 | 656 | 127 | 168.7 | Medium | (Cacciali, 2010; Pizzatto, Jordão, et al., 2008) |
| *Xenodon pulcher*\* | Semifossorial | 510 | 440 | 70 | 68.3 | Medium | (Cei, 1993; S. J. Nenda & Cacivio, 2007; G. Scrocchi & Cruz, 1993) |
| *Xenodon semicinctus* | Semifossorial | 412 | 366 | 46 | 46.2 | Medium | (Cei, 1993; S. J. Nenda & Cacivio, 2007; G. Scrocchi & Cruz, 1993) |
| *Xenodon severus* | Terrestrial | 1000 | 840 | 160 | 978.2 | Medium | (Chippaux, 1986; Kahn, 2010; M. V. Silva et al., 2006) |
| *Xenopholis undulatus* | Terrestrial | 465 | 395 | 70 | 24.2 | Medium | (Henrique Caldeira Costa et al., 2013; Gomes et al., 2020; Jansen et al., 2009) |

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**Table S2.** Predictor variables used in the study. Climatic variables were download from the WorldClim (Fick & Hijmans, 2017); http:// www.worldclim.org). The annual actual evapotranspiration (AET) was used from (Abatzoglou *et al.*, 2018) and net primary productivity (NPP from https://lpdaac.usgs.gov/, and the Normalized difference vegetation index (NDVI) from (Tucker *et al.*, 2005). Habitat heterogeneity variables were download from http://www.earthenv.org// (Tuanmu & Jetz, 2015), tree cover from the http://earthenginepartners.appspot.com/science-2013-global-forest (Hansen *et al.*, 2013), mean elevation download from https://asterweb.jpl.nasa.gov/gdem.asp (Graham *et al.*, 2014), and soil variables from https://soilgrids.org/ (Hengl *et al.*, 2017).

|  |  |
| --- | --- |
| **Climatic variables** | |
| BIO1 | Annual Mean Temperature |
| BIO2 | Mean Diurnal Range |
| BIO3 | Isothermality (BIO2/BIO7) (\* 100) |
| BIO4 | temperature seasonality |
| BIO5 | Max Temperature of Warmest Month |
| BIO6 | Min temperature of coldest month |
| BIO7 | Temperature Annual Range (BIO5-BIO6) |
| BIO8 | Mean Temperature of Wettest Quarter |
| BIO9 | Mean Temperature of Driest Quarter |
| BIO10 | Mean Temperature of Warmest Quarter |
| BIO11 | Mean Temperature of Coldest Quarter |
| BIO12 | Annual Precipitation |
| BIO13 | Precipitation of Wettest Month |
| BIO14 | Precipitation of Driest Month |
| BIO15 | Precipitation Seasonality |
| BIO16 | Precipitation of Wettest Quarter |
| BIO17 | Precipitation of Driest Quarter |
| BIO18 | Precipitation of Warmest Quarter |
| BIO19 | Precipitation of Coldest Quarter |
| **Productivity** | |
| AET | Actual evapotranspiration |
| NPP | Net primary productivity |
| NDVI | Normalized difference Vegetation index |
| **Habitat Heterogeneity** | |
| EVENNESS | Evenness of Enhanced Vegetation Index (EVI) |
| HOMOGENEITY | Similarity of Enhanced Vegetation Index (EVI) |
| TC | Tree cover in the year 2000, canopy closure |
| **Soil** | |
| FRAG | Volumetric fraction of coarse fragments (> 2 mm) |
| SAND | Proportion of sand particles (> 0.05 mm) in the fine earth fraction |
| **Topographic** | |
| ELEV | Mean elevation |

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**Table S3.** variance inflation factor (VIF) and Pearson correlation test of the variables using in the analysis.

|  |  |  |
| --- | --- | --- |
|  | **Environmental variables** | **VIF** |
| Climatic | Annual mean temperature | 5 |
| Precipitation seasonality | 2 |
| Habitat Heterogeneity | Evenness of the Enhaced Vegetation Index (EVI) | 2 |
| Homogeneity of the Enhaced Vegetation Index (EVI) | 3 |
| Tree cover | 2 |
| Productivity | Actual evapotranspiration | 2 |
| Net primary productivity | 2 |
| Normalized difference vegetation index | 2 |
| Soil | Volumetric percentage of coarse fragments | 3 |
| Proportion of sand particles in the soil | 1 |

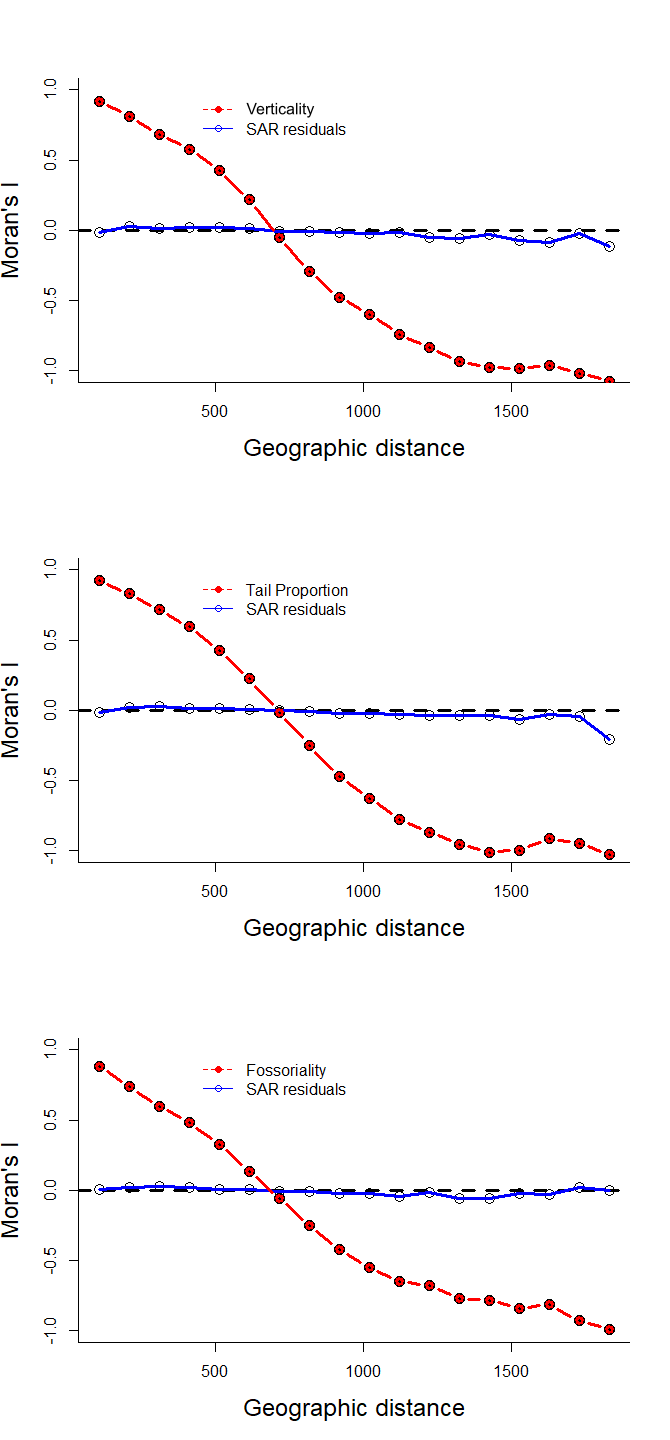
**Table S4.** Pearson correlation test for all the 10 environmental variables. No correlation between variables cor >0.8.

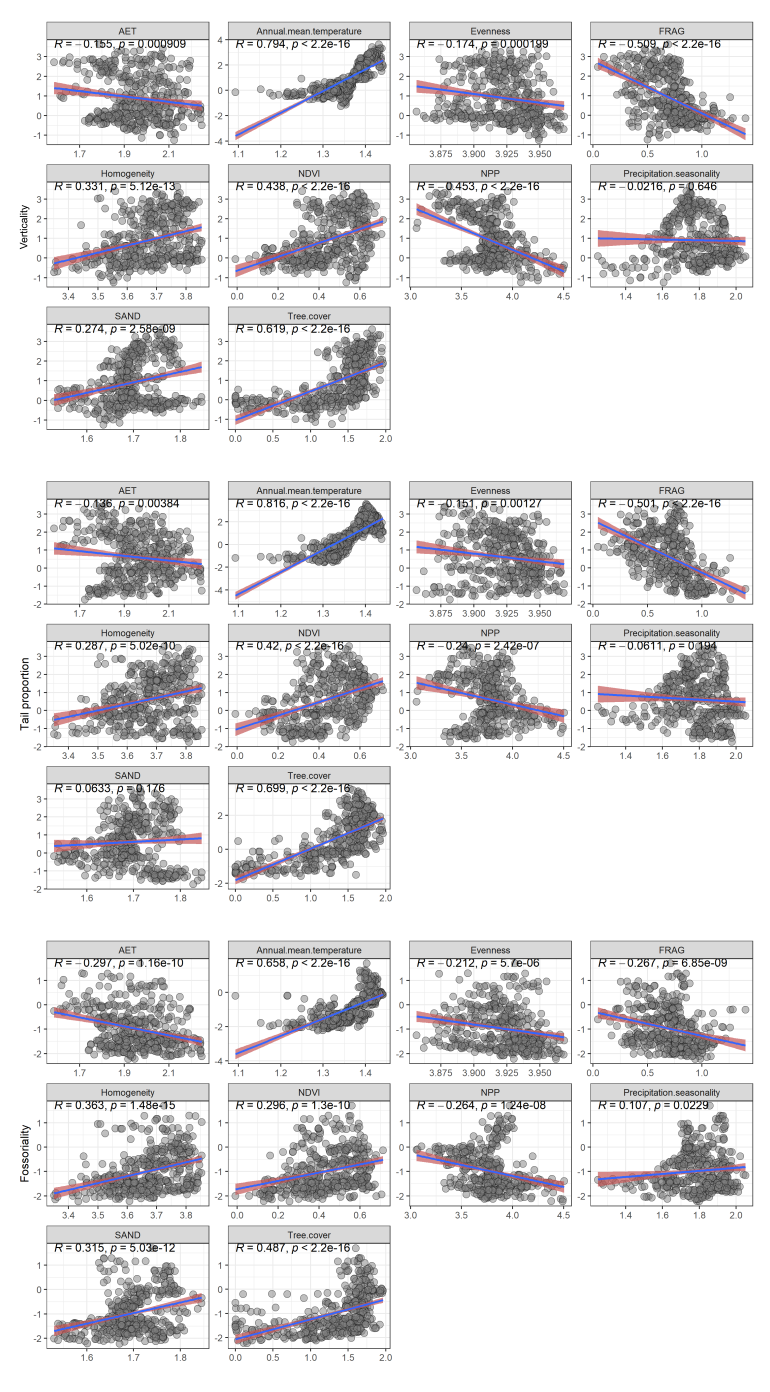
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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Annual mean temperature | Precipitation seasonality | Evenness of the Enhaced Vegetation Index (EVI) | Actual evapotranspiration | Volumetric percentage of coarse fragments | Homogeneity of the Enhaced Vegetation Index (EVI) | Net primary productivity | Proportion of sand particles in the soil | Tree cover | Normalized difference vegetation index |
| Annual mean temperature | 1.0 | 0.0 | 0.5 | 0.1 | -0.5 | 0.5 | -0.1 | 0.0 | 0.6 | 0.5 |
| Precipitation seasonality | 0.0 | 1.0 | 0.2 | -0.3 | 0.5 | 0.5 | -0.2 | 0.2 | 0.1 | -0.3 |
| Evenness of the Enhaced Vegetation Index (EVI) | 0.5 | 0.2 | 1.0 | 0.5 | -0.2 | 0.1 | 0.2 | -0.2 | 0.1 | 0.2 |
| Actual evapotranspiration | 0.1 | -0.3 | 0.5 | 1.0 | -0.3 | -0.4 | 0.4 | -0.4 | 0.0 | 0.3 |
| Volumetric percentage of coarse fragments | -0.5 | 0.5 | -0.2 | -0.3 | 1.0 | 0.1 | 0.2 | 0.2 | -0.4 | -0.4 |
| Homogeneity of the Enhaced Vegetation Index (EVI) | 0.5 | 0.5 | 0.1 | -0.4 | 0.1 | 1.0 | -0.4 | 0.3 | 0.3 | 0.0 |
| Net primary productivity | -0.1 | -0.2 | 0.2 | 0.4 | 0.2 | -0.4 | 1.0 | -0.3 | -0.2 | 0.0 |
| Proportion of sand particles in the soil | 0.0 | 0.2 | -0.2 | -0.4 | 0.2 | 0.3 | -0.3 | 1.0 | 0.2 | 0.1 |
| Tree cover | 0.6 | 0.1 | 0.1 | 0.0 | -0.4 | 0.3 | -0.2 | 0.2 | 1.0 | 0.5 |
| Normalized difference vegetation index | 0.5 | -0.3 | 0.2 | 0.3 | -0.4 | 0.0 | 0.0 | 0.1 | 0.5 | 1.0 |

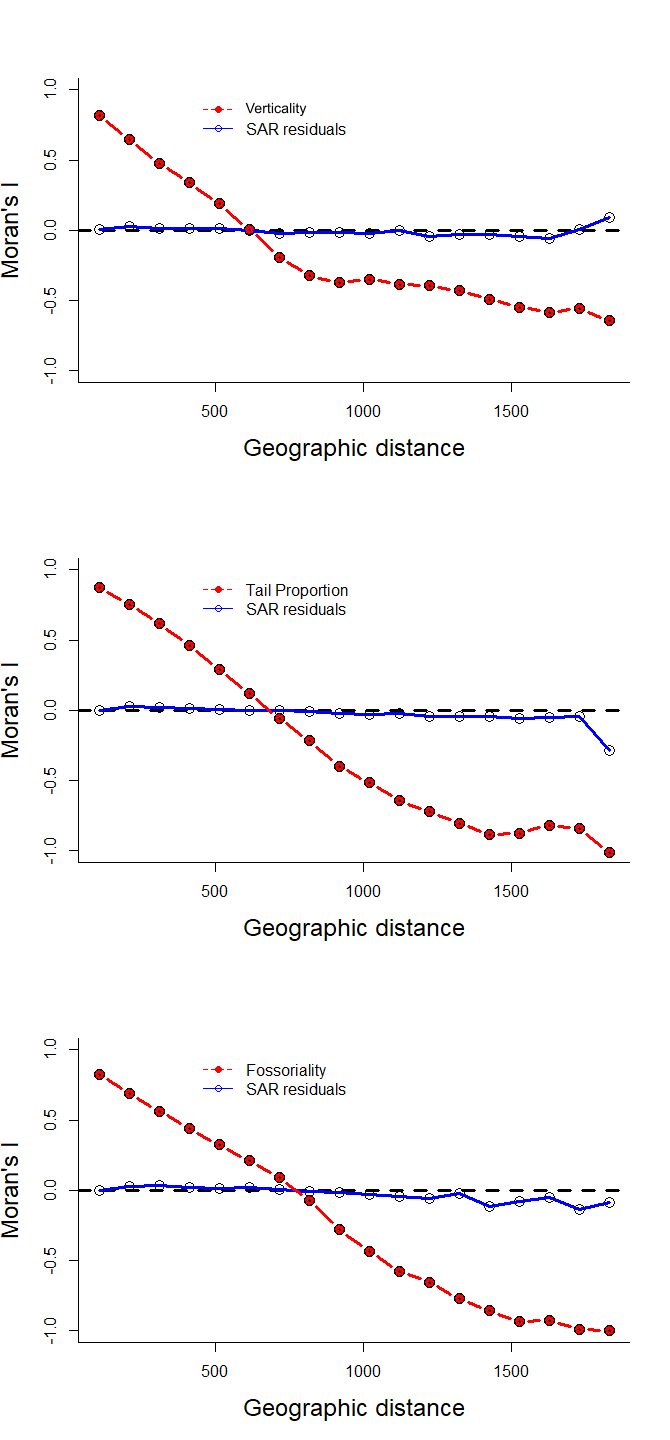
**Figure S1.** Principal components of our trait data. Fossorial species are located at the left and arboreal species at right.

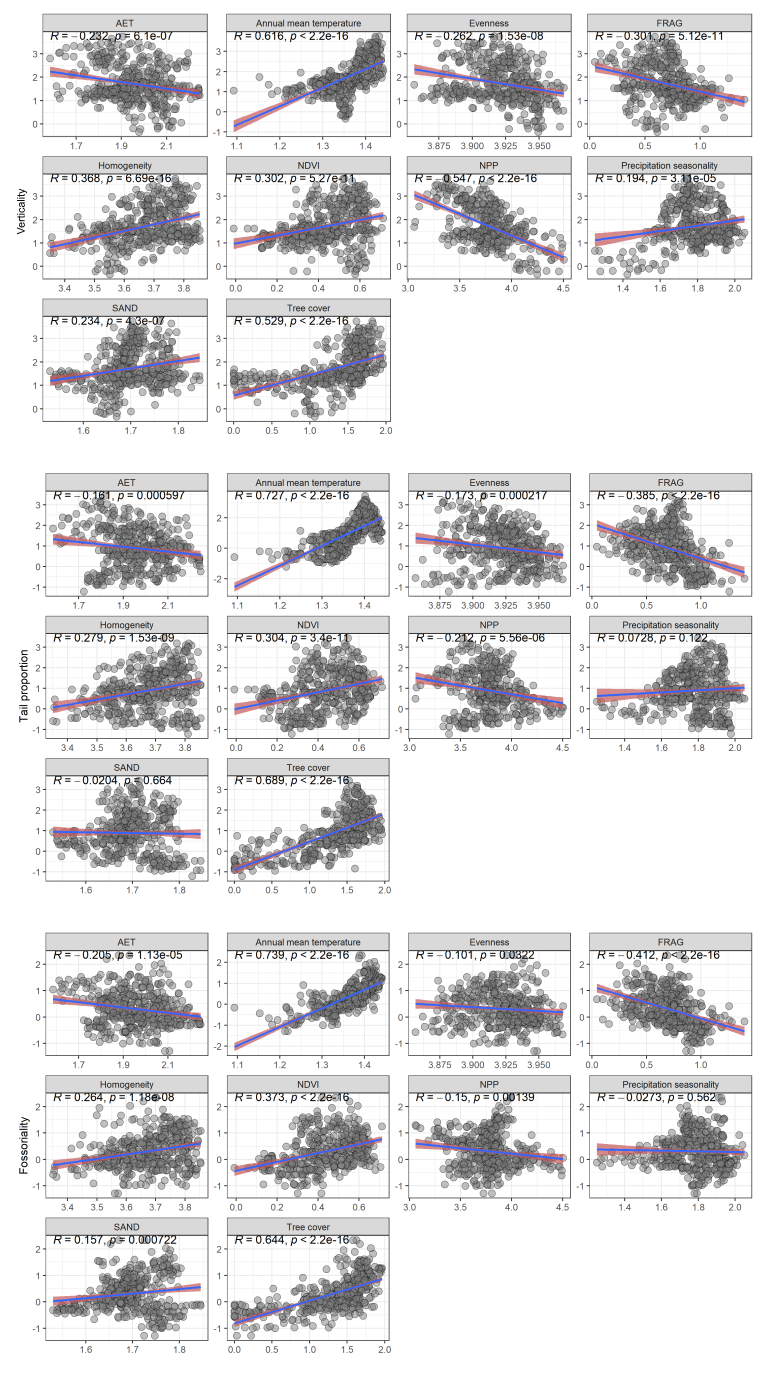
Gráfico, Gráfico de dispersión

Descripción generada automáticamente

**Figure S2.** Regional autocorrelograms. Red line represents spatial autocorrelation in vertical habitat, tail proportion and fossoriality. of our response and predictors variables. Blue lines are the spatial autocorrelation in our spatial autoregressive (SAR) models. Averaged residuals represent the difference between raw values from an explanatory variable and the averaged fitted values (weighted AICc x fitted values) from SAR models.

**Figure S3.** Correlation between our response and predictors variables. Numbers on top represent Pearson correlation with significance probability.

**Figure S4.** Regional autocorrelograms from our sensitivity analysis. Red line represents spatial autocorrelation in vertical habitat, tail proportion and fossoriality. of our response and predictors variables. Blue lines are the spatial autocorrelation in our spatial autoregressive (SAR) models. Averaged residuals represent the difference between raw values from an explanatory variable and the averaged fitted values (weighted AICc x fitted values) from SAR models.

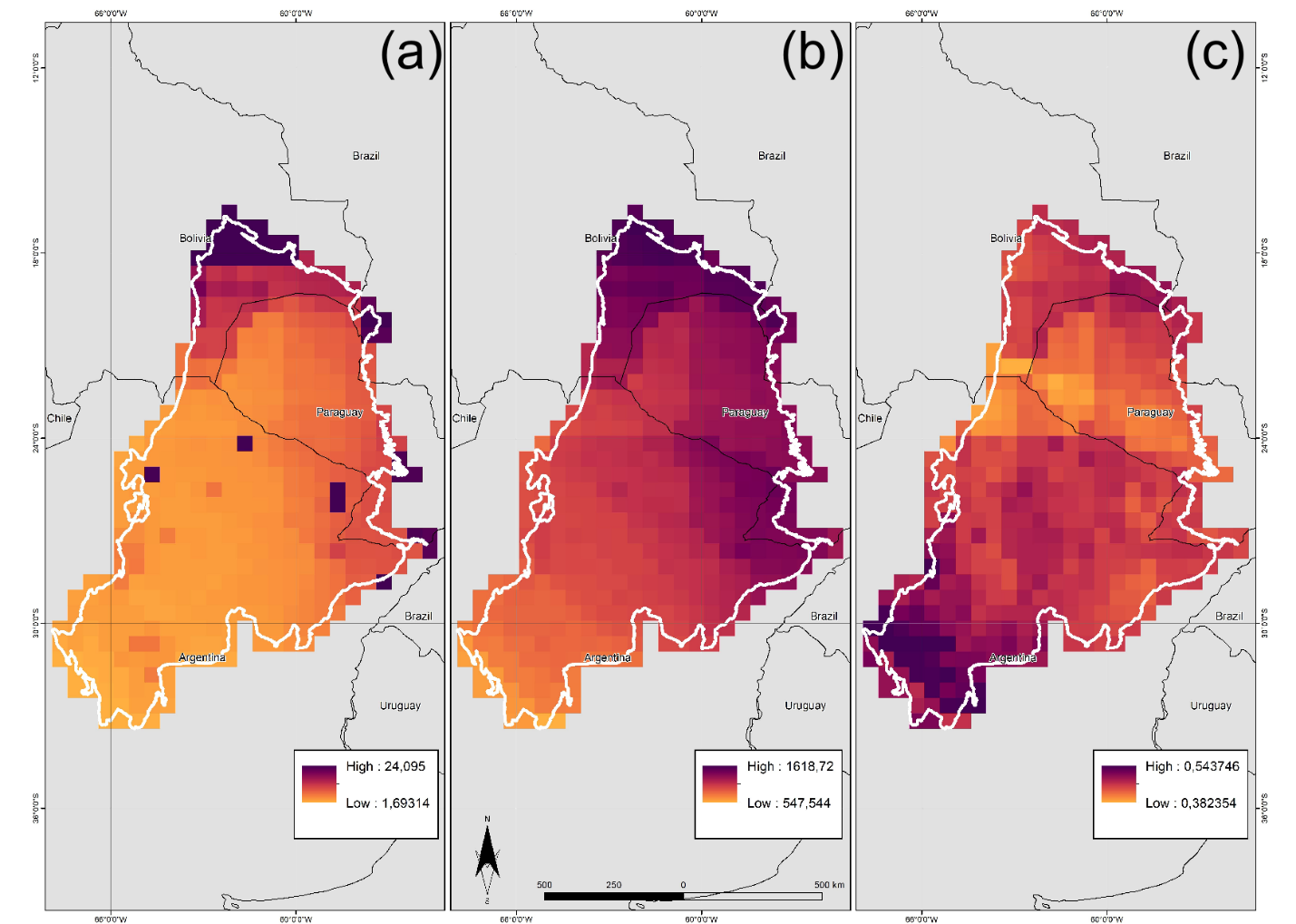
**Figure S5.** Correlation between our response and predictors variables from our sensitivity analysis. Numbers on top represent Pearson correlation with significance probability.

**Figure S6.** The threshold of explained variances to identify the optimal number of phylogenetic regions. Red line and circle in the graph represent the optimal numbers of phylogenetic region.

Gráfico, Gráfico de líneas

Descripción generada automáticamente

**Figure S7.** Geographical pattern of phylogenetic endemism PE, phylogenetic diversity PD, phylogenetic species variability (PSV). Phylogenetic endemism measures endemism based on the relatedness of species (Rosauer *et al.*, 2009; Daru *et al.*, 2020), calculate the spatial uniqueness of each branch in the tree taking the reciprocal of its range, multiplying by branch length, and summing for all branch lengths present at a sample/site (Rosauer *et al.*, 2009). Phylogenetic diversity is a measure to compared diversity in geographic areas, evolutionary history shared between areas (Graham & Fine, 2008; Laffan *et al.*, 2016), and describe the evolutionary distinctiveness of component taxa (Faith, 1992; Helmus *et al.*, 2007). How phylogenetically related are species in a community was measure through phylogenetic species variability (Helmus *et al.*, 2007). PSV is standardized to vary between zero when species are closely related and one when species are distantly related, indicating maximum variability. As relatedness increases, the index approaches 0, indicating reduced variability (Helmus *et al.*, 2007; Pyron & Burbrink, 2014; Burbrink & Myers, 2015).



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Figure S8. Phylogeny of snakes from the Gran Chaco, representing the 140 species used in this study. Phylogeny data was extracted and pruned from Tonini et al. (2016).

Diagrama

Descripción generada automáticamente

Tonini, J. F. R., Beard, K. H., Ferreira, R. B., Jetz, W., & Pyron, R. A. (2016). Fully-sampled phylogenies of squamates reveal evolutionary patterns in threat status. *Biological Conservation*, *204*, 23–31. https://doi.org/10.1016/j.biocon.2016.03.039