Data Paper

Encontros Bibli

RESEARCH DATA IN PALEOBOTANY: PETROGRAPHIC THIN SECTIONS FOSSIL WOOD DATASET

Dados de pesquisa em paleobotânica: conjunto de dados petrográficos de lâminas delgadas de lenhos fósseis

Alexandre Ribas Semeler
Universidade Federal do Rio Grande do Sul, Instituto de Geociências
Porto Alegre, RS, Brazil
alexandre.semeler@ufrgs.br
https://orcid.org/0000-0002-9517-4593

Margot Guerra Sommer
Universidade Federal do Rio Grande do Sul,
Porto Alegre, RS, Brazil
margot.sommer@ufrgs.br
https://orcid.org/0000-0002-8036-4271

A lista completa com informações dos autores está no final do artigo

ABSTRACT

Objective: This study was aimed at analyzing and disseminating the fossil wood collection data stored in the thin sections of the paleobotany collection of the Department of Paleontology and Stratigraphy of the Institute of Geosciences at the Federal University of Rio Grande do Sul. Thin sections of petrified wood are described. Research data used in geosciences specifically seek to develop a model for the use of this type of sheet in paleobotany, enabling visualization of its representativeness in studies published over 40 years to obtain the anatomical characteristics of fossil woods and define their systematic affinities as a specific typology of research data in geosciences.
Methods: The methodology involved interviewing a paleobotanical specialist and using different techniques applied in metric studies to map scientific production in petrified wood. Thus, a dataset of (20) thin slide sections of petrified fossil wood used in "Stressing environmental conditions in the 'petrified forest' from the Mata Sequence in the Triassic context of the Paraná Basin," a paper published by the *Journal of South American Earth Sciences* (DOI:10.1016/j.jsames.2023.104415), was used. Depending on the methodology, these thin sections petrified wood can reveal systematic paleoclimatic signatures based on the anatomical characteristics of the fossil wood. In addition to this case study, which represents a collection of more than (2.000) thousand blades of fossil wood and approximately 40 years of research, the paleobotanical collection of the department is reused in methodology classes. The collection comprises a database created by research physicists that provides information on anatomical features, systematic affinities, paleoclimatic conditions, and paleoenvironmental insights.
Potential for reuse: The reuse, registration, storage, identification, and preservation of thin sections as a type of research data used in paleobotany aims to improve the methodology associated with the organization of the physical database of the institution. The research data and blades of fossil wood are being digitized. They will soon be available under CC BY 4.0, according to the sample described in this data paper (DOI Mendeley: 10.17632/b8phfcsync.3). Furthermore, the data can be reused in optical and electronic scanning microscopy software.
KEYWORDS: Petrographic thin sections. Fossil woods. Palaeoxylology. Research data in geosciences. Physical database.

RESUMO

Objetivo: O estudo visa divulgar e analisar a coleção de lenhos fósseis armazenadas no acervo de lâminas delgadas da coleção de paleobotânica do Departamento de Paleontologia e Estratigrafia do Instituto de Geociências da Universidade Federal do Rio Grande do Sul. Descrevem-se lâminas delgadas de madeira petrificada, enquanto dados de pesquisa utilizados para investigação em Geociências, em específico, busca-se compor um modelo para utilização deste tipo de lâmina na paleobotânica o que permite visualizar sua representatividade em estudos publicados durante 40 anos. Assim, obter-se-á as características anatômicas de laminas de lenhos fósseis com vistas a definir suas afinidades sistemáticas como uma tipologia específica de dados de pesquisa em Geociências.
Métodos: A metodologia envolve entrevista com um especialista em paleobotânica e a utilização de diferentes técnicas aplicadas em estudos métricos para mapear a sua produção científica em lenhos fósseis. Nesse sentido, como exemplo

descrevem-se um conjunto de dados de (20) lâminas delgadas de lenhos fósseis petrificados utilizados no paper *Stressing environmental conditions in the "petrified forest" from the Mata Sequence in the Triassic context of the Paraná Basin* publicados pelo periódico *Journal of South American Earth Sciences*, conforme DOI: 10.1016/j.jsames.2023.104415. A metodologia de utilização dessas lâminas no paper permite a identificação de assinaturas paleoclimáticas, com base em características anatômicas de lenhos fósseis. Além desse estudo de caso, esse data paper serve para representar uma coleção de mais de (2.000) mil lâminas de lenhos fósseis, cerca de 40 anos de pesquisa em paleobotânica que é reutilizada em aulas de metodologia e compõem uma base de dados de pesquisa que fornece informações sobre características anatômicas, afinidades sistemáticas, condições paleoclimáticas e percepções paleoambientais.
Potencial de reutilização: A reutilização desse conjunto de dados permite o registro, o armazenamento, a identificação e a preservação de lâminas delgadas de lenhos fósseis enquanto um tipo de dado de pesquisa em Geociências, também objetiva aprimorar a organização de um banco de dados. Esses dados da pesquisa estão sendo digitalizados e em breve todos estarão disponíveis sob a licença CC BY 4.0, conforme a amostra descrita nesse data paper. (Mendeley DOI: 10.17632/b8phfcsync.3) os quais poderão ser reutilizados por softwares de microscopia óptica e de varredura eletrônica.
PALAVRAS-CHAVE: Lâminas petrográficas. Lenhos fosseis. Paleoxilologia. Dados de pesquisa em geociências. Base de dados física.

1 PRESENTATION

Thin sections of petrified wood, which are an object of investigation in geosciences, specifically in paleobotany and palaeoxylology, contain the anatomical characteristics of fossil wood used for defining systematic affinities (Santos et al. (2022); Santos et al. (2021); Pires and Guerra Sommer (2004)), in addition to paleoclimatic and paleoenvironmental insights (Santos et al., (2023); Guerra Sommer et al., (2021); Santos et al. (2020); Pires and Guerra Sommer, (2011); Pires et al., (2011)). This paper presents twenty (20) thin sections of petrified wood discussed by Santos et al. (2023).

According to Santos et al. (2023), these datasets indicated sedimentary deposits of petrified wood that correspond to architectural elements exclusively related to the filling processes of river channels.

Thin sections have been the most crucial physical database for the analysis of the anatomical features of petrified woods at different geological intervals, in distinct Brazilian sedimentary basins used, used since 1972 by researchers in the field of paleobotany from the Department of Paleontology and Stratigraphy at the Federal University of Rio Grande do Sul, when the paleobotany section was created at the Institute of Geosciences at the Federal University of Rio Grande do Sul. The thin sections are housed within the Department's General Collection to make these physical databases easily accessible. This collection represents a database of thin sections used to prepare theses and scientific papers on petrified wood from different geological intervals of the Phanerozoic era, which have been studied by Guerra Sommer for over 40 years.

The main aim of the present study was to highlight the collection of thin sections of petrified wood as physical research data related to the field of geosciences available in the repository of the Institute of Geosciences in the Department of Paleontology and

Stratigraphy at the Federal University of Rio Grande do Sul, as presented in Santos et al. (2023).

Fossil woods can be used in research with stratigraphic significance as paleoclimatic indicators by analyzing wood growth rings, among other types of studies in paleobotany (SANTOS, et al., 2023) (SANTOS, et al., 2022) (GUERRA-SOMMER, et al., 2021) (SANTOS, et al., 2021) (SANTOS, et al., 2020) (DEGANI-SCHMIDT, et al., 2015.) (PIRES, et al., 2014) (GUERRA-SOMMER, et al., 2014) (PIRES ; GUERRA-SOMMER, 2014) (MEDEIROS, ; GUERRA-SOMMER, 2014) (PIRES, et al., 2011) (ARAÚJO, et al., 2011) (PIRES; GUERRA-SOMMER, 2011) (PIRES, et al., 2001) (BARDOLA, et al., 2009) (GUERRA-SOMMER, et al., 2007) (ALVES; GUERRA-SOMMER, 2005) (PIRES; GUERRA-SOMMER ; SCHERER, 2005) (PIRES; GUERRA-SOMMER, 2004) (GUERRA-SOMMER.; SCHERER, 2000) (ALVES; GUERRA-SOMMER, 2000) (GUERRA-SOMMER, 1976) (GUERRA-SOMMER, 1975) (GUERRA-SOMMER, 1974) (GUERRA-SOMMER, 1972).

Therefore, it is important to emphasize that the focus of this study is not on the analysis of potential anatomical details preserved by the thin sections of petrified wood, but rather on their representativeness as data from paleobotanical research that generate results related to taxonomic, paleoclimatic, and paleoenvironmental inferences.

The additional potential of this dataset is the registration of thin sections with the same acronym as the macroscopic-type specimens housed in the paleobotanical collection of the Department of Paleontology and Stratigraphy for easy access. Thin sections are stored in specific cabinets, mostly in wooden and metal trays (Figure 1).

Figures 1: Physical database: storage of thin sections in cabinets and thin sections stored in metal trays.

Source: Prepared by the authors (2023).

The current study was aimed at analyzing and describing twenty (20) thin sections of petrified wood registered in the Laboratory of Paleobotany at the Federal University of Rio Grande do Sul as a type of research data in paleobotany and palaeoxylology in geosciences, involving research conducted since 1972 (when the paleobotany section was established in the Department of Paleontology and Stratigraphy at the Federal University of Rio Grande do Sul).

It is imperative that paleobotanists and geoscientists share and learn about the registered thin sections of petrified wood to collaborate on reusing these research data. Finally, the information in petrified wood is a heterogeneous dataset that makes it possible to access and preserve a wide range of research data types. In this context, the research will answer different questions to improve the model related to this physical database, such as, what are the correct procedures for registering petrified wood thin sections in paleobotanical collections? What is the best methodology to house the collection of thin sections in the laboratory repository of the Department of Paleontology and Stratigraphy at the university? Are there any more suitable identification methods for housing thin sections of petrified wood that would enhance consultation efficiency? What is the best method for preserving thin sections against degradation processes resulting from suboptimal

conditions? These questions, in addition to other questions that may arise during data interpretation, will be considered in this study. These issues demonstrate the complexity involved in obtaining biological data from petrified materials. Identifying these data enabled us to characterize the descriptive model that underlies all anatomical research on petrified wood.

2 METHODOLOGICAL INSTRUMENTS

The thin sections represent the physical data of petrified wood. They were prepared according to the standard technique for obtaining thin sections, as described in the literature. However, distinctively from the grounding of 5my used for petrographic rock slides, the average slide thickness for wood analyses is 40 µm.

The research method was based on an open interview with a paleobotanist, head professor, professor emeritus, and the leader of a research group registered in the CNPQ/Brazil Directory (ORCID:0000-0002-9517-4593), with more than 40 years of experience in the field of palaeobotany and extensive experience in the application of different methodologies in fossil wood analysis.

The spectrum of information provided by this type of biological data has expanded over 40 years of paleobotanical analysis on thin sections of petrified wood. In addition to systematic results, the following information has been obtained from the surface metallization of thin sections with gold or carbon by scanning electron microscopy (SEM) (Santos et al., 2023): (i) details of wood attack by microorganisms, (ii) details of the fossilization process, and (iii) identification of remnants of organic products produced by the plant in response to biological attack.

For labeling, the following data are recorded on each thin sections: (i) PB (indicates Paleobotany Collection), (ii) an acronym that is the same as the macroscopic specimen housed in the paleobotanical collection of the Department of Paleontology and Stratigraphy**,** followed by; (iii) a dot and a numeral that indicates the ordering of the thin sections in the sequence of slides from the specimen; (iv) the type of section that the thin sections represents, mentioned in parentheses: transverse (t), radial (r), or tangential [e.g., PB 5569.3(t)].

Figure 2: Example of thin sections of fossil *Agathoxylon* type of wood (Figure 1a). Thin sections latewood in each ring with mainly one, rarely two rows, of tracheids (Figure 1b).

Figure 1a

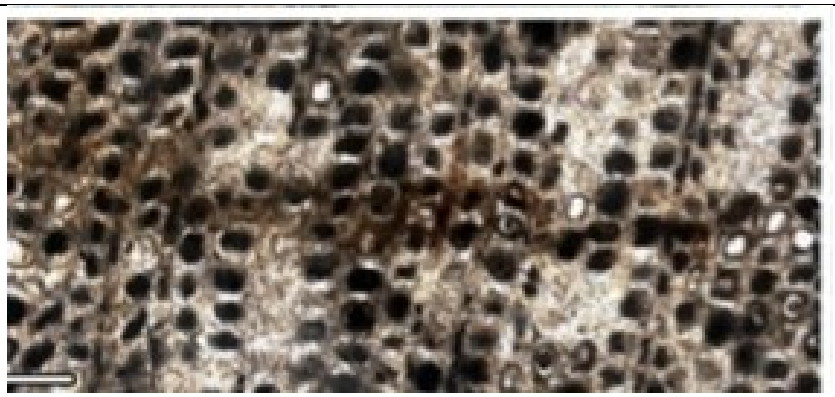

Figure 1b

Source: (Santos et al, 2023).

The thin sections were registered in the Mendeley Data Repository, where the following information was detailed: acronym, systematic affinities, procedure, geological age, author, stratigraphic unit, date of registration, anatomical section, and observation. The methodological procedures for collecting and analyzing data from the slides analyzed in this study require a minimum understanding of geosciences and paleobotany. The collected data, photographs, and digitized thin sections were published following the Research Data Management Plan (PGD) and are available under the CC BY 4.0 license from (DOI: 10.17632/b8phfcsync.3).

1 SPECIFICATION TABLE

Table 1: Data Specification Table

Area of knowledge	B. Earth Science
Specific subject area	Paleobotany
Language	English
Data type	Physical data of petrified wood, Laboratory notes, Thin sections
Data acquisition method	Thin sections represent the set of physical data of petrified wood. They are prepared according to the standard technique for obtaining thin sections of rocks, following the usual techniques described in the literature.
Data state	Primary
Parameters for data collection	Thin sections were prepared and recorded as follows: 1) precise laboratory preparation techniques were developed to obtain segments of wood corresponding to the transverse, radial, and tangential planes, following the standard principles for conventional rock sectioning procedures (cutting, sanding, and washing), aiming at the anatomical characterization of the wood in distinct sections; 2) elaboration of thin sections in transverse (t) radial (r) and tangential (tg) planes, following the principles of the standard technique for elaboration of petrographic slides, but with an average thickness of 40 µm.3) metallization of the slides with gold in case of SEM observation; 4) Photomicrographic documentation of the thin sections produced in different planes: transverse (t) radial (r) and tangential (tg).
Data source location	Department of Paleontology and Stratigraphy at Federal University of Rio Grande do Su, Porto Alegre, Rio Grande do Sul, Brazil.
Data accessibility	Repository name: Mendeley Data identification number: DOI: 10.17632/b8phfcsync.3

Source: Prepared by the authors (2023).

2 DATASET DESCRIPTION

The dataset contains (1) one metal tray (Figure 3) in the root directory with (20) thin sections of petrified wood digitized in Joint Photographic Experts Group image format (. JPG). The thin sections of petrified wood were published by Santos et al. (2023) with the authors of the data and technical descriptions for the analysis. The root folder contains the images and the file (metal_trays.pdf) table in PDF with explanations of the use of thin sections on paper.

Figure 3: Example of slides of fossil wood in metal trays

Source: (Santos et al, 2023)

The thin sections petrified wood slides is a database that digitizes the (20) thin sections and collection of thin sections in the repository of the Laboratory of Paleobotanical Collections of the Department of Paleontology and Stratigraphy at Federal University of Rio Grande do Sul. Physical data, code nº, designation, background, age, formation, author, date, section, notes, and images are available in the physical database. The datasets produced in this study are available from Mendeley Data, DOI: 10.17632/b8phfcsync.3.

Finally, the dataset, which can be can be downloaded from (DOI:10.17632/b8phfcsync.3), can be reused for studies in palaeobotanical fields, such as paleozoic flora of South America, paleophytogeography, phytostratigraphy, paleophytoecology, plant taphonomy introduction, and methodologies.

REFERENCES

SANTOS, Â. C. S.; GUERRA-SOMMER, M.; BARBOZA, E. G.; DEGANI-SCHMIDT, I.; SIEGLOCH, A. M.; VIEIRA, C. E. L.; VIEIRA, D. T.; BARDOLA, T. P.; SCHULTZ, C. L.. Stressing environmental conditions in the petrified forest from the mata sequence in the Triassic context of the Paraná Basin. *Journal Of South American Earth Sciences*, *128*, p. 104415, 2023. DOI: https://doi.org/10.1016/j.jsames.2023.104415.Disponível em: https://www.sciencedirect.com/science/article/pii/S0895981123002262. Acesso em: 24 Jan. 2024.

SANTOS, Â. C. S.; GUERRA-SOMMER, M.; DEGANI-SCHMIDT, I.; SIEGLOCH, A. M.; MENDONÇA, J.; MENDONÇA FILHO, J.; CARVALHO, I. Record of Brachyoxylon patagium, a Cheirolepidiaceae wood preserved by gelification in the Aptian Maceió Formation, Sergipe-Alagoas Basin, NE Brazil. *Journal of South American Earth Sciences 118*, p. 103950, 2022. DOI: https://doi.org/10.1016/j.jsames.2022.103950. Disponível em: https://www.sciencedirect.com/science/article/pii/S0895981122002395?via%3Dihub. Acesso em: 24 Jan. 2024.

GUERRA-SOMMER, M.; SIEGLOCH, ANELISE MARTA; DEGANI-SCHMIDT, I.; SANTOS, SANTOS, Â. C. S; CARVALHO, I.; ANDRADE, J. A.; FREITAS, F. I. Climate change during the deposition of the Aptian Santana Formation (Araripe Basin, Brazil): Preliminary data based on wood signatures. *Journal Of South American Earth Sciences* 111, p. 103462, 2021. DOI: https://doi.org/10.1016/j.jsames.2021.103462. Disponível em: https://www.sciencedirect.com/science/article/pii/S0895981121003096. Acesso em: 24 Jan. 2024.

SANTOS, Â. C. S; SIEGLOCH, A. M.; GUERRA-SOMMER, M.; DEGANI-SCHMIDT, I.; CARVALHO, I. Agathoxylon santanensis sp. nov. from the Aptian Crato fossil Lagerstätte, Santana Formation, Araripe Basin, Brazil. *Journal Of South American Earth Sciences*, *112*, 103633, 2021. DOI: https://doi.org/10.1016/j.jsames.2021.103633. Disponível em: https://www.sciencedirect.com/science/article/pii/S0895981121004788. Acesso em: 24 Jan. 2024.

SANTOS, Â. C. S.; SIEGLOCH, Â. C.; GUERRA-SOMMER, M.; DEGANI-SCHMIDT, I.; SIEGLOCH, A. M.; DE SOUZA, I.; MENDONÇA FILHO, J.G.; OLIVEIRA, J. Fungus-plant interactions in Aptian Tropical Equatorial Hot arid belt: White rot in araucarian wood from Crato fossil Lagerstätte (Araripe Basin, Brazil). *Cretaceous Research*, *114*, p. 104525, 2020. DOI: https://doi.org/10.1016/j.cretres.2020.104525. Disponível em: https://www.sciencedirect.com/science/article/pii/S0195667120302111. Acesso em: 24 Jan. 2024.

DEGANI-SCHMIDT, I.; GUERRA-SOMMER, M; MENDONÇA, J. G.; JASPER, A.; CAZZULO-KLEPZIG, M.; IANNUZZI, R. Charcoalified logs are evidence of hyperautochthonous/autochthonous wildfire events in a peat-forming environment from the Permian in the southern Paraná Basin (Brazil). *International Journal of Coal Geology*, *146*, p. 55-67, 2015.DOI: https://doi.org/10.1016/j.coal.2015.05.002. Disponível em: https://www.sciencedirect.com/science/article/pii/S016651621500110X. Acesso em: 24 Jan. 2024.

PIRES, E. F. ; GUERRA-SOMMER, M. The Paleoclimatic Record Provided by Dendrological Analyses in Early Cretaceous Coniferous Woods from a Paleoerg (Paraná Basin, Brazil). In: CARVALHO, I; GARCIA, M. J; LANA, C.; STROHSCHOEN, O. (Org.). *Paleontologia:* Cenários de vida - Paleoclimas. 1 ed. Rio Janeiro: Interciência, *5*, p. 77-86, 2014.

GUERRA-SOMMER, MARGOT; DEGANI-SCHMIDT, I.; MUSSA, D.; KAVALI, P. S.; SHIVANNA, M. Stratigraphic significance of the Solenoid Complex in the Permian of Gondwana. *Geologia USP*. Série Científica, *14*, p. 139-148, 2014. DOI: https://doi.org/10.5327/Z1519-874X201400020008.Disponível em: https://www.revistas.usp.br/guspsc/article/view/85371. Acesso em: 24 Jan. 2024.

PIRES, E. F.; GUERRA-SOMMER, M. Paleoclimatic Inferences From Missão Velha Formation (Tithonian/Berriasian, Araripe Basin Brazil) Based On Fossil Wood Analyses. In: CARVALHO, I; GARCIA, M. J; LANA, C.; STROHSCHOEN, O. (Org.). *Paleontologia:* Cenários de vida - Paleoclimas. 1 ed. Rio Janeiro: Interciência, *5*, p. 77-86, 2014.

MEDEIROS, M. A.; GUERRA-SOMMER, M. Fósseis como indicadores paleoclimáticos para o Eocenomaniano da Bacia de São Luíz-Grajaú. In: CARVALHO, I; GARCIA, M. J; LANA, C.; STROHSCHOEN, O. (Org.). *Paleontologia:* Cenários de vida - Paleoclimas. 1 ed. Rio Janeiro: Interciência, *5*, p. 77-86, 2014.

PIRES, E. F.; GUERRA-SOMMER, M.; BARDOLA, T. P.; VEECK, G. P. Padrões de crescimento em lenhos gimnospérmicos como indicadores paleoclimáticos na Floresta Petrificada do Tocantins Setentrional (Permiano), Bacia do Parnaíba, Tocantins, Brasil. In: MORAES, F. (Org.). *Contribuições à Geografia Física do Estado do Tocantins*. 1 ed. Goiânia: Kelps, p. 111-132, 2011.

ARAÚJO, K. C. O.; GUERRA-SOMMER, M.; MEDEIROS, M. A. A.; GIRNOS, E. C.; DEGANI-SCHMIDT, I. Lenhos de coníferas do Mesocretáceo do norte do Maranhão, Brasil. *Revista Brasileira de Paleontologia*, *14*, p. 29-38, 2011. Disponível em: https://www.sbpbrasil.org/revista/edicoes/14_1/Artigo%203%20-%20(COLORIDO)%20Araujo%20et%20al.pdf. Acesso em: 24 Jan. 2024.

PIRES, E. F.; GUERRA-SOMMER, M. Growth ring analysis of fossil coniferous woods from the Early Cretaceous of the Araripe Basin (Brazil). *Anais da Academia Brasileira de Ciências* (Impresso), version *83*, p. 409-423, 2011. DOI: https://doi.org/10.1590/S0001-37652011005000005. Disponível em: https://www.scielo.br/j/aabc/a/WHwhxJHSVzKcvmy359cRwpb/?lang=en. Acesso em: 24 Jan. 2024.

PIRES, E. F.; GUERRA-SOMMER, M.; SCHERER, C. M. S.; SANTOS, A. R.; CARDOSO, E. Early Cretaceous coniferous wood assemblage from a paleoclimate (Botucatu et al., Brazil): Dendrological parameters and their relationship to paleoclimatic data. *Journal Of South American Earth Sciences 32*, p. 96-109, 2001. DOI: https://doi.org/10.1016/j.jsames.2011.04.001. Disponível em: https://www.sciencedirect.com/science/article/pii/S089598111100054X. Acesso em: 24 Jan. 2024.

BARDOLA, T. P.; DEGANI-SCHMIDT, I.; GUERRA-SOMMER, M.; SCHULTZ, C. L. Lenhos de Ginkgophyta em florestas petrificadas no Triássico Superior sul-rio-grandense, Brasil. *Revista Brasileira de Paleontologia*, *12*, p. 139-148, 2009. Disponível em: https://www.sbpbrasil.org/revista/edicoes/12_2/Artigo%204%20-%20Bardola%20et%20al.pdf. Acesso em: 24 Jan. 2024.

GUERRA-SOMMER, M.; PIRES, E. F.; ALVES, L. S. R. CAZZULO-KLEPZIG, M. Análises Dendroclimatologicas No Gonduana Sul Brasileiro. In: IANNUZZI, R.; FRANTZ, J. C. (Org.). *50 Anos de Geologia. Instituto de Geociências. Contribuições.* 1 ed.Porto Alegre: Editora Comunicação e Identidade, *1*, p. 249-263, 2007.

ALVES, L. S. R.; GUERRA-SOMMER, M. Growth rings in fossil woods and paleoclimates in applied stratigraphy. In: KOUTSOUKOS, E. (Org.). *Applied Stratigraphy*. 1st ed. New York: Springer, 23, p. 181-193, 2005.

PIRES, E. F.; GUERRA-SOMMER, M.; SCHERER, C. Late Triassic climate in the southernmost Paraná Basin (Brazil): evidence from dendrochronological data. *Journal Of South American Earth Sciences*, Columbia - South Carolina, *18* (2), p. 213-221, 2005. DOI: https://doi.org/10.1016/j.jsames.2004.10.004. Disponível em: https://www.sciencedirect.com/science/article/pii/S0895981104001361. Acesso em: 24 Jan. 2024.

PIRES, E. F.; GUERRA-SOMMER, M. Sommerxylon spirals from the Upper Triassic in the southernmost Paraná Basin (Brazil): a new taxon with taxacean affinity. *Anais da Academia Brasileira de Ciências*, Rio de Janeiro, *76*(03), p. 595-609, 2004.

ALVES, L. S. R.; GUERRA-SOMMER, M. Inferências Tafonômicas para um fragmento de lenho da Formação Irati, Permiano superior, da bacia do Paraná, RS, Brasil. *Revista Universidade Guarulhos,* São Paulo, *1*(5), p. 49-53, 2000.

GUERRA-SOMMER, M.; SCHERER, C. Middle-Late Triassic Petrified Forests from mata sandstone at Rio Grande do Sul State, BR: a preliminary geological, taphonomic and biostratigraphic setting. *Revista Universidade Guarulhos, Guarulhos*, *5*, p. 117-120, 2000.

GUERRA-SOMMER, M. Vertebraria (Royle) Schopf (1965). Un Genre Présent Dans La Formation Irati du Rio Grande do Sul (Brésil). In: 101 Congrés National Des Societés Savantes*,* 1976, Lille. *Actes du 101 Congrès national des societés savantes*, 1976. p. 51-68, 1976.

GUERRA-SOMMER, M. Presença do Gênero Polysolenoxylon Formação Irati, do Rio Grande do Sul, Brasil. In: I Congresso Argentino de Paleontologia y Bioestratigrafia, 1975, Tucumán. *ACTAS I congresso Argentino de Paleontologia y Bioestratigrafia*, *1*. p. 371–400, 1975.

GUERRA-SOMMER, M**.** Uma Nova *Madeira Petrificada na Formação Irati do Rio Grande do Sul*. Ameghiniana, Argentina, *XIII*, (3-4), p. 254-267, 1974.

GUERRA-SOMMER, M. Damudoxylon (Maheshwari), 1972, Un Gênero Ocorrente no Gondwana do Brasil. *Pesquisas em Geociências*, *7*, p. 131-144, 1972. DOI: https://doi.org/10.22456/1807-9806.21824.Disponível em: https://seer.ufrgs.br/PesquisasemGeociencias/article/view/21824. Acesso em: 24 Jan. 2024.

NOTAS

CONTRIBUIÇÃO DE AUTORIA

Concepção e elaboração do manuscrito: Guerra-somer, M; Semeler, A. R.,
Coleta de dados: Guerra-somer, M; Semeler, A. R.,
Análise de dados: Guerra-somer, M; Semeler, A. R.,
Discussão dos resultados: Guerra-somer, M; Semeler, A. R.,
Revisão e aprovação: Guerra-somer, M; Semeler, A. R.,
Caso necessário veja outros papéis em: https://credit.niso.org

CONJUNTO DE DADOS DE PESQUISA

FINANCIAMENTO
Não se aplica.

CONSENTIMENTO DE USO DE IMAGEM
Não se aplica.

APROVAÇÃO DE COMITÊ DE ÉTICA EM PESQUISA
Não se aplica.

CONFLITO DE INTERESSES
Informar conflitos de interesse: financeiros, pessoais, entre possíveis revisores e editores, e/ou possíveis vieses temáticos. Se não houver, mencionar: Não se aplica. Para mais informações: https://www.abecbrasil.org.br/arquivos/whitepaper_CSE.pdf

PUBLISHER
Universidade Federal de Santa Catarina. Programa de Pós-graduação em Ciência da Informação. Publicação no Portal de Periódicos UFSC. As ideias expressadas neste artigo são de responsabilidade de seus autores, não representando, necessariamente, a opinião dos editores ou da universidade.

EDITORES
Edgar Bisset Alvarez, Ana Clara Cândido, Patrícia Neubert, Genilson Geraldo, Jônatas Edison da Silva, Mayara Madeira Trevisol.

HISTÓRICO
Recebido em: 09-09-2023 – Aprovado em: 29-01-2024 - Publicado em: 23-02-2024