**ATLANTIC-CAMTRAPS: a dataset of medium and large terrestrial mammal communities in the Atlantic Forest of South America**

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## INTRODUCTION

Camera traps have been used in studies of wild animals since the early 20th century (Chapman 1927). From the first attempts by George Shiras III to create self-triggered cameras in the early 1900's, to modern day camera traps, this tool has become essential in wildlife monitoring (Kucera and Barrett 2011). Its vast potential to monitor mammal communities soon became evident, and wildlife researchers realized that photography would be an invaluable aid to study animals in their natural environment. From then on, the development of camera trap technology, associated with a relative reduction in its costs, allowed an exponential increase in studies applying this method, especially with species difficult to observe and detect otherwise (Ahumada et al. 2013, Pimm et al. 2015).

Most terrestrial vertebrates – such as large mammal species – occur at low densities and are very secretive. Consequently, any relevant ecological question at the population or community level requires a huge effort in the field. In addition, with the continuous decline of biodiversity worldwide, many mammal species are becoming increasingly rare in areas with high hunting pressure, habitat loss and habitat fragmentation (Butchart et al. 2010, Kosydar et al. 2014b, Ripple et al. 2016). Systematic studies using camera traps over the past decade were aimed mainly at species inventories, activity patterns and estimation of abundance (Tobler et al. 2008a, 2008b). These studies have brought novel information on the distribution and behavior of many species.

Long-term wildlife monitoring programs and online databases, such as the Tropical Ecology Assessment and Monitoring Network, are dealing with an unprecedented amount of species records and data from camera traps surveys (Jansen et al. 2014). However, often information is kept trapped and dispersed in dissertations, reports, and all kinds of gray literature. At another level, wildlife surveys conducted by non-governmental agencies and private consultants are rarely easily accessible. Thus, the potential to detect large scale or global patterns by using this large amount of data is still underutilized due to most of the information being fragmented and inaccessible in regional samplings.

The Atlantic Forest along the coast and interior of South America is among the most threatened tropical forest in the world – one of the world's biodiversity hotspots – and draws a high conservation concern due to its concentration of endemic and small-ranged species (Myers et al. 2000, Jenkins et al. 2015). In this hotspot, where only 12% of original forest still remains, the use of camera traps became increasingly accessible and popular in the early 2000's (Srbek-Araujo and Chiarello 2005, Ribeiro et al. 2009). Here we summarize and make available a database on camera trap studies conducted in the Atlantic Forest hotspot. Data was compiled from the existing literature and through direct contact with research groups and professionals.

This dataset derives from a large-scale synthesis of studies that used camera traps to sample medium and large terrestrial mammals in a biodiversity hotspot. To the best of our knowledge, this study is the first joint effort of field researchers and ecologists to organize a large-scale dataset of this kind, and provides an opportunity for understanding macroecological patterns, improving conservation strategies, and doing new community ecology research. A major distinction of this dataset is the inclusion of a large amount of raw and unpublished data, gathered through a network of collaborators and within a representative geographic extension of the Atlantic Forest hotspot. It combines 53,438 independent records of 83 mammalian species from 170 surveys conducted in 144 areas by 74 studies.

**METADATA**

**CLASS I. DATA SET DESCRIPTORS**

**A. Data set identity:** ATLANTIC-CAMTRAPS: a dataset of medium and large terrestrial mammal communities in the Atlantic Forest of South America

**B. Data set identification code:**

(1) ATLANTIC_CAMTRAPS_1-0_STUDY.csv

(2) ATLANTIC_CAMTRAPS_1-0_LOCATION.csv

(3) ATLANTIC_CAMTRAPS_1-0_SURVEY.csv

(4) ATLANTIC_CAMTRAPS_1-0_RECORDS.csv

(5) ATLANTIC_CAMTRAPS_1-0_SPECIES.csv

**C. Data set description:**

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**Abstract:**

Our understanding of mammal ecology has always been hindered by the difficulties of observing species in closed tropical forests. Camera trapping has become a major advance for monitoring terrestrial mammals in biodiversity rich ecosystems. Here we compiled one of the largest datasets of inventories of terrestrial mammal communities for the Neotropical region based on camera trapping studies. The dataset comprises 170 surveys of medium to large terrestrial mammals using camera traps conducted in 144 areas by 74 studies, covering six vegetation types of tropical and subtropical Atlantic Forest of South America (Brazil and Argentina), and present data on species composition and richness. The complete dataset comprises 53,438 independent records of 83 species of mammals, includes 10 species of marsupials, 15 rodents, 20 carnivores, 8 ungulates and 6 armadillos. Species richness averaged 13 species (± 6.07 SD) per site. Only six species occurred in more than 50% of the sites: the domestic dog *Canis familiaris*, crab-eating fox *Cerdocyon thous*, tayra *Eira barbara*, south American coati *Nasua nasua*, crab-eating raccoon *Procyon cancrivorus* and the nine-banded armadillo *Dasypus novemcinctus.* The information contained in this dataset can be used to understand macroecological patterns of biodiversity, community, and population structure, but also to evaluate the ecological consequences of fragmentation, defaunation, and trophic interactions.

**D. Key words:** Atlantic Forest, forest fragmentation, camera traps, neotropical mammals, biodiversity hotspot, mammal communities, invasive species

**E. Description:** The dataset combines 53,438 independent records of 83 species of medium to large terrestrial mammals from 170 surveys using camera traps conducted in 144 areas by 74 studies. We used data exclusively from camera trap surveys as they are ideal to record communities of terrestrial mammals, not selecting a specific group and photographing most species that cross in front of them. For this reason, it is considered the most reliable tool to register the occurrence and ecology of medium to large terrestrial mammals in tropical forests (Tobler et al. 2008a). In addition, it reduces our bias of detecting or missing species when compared with human direct surveys, such as line transect census and track surveys (Silveira et al. 2003). The dataset is restricted to the Atlantic Forest hotspot (Fig. 1).

For the general data analysis, we considered only species that were the focus of the included studies, medium to large terrestrial mammals, and excluded records considered opportunistic (such as birds, bats, primates, and small mammals). However, we kept the full records of all mammalian species in the database. Specifically, we only evaluated 47 species, from 36 genera, 17 families and 8 orders – hereafter, filtered dataset (Fig. 2). The full dataset has 10 orders, 28 families, 58 genera, and 83 species, of which 10% are classified as Vulnerable (VU) by IUCN, 61% are Least Concern (LC), 2% are Critically Endangered (CR), and 5% are invasive. Both species with CR status are primates (the muriqui *Brachyteles hypoxanthus*, and the buff-headed capuchin *Sapajus xanthosternos*). From the filtered dataset, seven species are classified as Vulnerable (Brazilian dwarf brocket *Mazama nana*, white-lipped peccary *Tayassu pecari*, southern tiger cat *Leopardus guttulus*, giant armadillo *Priodontes maximus*, lowland tapir *Tapirus terrestris*, giant anteater *Myrmecophaga tridactyla*, bristle-spined rat *Chaetomys subspinosus*) and five are Near Threatened (maned wolf *Chrysocyon brachyurus*, bush dog *Speothos venaticus*, margay *Leopardus wiedii*, jaguar *Panthera onca* and the neotropical otter *Lontra longicaudis*) (Fig. 3).

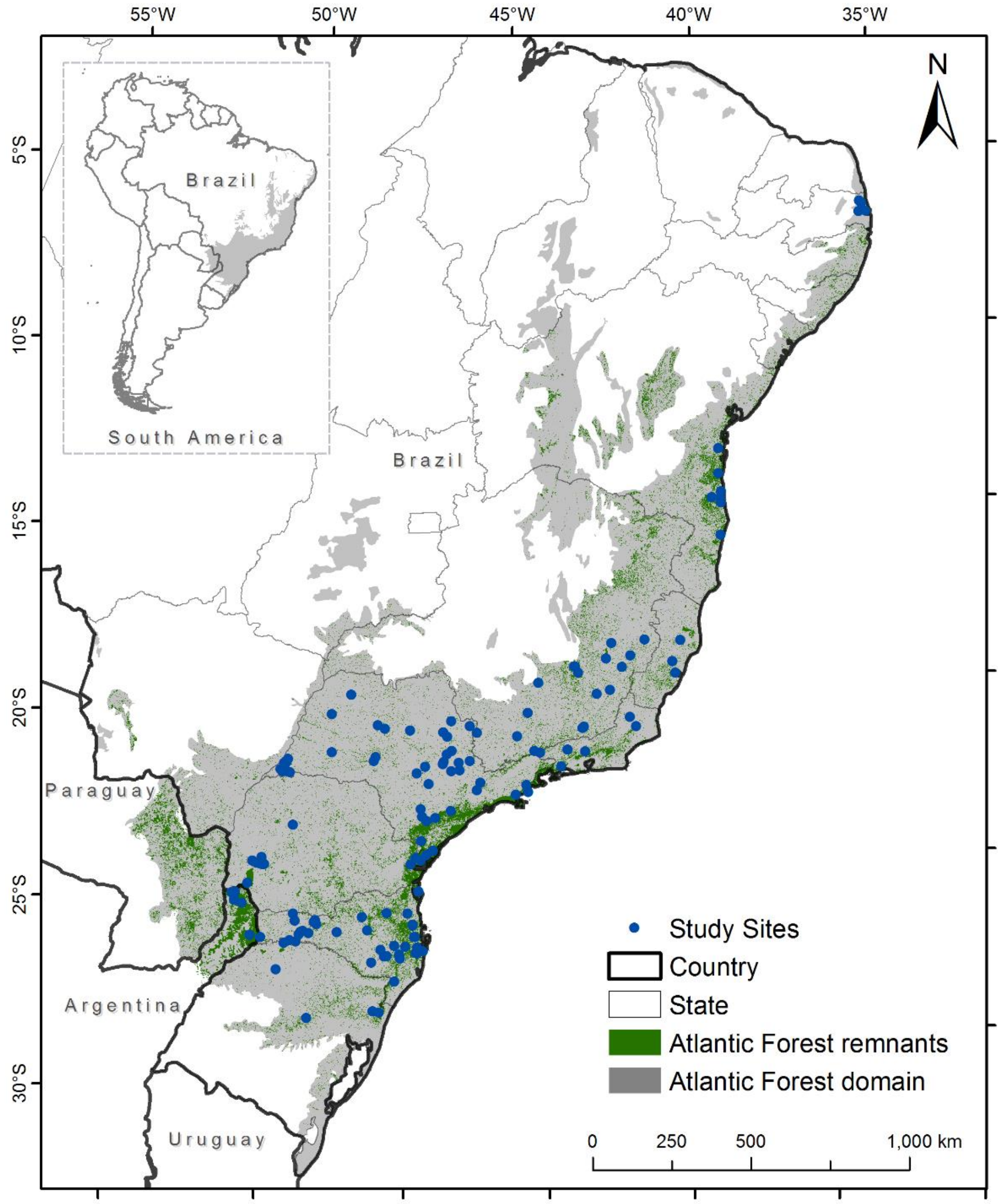


**Fig. 1. Distribution of the camera trap surveys of medium and large terrestrial mammal communities within the Atlantic Forest extent**. Gray shows the Atlantic Forest extent with remaining forest patches in green (*sensu* Ribeiro et al. 2009). Blue dots show the geographic locations of studies.

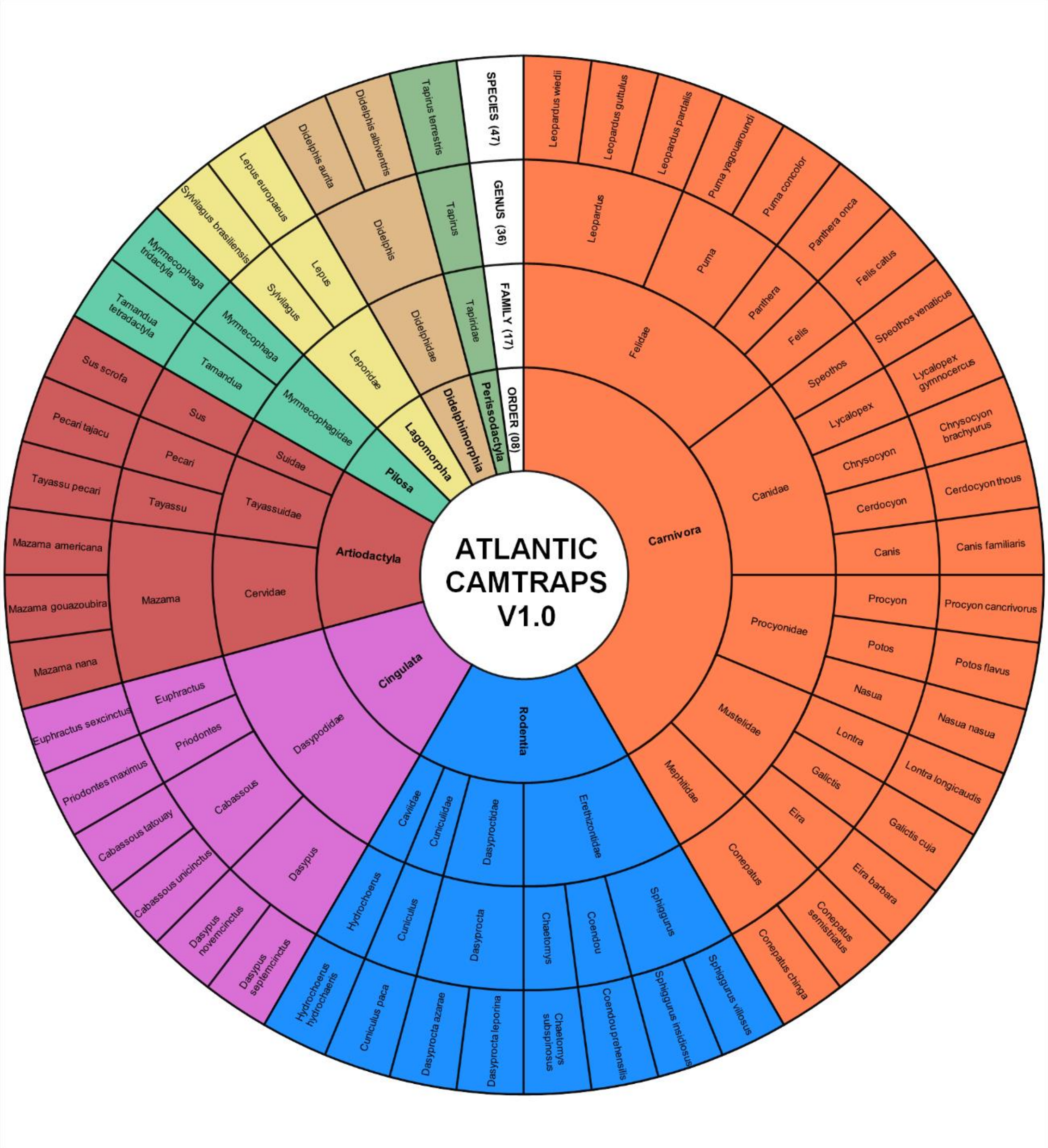


**Fig. 2**. **Taxonomic information levels of medium and large terrestrial mammal species recorded in camera trap surveys within the Atlantic Forest.** Only species considered well detected by camera traps are listed. From the 83 species reported in the database, 8 are not listed because the identification is at genera level. Another 28 species are not listed because they were considered opportunistic records of species not usually detected by camera traps (primates, bats, small rodents, and small marsupials).

The most frequent species were the nine-banded armadillo *Dasypus novemcinctus*, the south American coati *Nasua nasua*, and the crab-eating fox *Cerdocyon thous*, occurring in 79, 69, and 58% of all sites, respectively (Fig. 3). Species richness averaged 13 species (± 6.07 SD) per site (Fig. 4). Five species occurred in more than 50% of the sites: the domestic dog *Canis familiaris*, crab-eating fox *Cerdocyon thous*, tayra *Eira barbara*, south American coati *Nasua nasua*, crab-eating raccoon *Procyon cancrivorus*, and the nine-banded armadillo *Dasypus novemcinctus* (Fig. 3). From the full dataset, in the 144 sites, we had 16 species as singletons (i.e. species recorded in only one site). However, in our filtered dataset we had just two singletons: southern naked-tailed armadillo *Cabassous unicinctus* and giant armadillo *Priodontes maximus* (Fig. 3). From all the records, the most frequent species was the Brazilian common opossum *Didelphis aurita* with 1,283 records in a single site. This species alone is represented 10% of overall survey records (2,637 of 25,535), only considering studies that use a minimum one hour interval among records of the same species to allow comparison (*N* = 71). Among invasive species, the domestic dog was recorded in 56% of the sites and wild boars (*Sus scrofa*) in 16%.

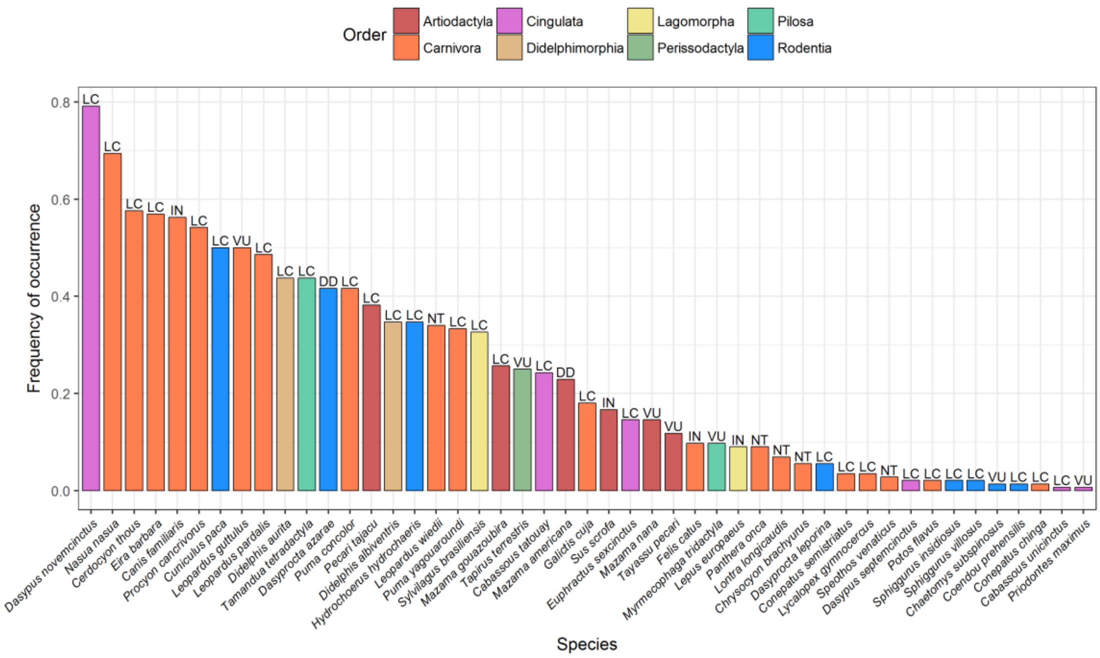


**Fig. 3. Distribution of frequencies of occurrence of the main species evaluated in ATLANTIC-CAMTRAPS, and their status in the 2017 IUCN Red list of threatened species.** LC = least concern, NT = near threatened, VU = vulnerable, EN = endangered, CR = critically endangered, DD = data deficient, and IN = invasive species (not an IUCN category).

Survey site altitude varied from sea level to 2,791 m (Parque Nacional do Itatiaia) and 67% were conducted in protected areas, adequately representing the broad altitudinal variation of Atlantic forests. On average the surveys used 12 (±12.76 SD) camera traps. As many studies reported that they moved camera traps during the same survey, the average number of sampling points was 16 (±20.77 SD). Distance between sampling stations varied from 100 to 7,192 m. Sampling effort per time, or trap/days, given by the number of survey days multiplied by the number of sampling points, is one of the main factors determining survey success and the number of recorded species (Srbek-Araujo and Chiarello 2007, Tobler et al. 2008a). This pattern was also detected in our dataset, as species richness showed to be correlated to sampling effort (adjusted $R^2$= 0.51, slope=8.18 ±0.66 SE, df=142, p<0.001, Fig. 5). The average effort among studies was 1,185 trap/days (min 40 – max 9,078). The median effort (450 trap/days) is considered adequate to obtain records from the most common species, while a minimum of 900 trap/days would be needed to detected local species efficiently (Tobler et al. 2008b, Si et al. 2014).

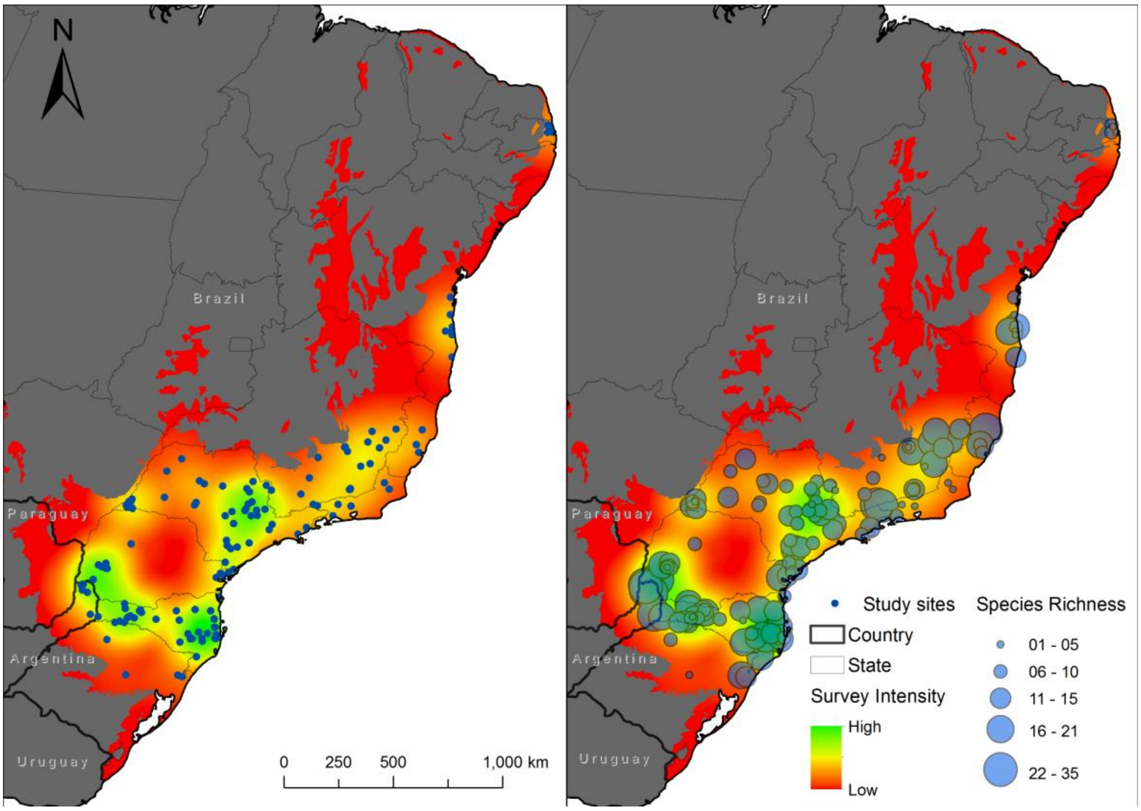


**Fig. 4. Distribution of taxonomic richness and sampling effort across Atlantic Forest sites where camera traps were used for sampling of medium and large terrestrial mammal species.** Opportunistic records (see the text) were removed from this analysis.

Some species can spend several minutes in front of a sampling station and trigger the sensor several times. The same individuals of a given species can also cross at the same sampling station many times in a short period. Also, species that present social behavior such as peccaries and coatis may highly increase the total number of records. To minimize these sources of bias, researchers establish a time interval among consecutive records to determine independence. Most surveys reported one hour minimum interval (42%), while 41 (24%) considered a 24-hour interval as an independent record. Other criteria were: 30 min (7%), 5 min (2%), and 30 seconds (1%). The remaining 24% of studies did not describe any criteria or reported only the total number of records. Only 18% reported having used any kind of baiting to increase detection probability.

In Brazil, most surveys were carried out in São Paulo state (27%) followed by Santa Catarina (21%) and Minas Gerais (18%) states. In Argentina, the surveys are concentrated in Misiones province, the southwestern limit of the Atlantic Forest. Several surveys from this region are raw data from a long term participatory network for carnivore monitoring promoted by Argentine researchers (De Angelo et al. 2011). No surveys in the Atlantic Forest of Paraguay were found during our data compilation process.

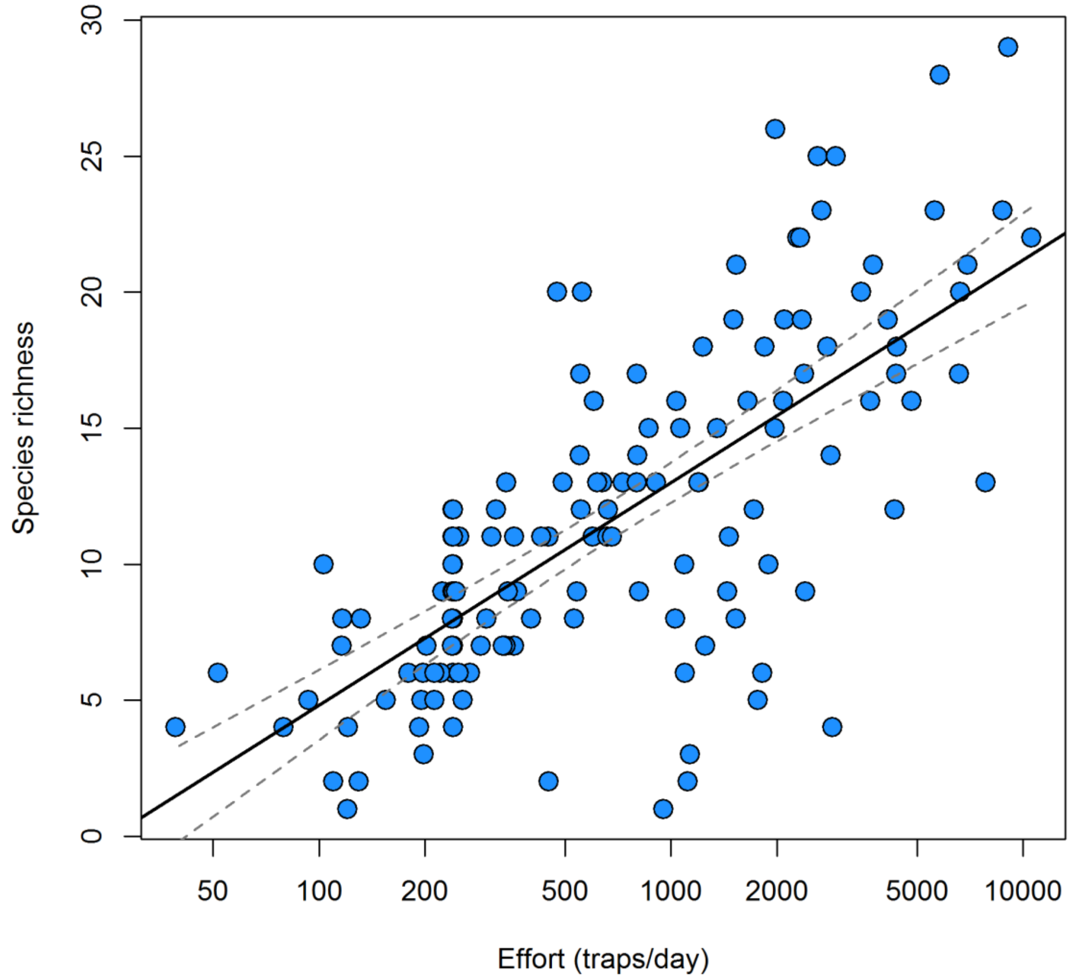


**Fig. 5. Positive effect of sampling effort on observed taxonomic richness of ATLANTIC-CAMTRAPS database.** Predictor of linear regression was log transformed (adjusted $R^2$= 0.51, slope=8.18 ±0.66 SE, df=142, p<0.001). Gray dashed lines represent 95% confidence intervals of predicted values.

**CLASS II. RESEARCH ORIGIN DESCRIPTORS**

**A. Overall project description**

**Identity:** A database integrating information medium to large terrestrial mammals from camera trap studies in the Atlantic Forest hotspot.

**Period of study:** Raw data range from 1999-2017.

**Objectives:** Our main goals in compiling this dataset were: (1) to summarize information on camera trap inventories conducted in the Atlantic Forest hotspot, (2) to make available data restricted to research groups and/or usually available only to Portuguese and Spanish speakers, and (3) to describe the major patterns in the studies and identify gaps of knowledge and information to guide future sampling and conservation efforts. This dataset follows the ATLANTIC biodiversity series, an effort to compile biodiversity information for the Atlantic Forest (e.g. Bello et al. 2017, Bovendorp et al. 2017)

**Abstract:** Same as above.

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**Site description:** Originally, the Atlantic Forest comprised a continuous forest of 150 million ha of evergreen and seasonally-dry forests ranging across a latitudinal gradient of over 3,300 km of the Brazilian Atlantic coast, with extensions in Paraguay and Argentina (Galindo-Leal and Câmara 2003, Tabarelli et al. 2010). The Atlantic Forest is divided into eight biogeographic sub regions, based on endemic species distribution, varying in altitude from sea level to 2,700 m above sea level and annual precipitation up to 4,000 mm/year (Câmara 2003, Silva and Casteleti 2003, Ribeiro et al. 2009).

The Atlantic Forest of South America supports up to 8% of the world's species and has one of the highest rates of endemism in the world (Myers et al. 2000). At least 15,519 plant species (3,343 trees) (Zappi et al. 2015), 891 bird species (Lima 2014), 543 amphibians (Haddad et al. 2013), 200 reptiles (Bérnils and Costa 2015), 350 fishes (MMA 2010), and 298 mammals (Paglia et al. 2012), including 22 species of marsupials (Paglia et al. 2012), and 105 species of rodents (Patton et al. 2015) are known from this ecoregion. The latest national evaluation classified 598 species as threatened in the ecoregion, and 428 of these are endemic (ICMBio 2016).

Its spatial distribution along the Brazilian coast exposed the Atlantic Forest to an intense process of territorial occupation in the past 300 years (Dean 1996). Currently, 88% of its extent has been lost and the remains are divided in more than 200,000 forest fragments (Ribeiro et al. 2009). Nearly 93% of the remaining forest is within one kilometer of a forest edge, and 12 km is the maximum distance from remnants to any non-forested area (Ribeiro et al. 2009, Haddad et al. 2015). Therefore, the Atlantic Forest is among the most threatened of tropical forests, and it draws a high conservation concern due to its high concentration of endemic and small-ranged species (Jenkins et al. 2015).

A major consequence of habitat loss and deterioration is the loss of sensitive species (i.e., rare and with low growth rate), particularly the losses of large vertebrates (Jorge et al. 2013, Kosydar et al. 2014a, Galetti et al. 2016a). Among the myriad causes of defaunation, poaching can be considered the main direct threat for medium and large mammals in the remaining forest fragments (Cullen et al. 2000, Canale et al. 2012, Kosydar et al. 2014b, Galetti et al. 2016a). Although 88% of the forest cover has been lost, there are no documented extinction of mammal in the last 500 years (Paglia et al. 2012). A few endangered species have recovered after major management and conservation interventions (e.g. the golden lion tamarin, *Leontopithecus rosalia*) (Johnson et al. 2017).

**Data compilation:** We obtained data from three main sources: (i) literature search using Google Scholar, Web of Science, Scielo, Scopus, JStore, and ResearchGate, (ii) data mining on gray literature to look for reports, reserve management plans, monographs, unpublished theses, and dissertations, and (iii) contacts with individuals and organizations known to have conducted camera trap surveys in the Atlantic Forest, inviting them to contribute.

**Research Methods:** We divided data acquisition in three stages. First, we conducted a literature search using Google Scholar, Web of Science, Scielo, Scopus, JStore, and ResearchGate. Second, we conducted data mining on gray literature, applying the same keywords to look reports, reserves management plans, monographs, unpublished theses, and dissertations.

Even with the increase in scale and popularity of studies using camera traps over the last decade, there is no standard data, metadata, and protocols (Forrester et al. 2016). In order to aggregate data from such a variety of sources, we divided camera trap data in five groups of information: 1) the "study" is a survey or scientific study conducted within a defined location and timeframe; 2) the "location" is a group of general descriptive spatial information, associated with a geographic coordinate of the forest patch(es) or region where the study were conducted; 3) the "survey" is a group of general information that describes the methods, equipment, and protocols used in the study, as well as its timeframe; 4) the "record" contains information associating each record to a species detected during the study as well as number of records or presence/absence data; and 5) the "species" data with taxonomic information of species detected during the study. We organized these groups of information in a relational database structure in Microsoft Access – version 2007-2016 (Fig. 6). For each group of information, we standardized and converted data to fit the dataset structure (Tables 02 to 06). Using this approach we gathered data from Cerveira 2005, Alves and Andriolo 2005, Srbek-Araujo and Chiarello 2005, 2013, Rezini 2007, Kasper et al. 2007, Diniz 2008, Barros 2008, Modesto et al. 2008b, 2008a, Lyra-Jorge et al. 2008, Prado et al. 2008, 2014, Paviolo et al. 2008, 2016, Alves 2009, Lima 2009, 2012, Bastos Neto et al. 2009, Silva and Passamani 2009, Goulart et al. 2009, Abreu Júnior and Köhler 2009, Esteves 2010, Kuhnen 2010, Tonini et al. 2010, de Oliveira 2011, Marques et al. 2011, Norris et al. 2011, Cherem et al. 2011, Espartosa et al. 2011, Falcão et al. 2012, Hortenci 2012, Melo et al. 2012, Motta Lessa 2012, Penido and Zanzini 2012, Paschoal et al. 2012, Nunes et al. 2012, 2013, Cassano et al. 2012, 2014, Brocardo et al. 2012, 2013, de Carvalho et al. 2013, Gomes Albuquerque et al. 2013, Kionka 2013, Pazio 2013, Bogoni et al. 2013, 2016, Carvalho et al. 2013, Costa 2014, Gatti et al. 2014, Soares et al. 2014, Tortato et al. 2014, Talamoni et al. 2014, Rocha-Mendes et al. 2015, Beca et al. 2017.

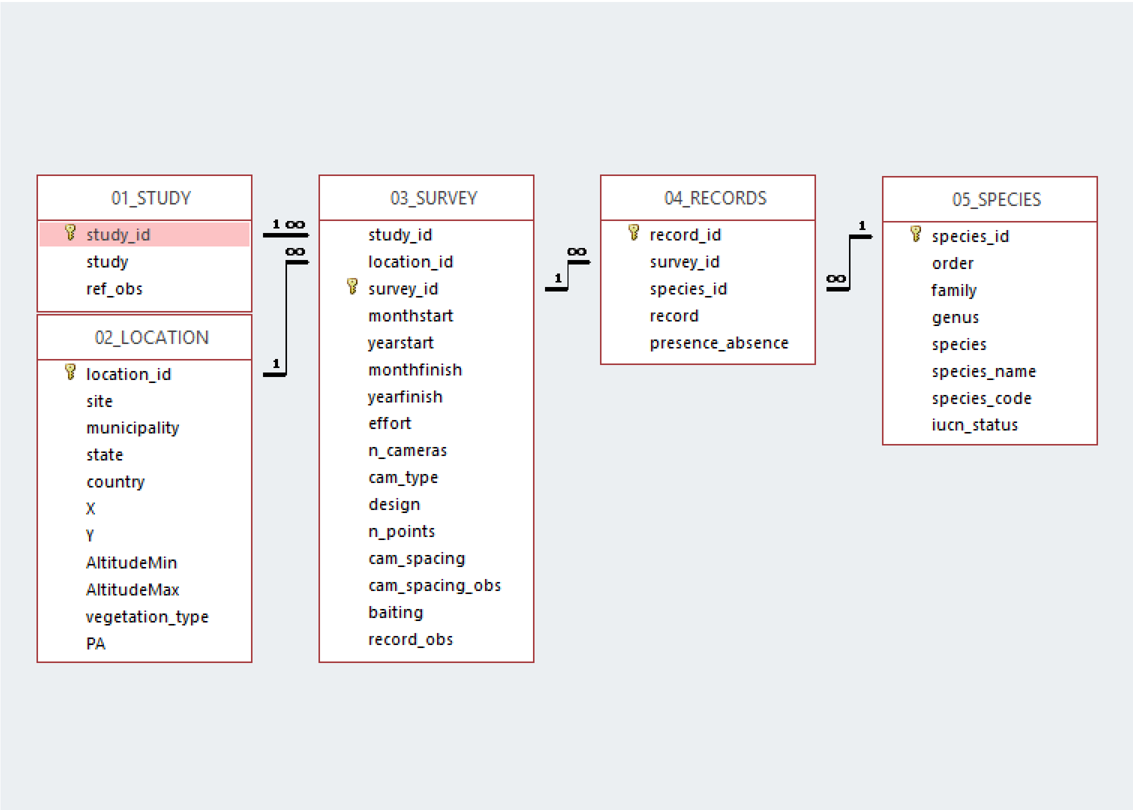


**Fig. 6 Standardized layout of the database ATLANTIC-CAMTRAPS.** Guideline to the correlational structure in order to inform how the database is organized.

After the definition of the database structure and organization of the literature data resulting from the two stages of data mining, we observed several spatial gaps of information, that is although the search in the literature did not reveal the presence of studies, we knew that some regions had already been sampled by research groups. Finally, to fill these gaps, as a third stage of data acquisition, we contacted several individuals and organizations known to have conducted camera trap surveys in the Atlantic Forest, inviting them to contribute.

For each survey, when described otherwise (e.g., trap/hour), we converted the effort to trap/day (number of sampling stations * sampling period). We converted latitudes and longitudes to Geographic Coordinate System WGS 84. Survey sites from the literature were checked and adjusted one by one using Google Earth and we extracted the vegetation type using the classes described in Ribeiro et al. (2009). We standardized the taxonomy of medium to large terrestrial mammals using the Taxize package in R environment (Chamberlain and Szöcs 2013, R Core Team 2016). We used the same package to access species status under the IUCN Red List of Threatened Species, and later verified it on the IUCN website (IUCN 2016). We also added the category IN as a reference to invasive species and feral domestic animals detected in the surveys (i.e. *Sus scrofa, Felis catus, Canis familiaris, Lepus europaeus*). We did not exclude these species because of their high detectability in camera trap studies and because they present feral populations and may have a high impact on the community and disease transmission (Galetti and Sazima 2006, Pedrosa et al. 2015, Paschoal et al. 2016, Galetti et al. 2016b). However, we excluded cattle, horses, and goats, since their presence and absence are related to management and they do not represent feral populations in the Atlantic Forest.

The placement of camera traps near the ground favors terrestrial and scansorial species, thus not being appropriate to register other groups of mammals (Srbek-Araujo and Chiarello 2005). Nevertheless, many studies report opportunistic records of small rodents, primates, and even bats. For the general data description presented here we, excluded records considered opportunistic, but kept the records in the database. The species excluded are presented in Table 1. We also excluded records of genera without a species identification: *Mazama* sp., *Leopardus* sp., *Cabassous* sp. *Dasypus* sp., *Didelphis* sp. *Marmosops* sp., *Cavia* sp., *Dasyprocta* sp., and *Trinomys* sp.

To define Atlantic Forest boundaries, we merged available geographic information from widely used limits along an area that comprises more than 2 million km$^2$: the Brazilian limit provided by government Institutes (IBGE 2004), the limit provided by the Atlantic Forest Law website (MMA 2006), the one available at Ribeiro et al. (2009), and the shapefile reported in Olson et al. (2001) where the categories Atlantic forests and Atlantic dry forests are represented inside and outside Brazil.

**Taxonomy and systematics:** We standardized up to date taxonomy of medium to large terrestrial mammals using the Taxize package in R environment (Chamberlain and Szöcs 2013, R Core Team 2016). We used the same package to access species status under the IUCN Red List of Threatened Species, and later verified it on the IUCN website (IUCN 2016).

**C. Data limitations and potential enhancements:**

We recognize that documenting all species of terrestrial mammals present in megadiverse ecosystems depends on sampling effort, microhabitats sampled, and detectability of each species (Tobler et al. 2008a). Several species occur along water bodies (e.g., *Cuniculus paca,* *Hydrochoerus hydrochaeris, Lontra longicaudis*) and may not be recorded if this microhabitat is not sampled (Beca et al. 2017). Sampling along roads and large trails can also affect detectability and the species recorded (Harmsen et al. 2010, Bitetti et al. 2014). Some species are too rare (e.g. *Panthera onca, Speothos venaticus*) or move too fast (*Galictis* spp.) and require intensive sampling (Fusco-Costa and Ingberman 2013).

Although this dataset comprises only studies that used camera trapping, most surveys are heterogeneous, with sampling design and efforts highly variable, precluding a more comprehensive diagnosis of diversity throughout the Atlantic Forest. Effort alone has a relevant influence on species richness (adjusted $R^2$= 0.51, slope=8.18 ±0.66 SE, df=142, p<0.001; Fig. 5). Different equipment may influence the capture success of species (Tobler et al. 2008). The use of baits, despite not used in most studies, may also introduce bias in the results. Baits used to improve predator detection have been reported to repel some prey species (Rocha et al. 2016). In addition, the sampling effort length of studies is highly variable, and all them are limited to an 18-year timeframe with most areas sampled only once, limiting the ability to detect long-term population trends.

Another consistent limitation is the uneven sampling throughout the Atlantic Forest, with very few studies in the fragmented forest in north-east of Brazil and none in Paraguay (Fig. 4). The general spatial pattern of survey intensity is biased towards economically developed regions, protected areas, and with close proximity to large cities and universities. It is important to mention that, despite representing the general pattern of survey intensity along the Atlantic Forest, likely not all studies are included here. The data mining process may have overlooked some studies. Also, a few invited research groups and individuals declined to collaborate with unpublished data. Some bioregions where we expect to find highly endemic species were not sampled (e.g. Brejos de Altitude, Ceará). Another limitation is in species identification of some groups (e.g. *Leopardus, Mazama*) where more than one species in the same genera can occur and good photography is needed to identify the correct species.

Despite these limitations, these data represent a massive effort by biologists and ecologists working in this biodiversity hotspot. Collectively, it represents the largest available dataset of the communities of medium and large mammals in tropical and subtropical forests. The results from this dataset can detect gaps to improve the sampling of terrestrial mammals, help identify priority areas for conserving endangered species and populations, aid in understanding community composition and potential trophic cascades mediated by mammals (Jorge et al. 2013), and help to understand the impact and occurrence of invasive species (Pedrosa et al. 2015, da Rosa et al. 2017).

**CLASS III. DATA SET STATUS AND ACCESSIBILITY**

**A. Status**

**Latest update:** May 2017

**Latest archive date:** May 2017

**Metadata status:** Last updated May 2017, version submitted

**Data verification:** We verified the data at distinct levels. We converted all latitudes and longitudes to Geographic Coordinate System WGS 84, and checked and adjusted one by one when necessary using Google Earth. We searched for extreme values, transcription errors, and excluded all diacritic marks to avoid encoding problems. See Research Methods section for further details.

**B. Accessibility**

**Storage location and medium:** In addition to Ecological Society of America Data Registry, our dataset will also be available in MySQL format at http://www.leec.eco.br/data.html (Spatial Ecology and Conservation Lab repository).

**Contact person(s):** Fernando Lima (pardalismitis@gmail.com), Mauro Galetti (mgaletti@rc.unesp.br), Milton Cezar Ribeiro (mcr@rc.unesp.br)

**Copyright restrictions:** None

**Proprietary restrictions:** Please cite this data paper if the data are used in publications. We intend to keep it up to date as novel studies become available (server link above).

**Costs:** None

**CLASS IV. Data structural descriptors**

**A. Data set file**

**Identity:** (1) ATLANTIC_CAMTRAPS_1-0_STUDY.csv

(2) ATLANTIC_CAMTRAPS_1-0_LOCATION.csv

(3) ATLANTIC_CAMTRAPS_1-0_SURVEY.csv

(4) ATLANTIC_CAMTRAPS_1-0_RECORDS.csv

(5) ATLANTIC_CAMTRAPS_1-0_SPECIES.csv

**Size:** (1) ATLANTIC_CAMTRAPS_1-0_STUDY.csv, 74 studies, 16 KB;

(2) ATLANTIC_CAMTRAPS_1-0_LOCATION.csv, 144 communities, 20 KB;

(3) ATLANTIC_CAMTRAPS_1-0_SURVEY.csv, 170 surveys, 28 KB;

(4) ATLANTIC_CAMTRAPS_1-0_RECORDS.csv, 14.110 entries, 452 KB;

(5) ATLANTIC_CAMTRAPS_1-0_SPECIES.csv, 83 species, 8 KB.

**Format and storage mode:** available as comma-separated values (*.csv), and stored in a relational Microsoft Access database (*.accdb)

**Alphanumeric attributes:** Mixed

**Data anomalies:** If no information is available for a given record the field is empty.

**TABLES**

**Table 1.** Species detected in camera trap surveys in Atlantic Forest considered opportunistic records. These species were not accounted in data description, but the records are kept in the database.

| ORDER | FAMILY | GENUS | SPECIES | IUCN STATUS |
|---|---|---|---|---|
| Artiodactyla | Bovidae | Bos | *Bos taurus* | - |
| Chiroptera | Phyllostomidae | Sturnira | *Sturnira lilium* | LC |
| Didelphimorphia | Didelphidae | Gracilinanus | *Gracilinanus agilis* | LC |
| | | | *Gracilinanus microtarsus* | LC |
| | | Marmosa | *Marmosa murina* | LC |
| | | Marmosops | *Marmosops incanus* | LC |
| | | Metachirus | *Metachirus nudicaudatus* | LC |
| | | Monodelphis | *Monodelphis scalops* | LC |
| | | Philander | *Philander frenatus* | LC |
| | | | *Philander opossum* | LC |
| Pilosa | Bradypodidae | Bradypus | *Bradypus torquatus* | VU |
| Primates | Atelidae | Alouatta | *Alouatta caraya* | LC |
| | | | *Alouatta guariba* | LC |
| | | Brachyteles | *Brachyteles hypoxanthus* | CR |
| | Callitrichidae | Callithrix | *Callithrix geoffroyi* | LC |
| | | | *Callithrix kuhlii* | NT |
| | | | *Callithrix penicillata* | LC |
| | | Leontopithecus | *Leontopithecus chrysomelas* | EN |
| | Cebidae | Sapajus | *Sapajus nigritus* | NT |
| | | | *Sapajus xanthosternos* | CR |
| | Pitheciidae | Callicebus | *Callicebus melanochir* | VU |
| Rodentia | Cricetidae | Juliomys | *Juliomys pictipes* | LC |
| | | Nectomys | *Nectomys squamipes* | LC |
| | | Sooretamys | *Sooretamys angouya* | LC |
| | Echimyidae | Trinomys | *Trinomys dimidiatus* | LC |
| | | | *Trinomys iheringi* | LC |
| | Myocastoridae | Myocastor | *Myocastor coypus* | LC |
| | Sciuridae | Sciurus | *Sciurus aestuans* | LC |

**Table 2. Studies information**: Description of the fields related with the study sites information – file ATLANTIC_CAMTRAPS_1-0_STUDY.csv

| FIELD | DESCRIPTION | LEVELS | EXAMPLE |
|---|---|---|---|
| **study_id** | Identification code for each study | 1001 - 1074 | 1001 |
| **study** | Citation of the study | | Lima, F., C.N. Jenkins and R. Muylaert. 2017. Do ewoks live in the Atlantic Forest? A study case in southeastern Brazil. Ridiculous Mammal Ecology 10:67–76. |
| **ref_obs** | Any observation regarding the study | | Valar Morghulis – Valar Dohaeris |

**Table 3. Location information:** Description of the fields related with the location of each study sites – file ATLANTIC_CAMTRAPS_1-0_LOCATION.csv

| FIELD | DESCRIPTION | LEVELS | EXAMPLE |
|---|---|---|---|
| **location_id** | Identification code for the location of the study | 1001 – 1144 | 1001 |
| **site** | Local name of the study area | | Estacao Ecologica Mico-leao-preto Tucano |
| **municipality** | Municipality of the study | | Euclides da Cunha |
| **state** | State or province of the study | | Sao Paulo |
| **country** | Name of the country | | Brazil |
| **X** | Longitude in decimal degrees (GCS - WGS 84) | | -52,46820 |
| **Y** | Latitude in decimal degrees (GCS - WGS 84) | | -22,48010 |
| **altitudeMin** | Minimum altitude of study area when described | 0 – 1450 | 0 |
| **altitudeMax** | Maximum altitude of study area when described | 20 – 2791 | 20 |
| **vegetation_type** | Atlantic Forest Vegetation type according to Ribeiro et al. (2009) | Deciduous Forest<br>Dense Ombrophilous Forest<br>Mixed Ombrophilous Forest<br>Semideciduous Forest<br>Steppe | Deciduous Forest |
| **PA** | If the study or part of it was conducted in a protected area | yes - no (y - n) | Y |

**Table 4. Survey information**: Description of the fields related with each survey – file ATLANTIC_CAMTRAPS_1-0_SURVEY.csv

| FIELD | DESCRIPTION | LEVELS | EXAMPLE |
|---|---|---|---|
| **study_id** | Identification code for each study (one-to-many relationship link to STUDY Table) | 1001 – 1074 | 1001 |
| **location_id** | Identification code for the location of the study (one-to-many relationship link to LOCATION Table) | 1001 – 1144 | 1001 |
| **survey_id** | Identification code for each survey | 1001 – 1170 | 1001 |
| **monthstart** | month of the start of the survey | 01 – 12 | 10 |
| **yearstart** | year of the start of the survey | 1999 – 2017 | 2016 |
| **monthfinish** | month of the end of the survey | 01 – 12 | 10 |
| **yearfinish** | year of the end of the survey | 2002 – 2017 | 2017 |
| **Effort** | Sampling Effort: number of sampling stations * sampling period (trap-days) | 35 - 9078 | 500 |
| **n_cameras** | Number of camera traps used in the study | 01 - 72 | 50 |
| **cam_type** | Type or brand of camera traps used | | LeafRiver |
| **design** | Protocol used to distribute sampling points | grid,<br>transect,<br>points (opportunistic) | Grid |
| **n_points** | Number of sample points | 01 - 184 | 50 |
| **cam_spacing** | Average distance between sample points | 100 - 7192 | 500 |
| **cam_spacing_obs** | Observation about camera trap spacing | | min 1000; max 01500 |
| **baiting** | If any kind of baiting was used in the survey | yes - no (y - n) | y |
| **records_obs** | Observation about records. Independence among records criteria | | independent record = 24 hour interval |

**Table 5. Records information**: Description of the fields related with the records of medium and large terrestrial mammal each survey – file ATLANTIC_CAMTRAPS_1-0_RECORDS.csv

| FIELD | DESCRIPTION | LEVELS | EXAMPLE |
|---|---|---|---|
| **record_id** | Identification code for each record | 10001 - 14110 | 10001 |
| **survey_id** | Identification code for each survey (one-to-many relationship link to SURVEY Table) | 1001 - 1170 | 1001 |
| **species_id** | Identification code for each survey (one-to-many relationship link to SPECIES Table) | 1001 - 1083 | 1001 |
| **species_code** | Code is the first four letters of the genus followed by the first four letters of the species scientific name | | Leop_pard |
| **record** | Number of records of each species during the survey | 1 - 14110 | 55 |
| **presence_absence** | presence-absence data of species (1-0) | 1<br>0 | 1 |

**Table 6. Species information**: Description of the fields related with the species of medium and large terrestrial mammal detected by camera traps in each survey – file ATLANTIC_CAMTRAPS_1-0_SPECIES.csv

| FIELD | DESCRIPTION | LEVELS | EXAMPLE |
|---|---|---|---|
| **species_id** | Identification code for each species (one-to-many relationship link to SPECIES Table) | 1001 - 1083 | 1001 |
| **order** | Order of the species | Artiodactyla<br>Chiroptera<br>Carnivora<br>Cingulata<br>Didelphimorphia<br>Lagomorpha<br>Perissodactyla<br>Pilosa<br>Primates<br>Rodentia | Carnivora |
| **family** | Family of the species | | Felidae |
| **genus** | Genus of the species | | Leopardus |
| **species** | Species name | | pardalis |
| **species_name** | Scientific name of the species | | Leopardus pardalis |
| **species_code** | Code composed by 4 characters of species genus followed by 4 characters for species scientific name | | Leop_pard |
| **iucn_status** | IUCN status of the species (accessed April 2017). Critically endangered (CR), Data Deficient (DD), Endangered (EN), Least Concern (LC), Near Threatened (NT), Vulnerable (VU), Invasive (IN) | CR<br>DD<br>EN<br>LC<br>NT<br>VU<br>IN | LC |
| **records (survey_id)** | Each of the next columns are named with a code from survey_id (one-to-one relationship link to SURVEY table). Data in these columns correspond to the number of records of each species during the survey. In presence/absence surveys records are filled as "y" | 1 - ... Or "y" | 55 |

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