PALAEONEWS

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HIGHLIGHTS

The preparation of CAS Center for Excellence in Life and Paleoenvironment was finished

The preparation of CAS Center for Excellence in Life and Paleoenvironment approved in September 2017 has just passed the assessment and evaluation by CAS in December 2020. It is based on both the Institute of Vertebrate Paleontology and Paleoanthropology, CAS (IVPP) and the NIGPAS.

With China's domestic unique geological and palaeontological resources, and various advanced technologies, the Center focuses on the interdisciplinary frontiers in palaeontology, stratigraphy and palaeoenvironment, striving for the understanding more deeply on the origin, radiation, extinction and recovery of the key taxa, groups and faunas/floras, on the basis of high-resolution stratigraphic subdivision and correlation, and on the mechanism of the co-evolution between life and environment.

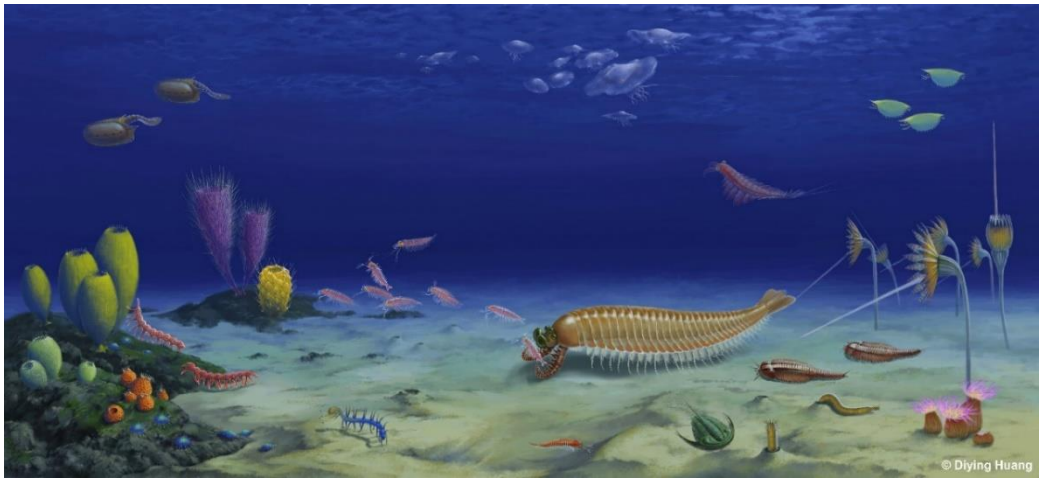
A 520-million-year-old chimeric fossil uncovers the origin of arthropods

The discovery of a shrimp-like fossil with five eyes named *Kylinxia* from the Chengjiang fauna in Yunnan (southwest China) provides important insights into the early evolutionary history of arthropods. The study was conducted by scientists from Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences (NIGPAS), and the results were published in *Nature* on November 4, 2020.

Kylinxia is a very rare chimeric species. It has a body showing distinctive features of true arthropods, such as a hardened cuticle, a segmented trunk and jointed legs. However, *Kylinxia* also integrates the morphological characters present in ancestral forms, which include the bizarre five eyes as in *Opabinia*, as well as the iconic raptorial appendages as in *Anomalocaris*.

Kylinxia represents a crucial transitional fossil predicted by Darwin's evolutionary theory. It bridges the evolutionary gap from *Anomalocaris* to true arthropods and forms a key 'missing link' in the origin of arthropods, contributing a strong fossil evidence for the evolutionary theory of life.

Reference: Zeng, H., Zhao, F., Niu, K., Zhu, M., Huang, D., 2020. An early Cambrian euarthropod with radiodont-like raptorial appendages. ***Nature***, https://doi.org/10.1038/s41586-020-2883-7.



Ecological restoration of *Kylinxia* (guided by Huang Diying, drawing by Sun Jie)

Scientists reveal the evolution of marine biodiversity in the Paleozoic era

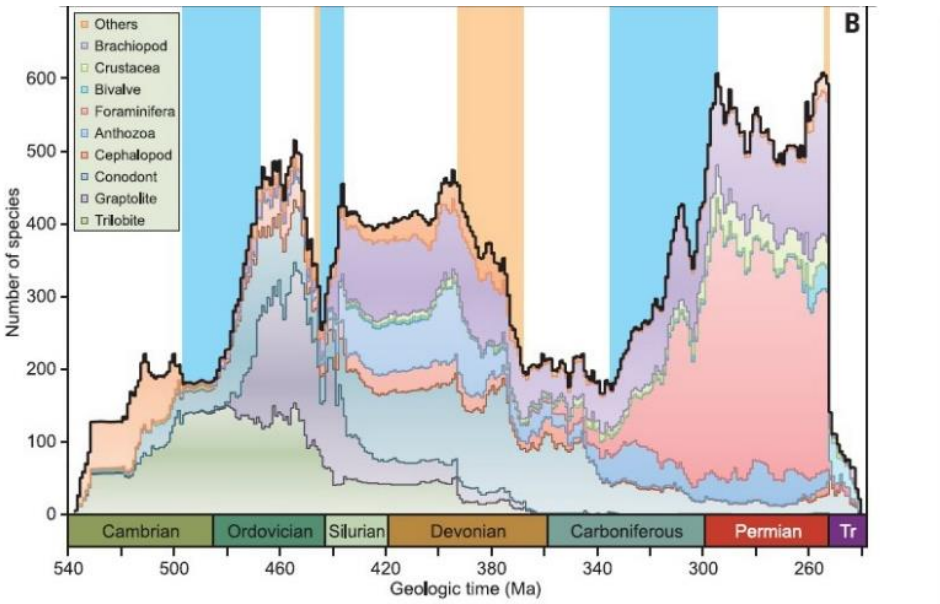
The origin and evolution of life are the top ten scientific mysteries in the world and one of the 125 major scientific issues listed in the "Science" magazine. We have pressing, human-generated reasons to explore the influence of environmental change on biodiversity. Prior research resolutions are often too crude and imprecise to assess diversification rates or patterns associated with various global events (gradual, stepwise, or abrupt) and may mask multiple events as well as finer-scale fluctuations.

With the support of the Strategic Priority Research Programs (B) of the Chinese Academy of Sciences etc., the research results on the evolution of marine invertebrate biodiversity from the Cambrian to the early Triassic, which jointly completed by Nanjing University and NIGPAS et al., was published online in *Science* on January 17, 2020.

Here, the researchers combined with new Chinese data compilation, a new parallel computing implementation of CONOP.SAGA stratigraphic correlation algorithms, and the parallel processing power of the Tianhe II supercomputer have allowed the construction of a high-resolution composite species-diversity history with an average resolving power of 26.0 ± 14.9 kyr. Results indicate that the coarse and uneven temporal resolutions used by previous summaries artificially influenced paleobiodiversity estimations. This analysis confirms the existence of end-Ordovician and end-Permian mass extinctions, a long-term Middle to Late Devonian diversity decline, and a markedly subdued Frasnian–Famennian event.

Looking back can not only help us understand this relationship, but also help us understand current changes. This research is a breakthrough both earth science and data science. Under the framework of the DDE project, and based on global geological big data and efficient Tianhe II supercomputer methods, reconstruction of the complete life evolution history will be realized.

Reference: Jun-xuan Fan, Shu-zhong Shen*, Douglas H. Erwin, Peter M. Sadler, Norman MacLeod, Qiu-ming Cheng, Xu-dong Hou, Jiao Yang, Xiang-dong Wang, Yue Wang, Hua Zhang, Xu Chen, Guo-xiang Li, Yi-chun Zhang, Yu-kun Shi, Dong-xun Yuan, Qing Chen, Lin-na Zhang, Chao Li, Ying-ying Zhao, 2020, A high-resolution summary of Cambrian to Early Triassic marine invertebrate biodiversity, ***Science***, 367-6475, pp. 272-277. DOI: 10.1126/science.aax4953.



General trajectories of Paleozoic genus and species diversity and species diversity for 10 major fossil groups

Nanjing Museum of Palaeontology completed the exhibition reconfiguration and renovation

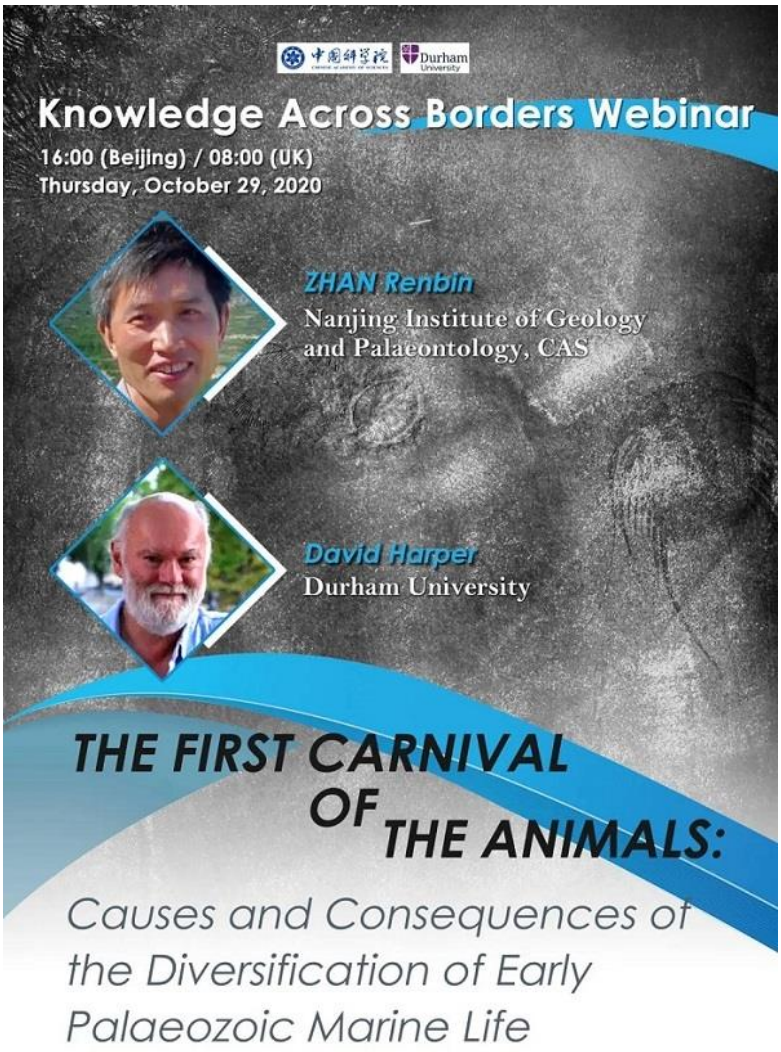
After 15 years of operation, Nanjing Museum of Palaeontology has successfully completed its exhibition reconfiguration and renovation in 2020, via the support from CAS, to show the public more fossil specimens and the latest palaeontological research progresses.

From December 26th to 27th, the "Ancient life Accompanies You and Me" large-scale theme science forum and the upgrading and reopening ceremony of the Nanjing Museum of Palaeontology, together with the 2020 Annual Meeting of the Science Popularization Network Committee of the Herbarium/Museum of the Chinese Academy of Sciences was held in Nanjing. At the opening ceremony of the conference, Academician ZHOU Zhonghe was invited to give a wonderful lecture titled "Secrets from Fossils-Talking about Paleontology". A series of popular science activities, including a forum for museum curators and school principals, etc. were held in the meantime. There were 15 experts from eight CAS institutes carried out science lectures to 15 primary or secondary schools in Nanjing, which attracted thousands of audiences.

INTERNATIONAL COLLABORATION

CAS-Durham webinar "Knowledge Across Borders"

On October 29, 2020, the Chinese Academy of Sciences and Durham University (UK) launched web lectures of "Knowledge Across Borders". The first issue was jointly conducted by Prof. David Harper from Durham University, and Prof. ZHAN Renbin from NIGPAS. The webinar was focused on a theme "The First Carnival of the Animals: Causes and Consequences of the Diversification of the Early Paleozoic Marine Life". More than 400 participants all over the world attended this webinar on line.



Scientists from NIGPAS participated in international meeting

During September 7-10, 2020, the Project IGCP653 "The Initiation Process of Ordovician Biological Radiation Event" was hosted by the University of Copenhagen and held on the Zoom platform. This online conference included a 4-day academic report, attended by more than 200 experts and scholars from 28 countries. More than 10 participants including Prof. ZHANG Yuandong from NIGPAS registered and participated in the conference.

NEWS IN PICTURES

Perform the second comprehensive scientific investigation of the Qinghai-Xizang (Tibet) Plateau

From July to October, 2020, several research teams from NIGPAS together with scientists from Peking University, Nanjing University and some others went to the Qinghai-Xizang (Tibet) Plateau in batches to perform the second comprehensive scientific investigation.

This scientific expedition aims to systematically explore the strata in the Qinghai-Xizang Plateau, study the biodiversity, biological stratigraphy, chemical stratigraphy and chronostratigraphic framework of the Qinghai-Xizang Plateau, and reveal the inner relationship between paleontology, paleogeography and paleoenvironment of each block during the period.

The early life research team of NIGPAS went to the Qinghai-Xizang Plateau

The Cambrian Explosion research team of NIGPAS went to the Qinghai-Xizang Plateau

The Nanjing Stratigraphy and Palaeontology research team went to the Qinghai-Xizang Plateau

"The Qinghai-Xizang Plateau is a difficult-to-read book for stratigraphy and paleontology, and even for the entire earth sciences." Prof. ZHANG Yichun, leader of Nanjing Stratigraphy and Palaeontology research team, said frankly, "How did life and the environment evolve in the distant geological history? Maybe the answer would provide some clues for us to explore the relationship between living organisms and the environment."

Academic Activities with NIGPAS People

During November 6–10, 2020, the 19th Academic Annual Meeting of the Fossil Algae Professional Committee of the Palaeontological Society of China (PSC), with the 11th Member Representative Conference and the 18th Academic Annual Conference of the Micropaleontology Branch of PSC, as well as the 2020 Academic Annual Conference of the Jiangsu Paleontological Society, was successfully held in Chengjiang, Yunnan Province.

On October 20, the 5th National Geological and Palaeontological Science Popularization Symposium was held in the Inner Mongolia Natural Museum. More than 150 participants from over 60 units including scientific research institutes, universities, natural museums, popular science bases, national geological parks, key fossil producing areas, scientific and technological publishing organization and so on, attended this meeting.

Serve the National Economy

On July 3, 2020, NIGPAS and PetroChina Xinjiang Oilfield Company established a joint stratigraphic paleontology laboratory and held its first academic committee meeting.

On October 15, 2020, NIGPAS and Tianjin Branch of China National Offshore Oil Corporation (CNOOC Ltd) signed a strategic cooperation framework agreement.

Education

In September 2020, a welcome party was held for the institute new graduate students, 12 PhD and 15 MSc candidates in number. Now, the institute has 95 graduate students in total.

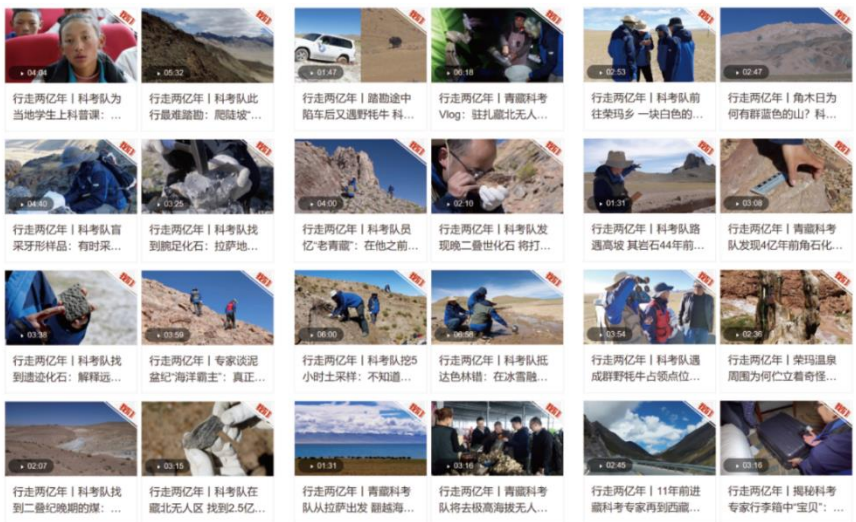
On June 13, 2020, the ceremony for the newly graduated MSc and PhD students from NIGPAS was held. This year, total of 20 graduate students including 6 PhD and 14 MSc candidates successfully graduated.

Science communication

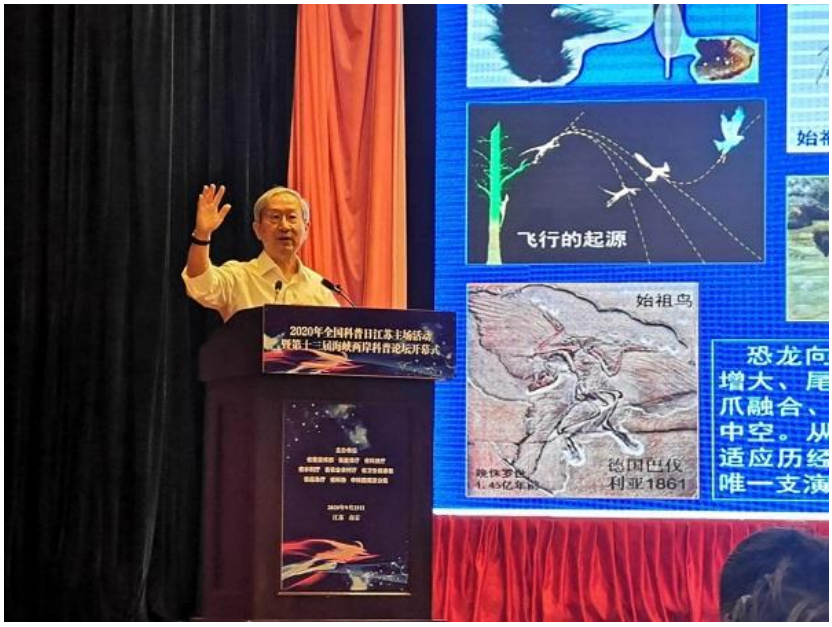
NIGPAS actively joint various social resources to promote the scientific communication toward high-quality and high-level. On July 15, 2020, Jiangsu Science and Technology Press, Phoenix Publishing & Media Group and NIGPAS jointly established the "Phoenix-NIGPAS Joint Science Communication Center", and launched the first cooperation about multimedia course.

For the development of the cultural and creative industries, on August 26, 2020, Vision Geology Space and NIGPAS jointly signed a strategic cooperation framework agreement to establish the "NIGPAS-VGS Joint Cultural and Creative Industry Development Center".

From September to October, 2020, *The Beijing News* "Through 200 Million Years" program recorded the Xizang scientific expedition of Nanjing Stratigraphy & Palaeontology research team from NIGPAS and Nanjing University, through 12 live broadcasts and 123 short videos. In the whole process, the video viewers reached 6.78 million, and the Weibo topic viewers were more than 30 million. Through these activities, the knowledge of stratigraphy & paleontology has been disseminated, and the science spirit of Qinghai-Xizang scientific research has also been demonstrated.

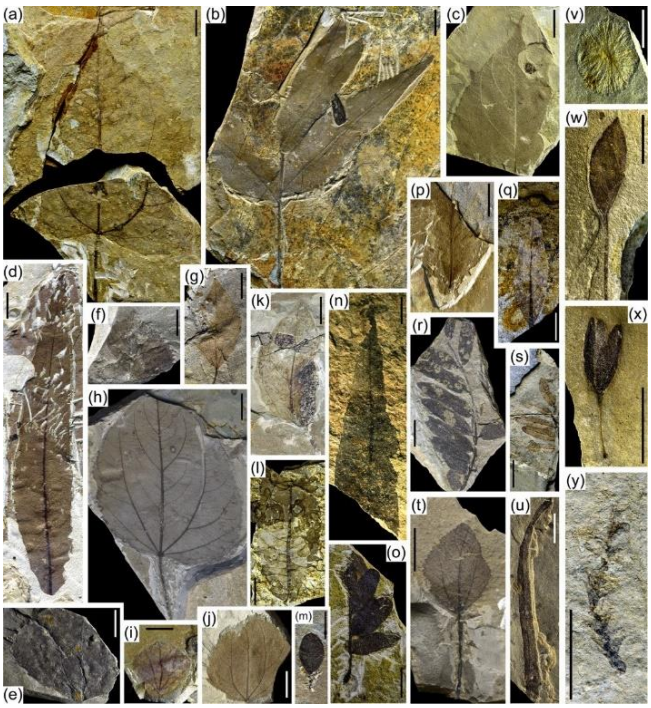


On September 25, 2020, the 2020 National Science Popularization Day in Jiangsu Province and the 13th Cross-Strait Science Popularization Forum were held in Nanjing. At the forum, Academician RONG Jiayu from NIGPAS gave a keynote speech entitled "Exploring the Mystery of Biological Evolution". He used wonderful fossil evidence to show the evolution process of life on Earth, to discuss the origin of life, the creation of life, and the great innovation, radiation and extinction of life, and to reveal the mystery of evolution.

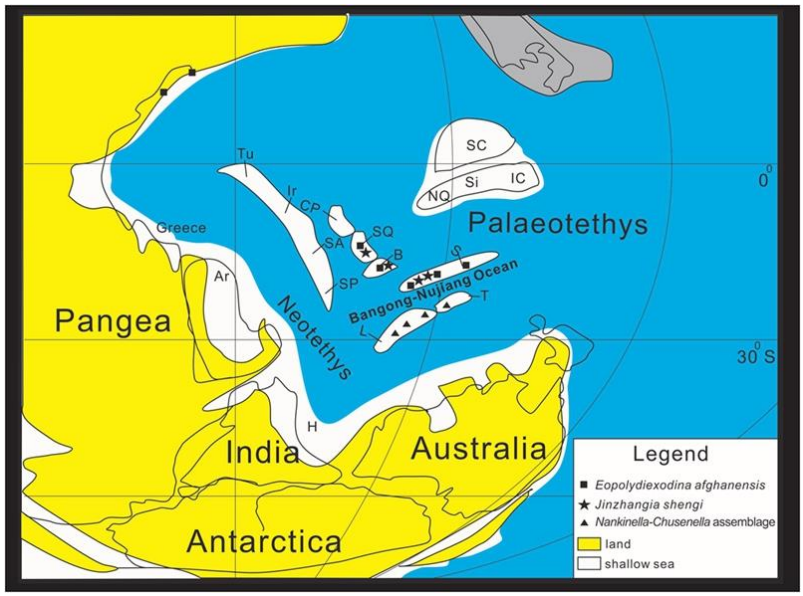


Research Updates (till the end of Dec. 2020)

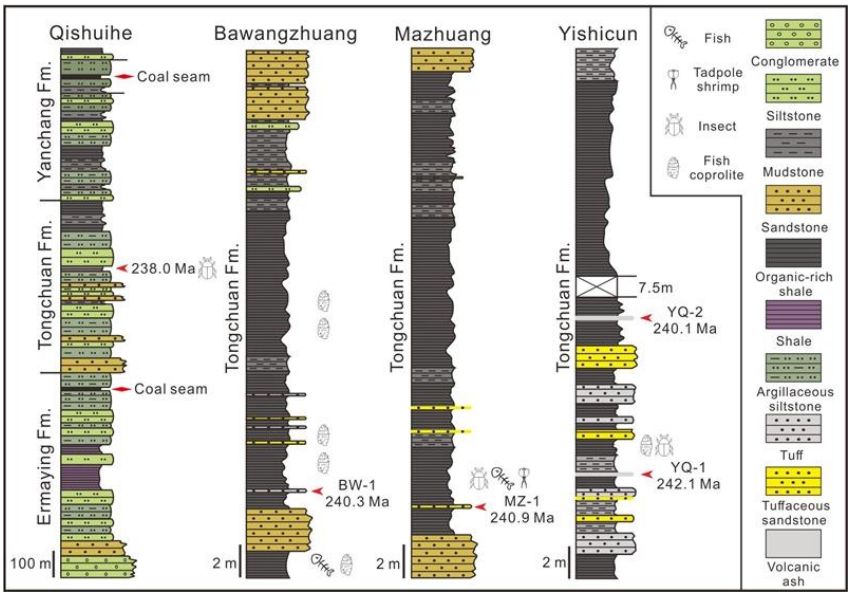
Mouthpart homologies and life habits of Mesozoic long-proboscid scorpionflies. (*Science Advances.* http://doi.org/10.1126/sciadv.aay1259)



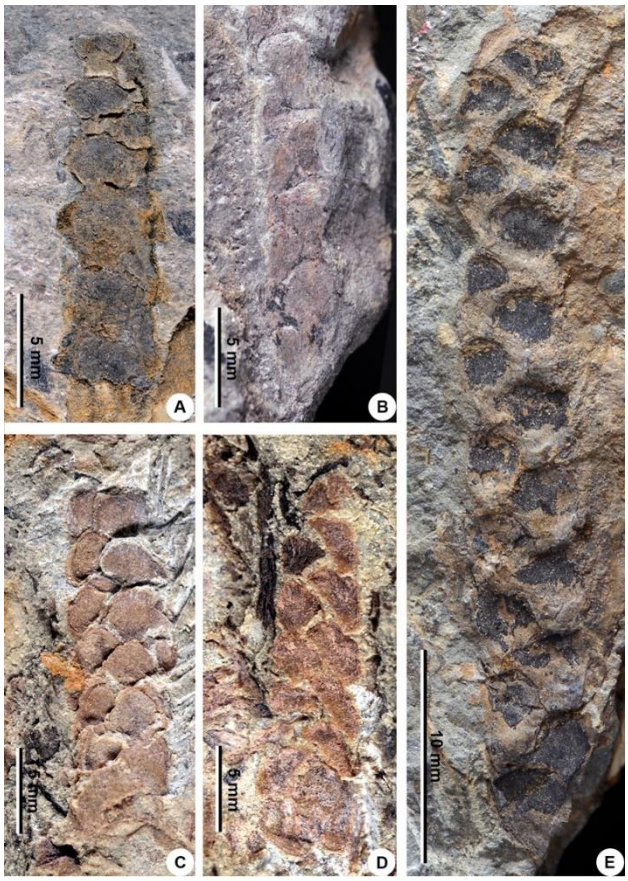
Qaidam Basin leaf fossils show northeastern Xizang was high, wet and cool in the early Oligocene. (*Earth and Planetary Science Letters.* https://doi.org/10.1016/j.epsl.2020.116175)



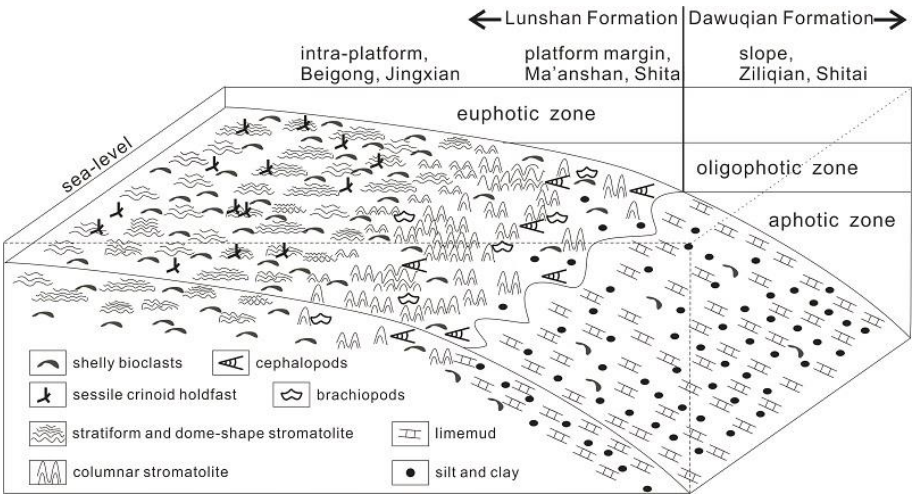
Middle Permian fusulines from the Thitsipin Formation of Shan State, Myanmar and their palaeobiogeographical and palaeogeographical implications. (*Papers in Palaeontology*, https://doi.org/10.5061/dryad.ghx3ffbj6)



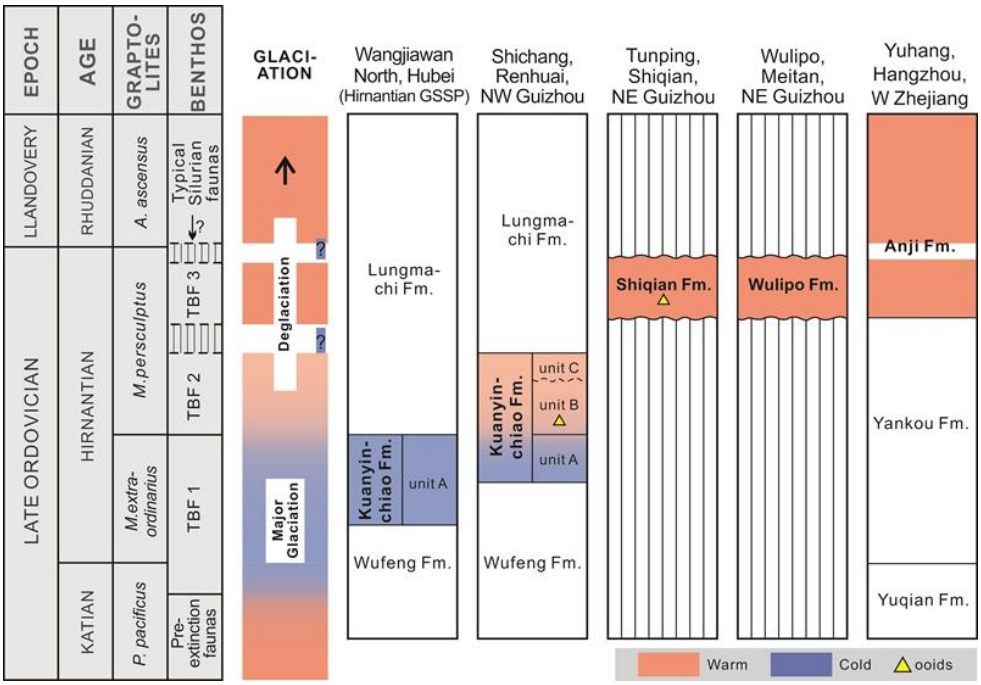
Recovery of lacustrine ecosystems after the end-Permian mass extinction. (*Geology*, http://doi.org/10.1130/G47502.1)



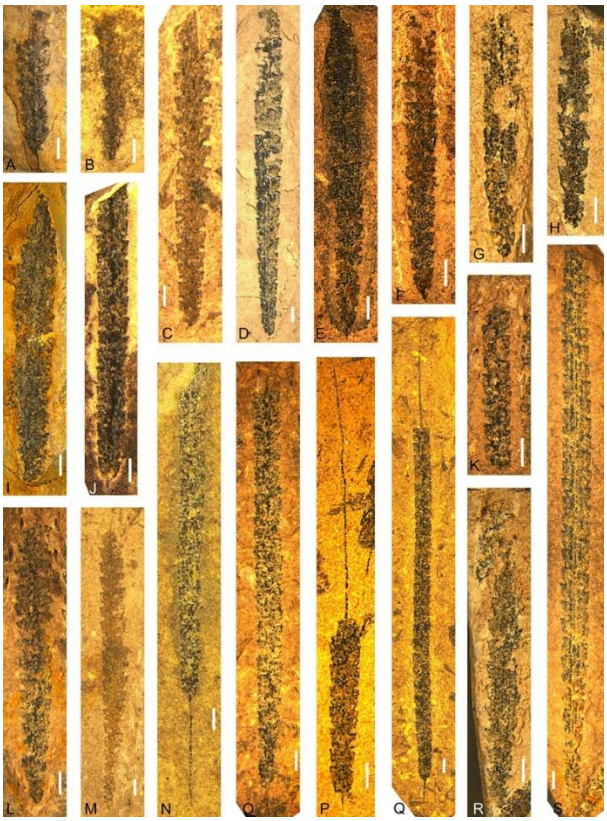
Morphology, nomenclature and potential paleophytogeographic implication of *Demersatheca contigua* (Zosterophyllopsida) from the Lower Devonian of Yunnan and Guangxi, southwestern China. (*Review of Palaeobotany and Palynology*. https://doi.org/10.1016/j.revpalbo.2020.104209)



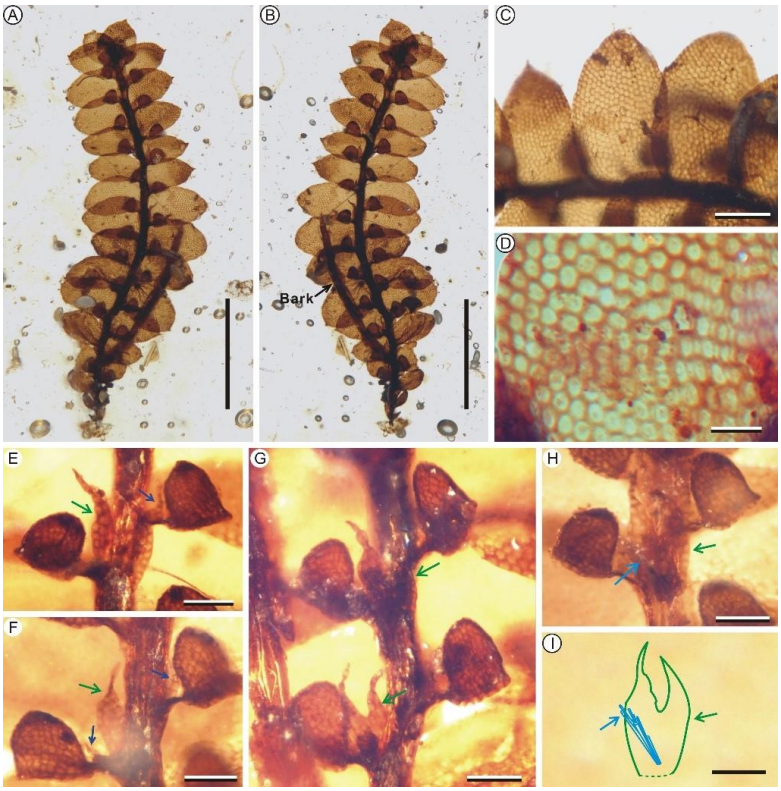
Microbial reefs in eastern Yangtze Platform, South China Block: the last golden age of stromatolites in the Ordovician. (*Facies*. https://doi.org/10.1007/s10347-020-0596-x)



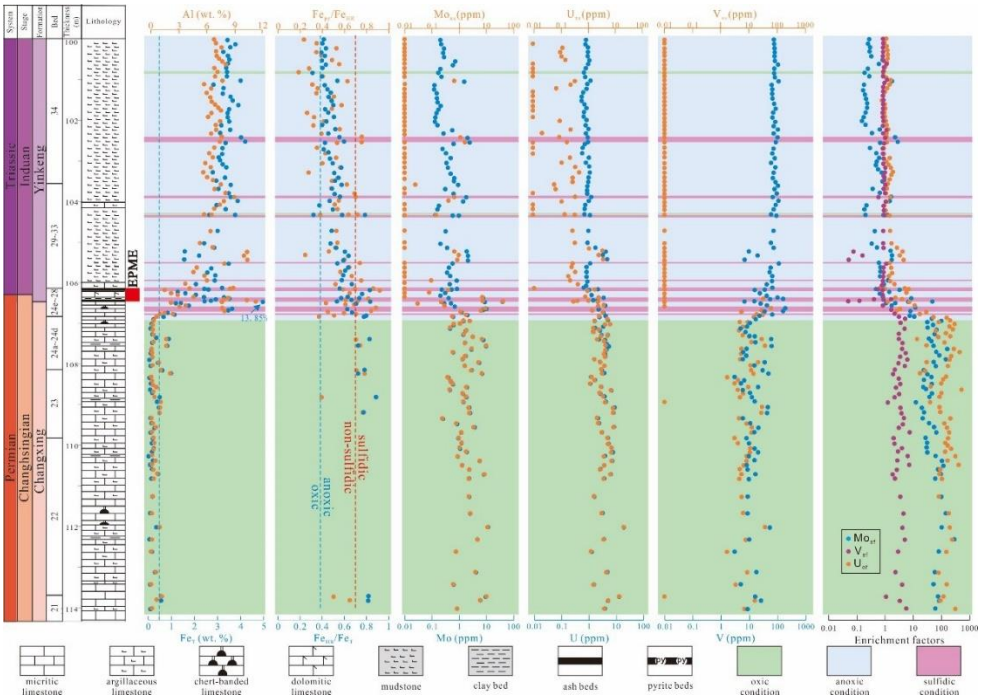
Constraining the biotic transitions across the end-Ordovician mass extinction in South China: Bio- and chemostratigraphy of the Wulipo Formation in the Meitan area of northern Guizhou. (*Geological Journal.* https://onlinelibrary.wiley.com/doi/10.1002/gj.3816)



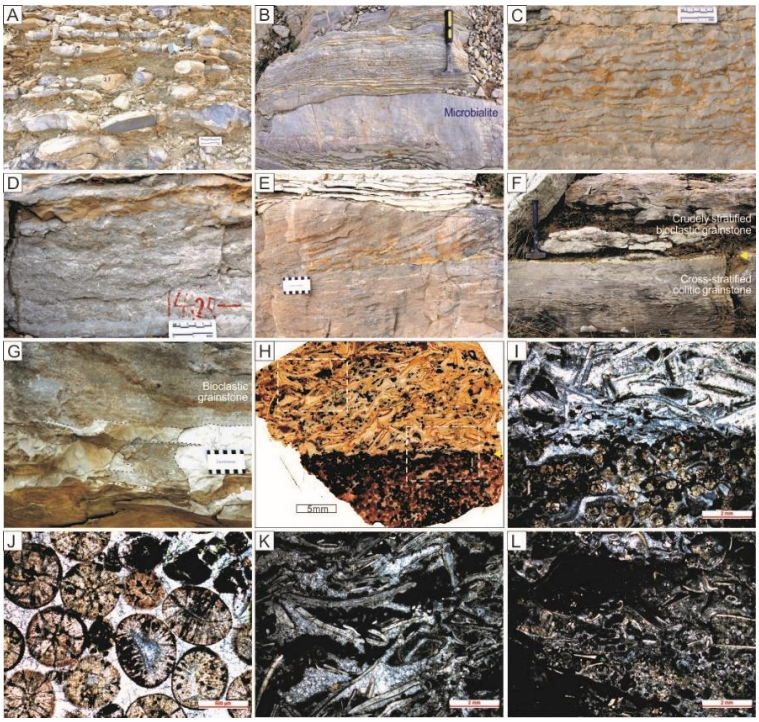
Latest Ordovician graptolites from the Mandalay Region, Myanmar. (*Palaeoworld*. https://doi.org/10.1016/j.palwor.2019.09.003)



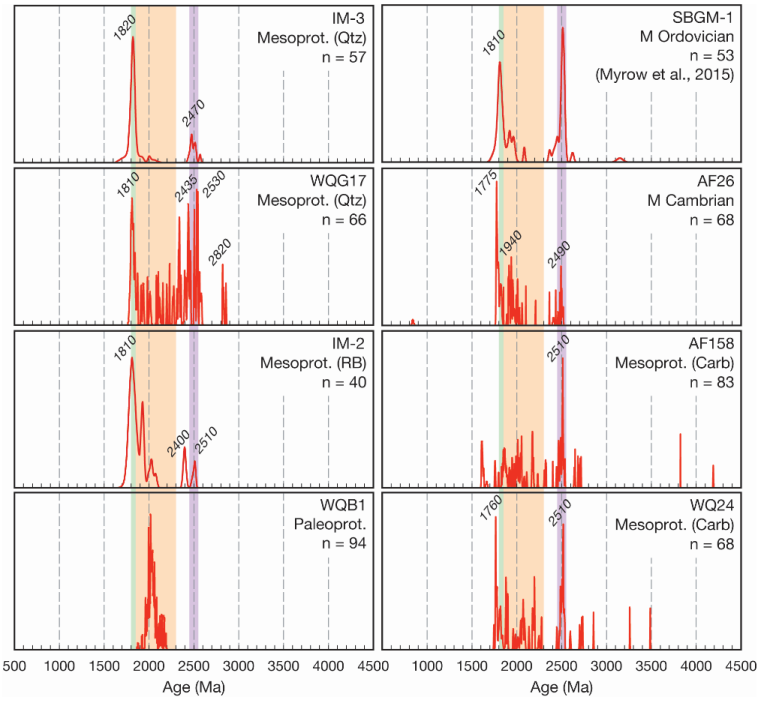
Frullania partita sp. nov. (Frullaniaceae, Porellales), a new leafy liverwort from the mid-Cretaceous of Myanmar. (*Cretaceous Research.* https://doi.org/10.1016/j.cretres.2019.104341)



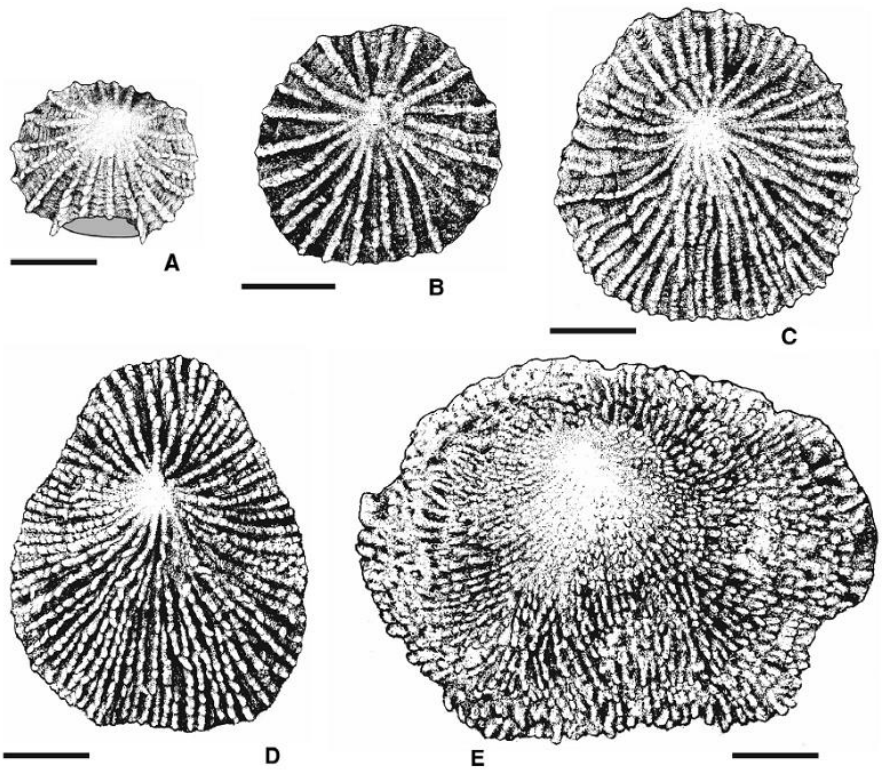
Oceanic redox evolution around the end-Permian mass extinction at Meishan, South China. (*Paleogeogr. Paleoclimatol. Paleoecol.* https://doi.org/10.1016/j.palaeo.2020.109626)



Spatial variation in carbonate carbon isotope during the Cambrian SPICE event across the North China Platform. (*Palaeogeography, Palaeoclimatology, Palaeoecology*. https://doi.org/10.1016/j.palaeo.2020.109669)



Sedimentology, stratigraphy, and detrital zircon geochronology of Mesoproterozoic strata in the northern Helan Mountains, western margin of the North China Block. (*Precambrian Research*. https://doi.org/10.1016/j.precamres.2020.105730)

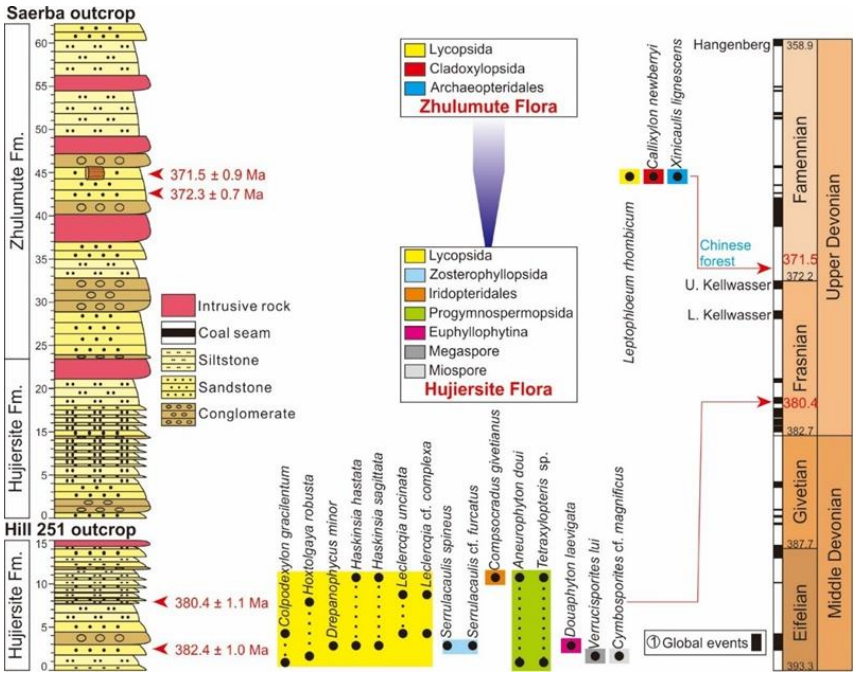


The latest Ordovician *Hirnantia* brachiopod Fauna of Myanmar: Significance of new data from the Mandalay Region. (*Palaeoworld*. https://doi.org/10.1016/j.palwor.2019.07.002.)

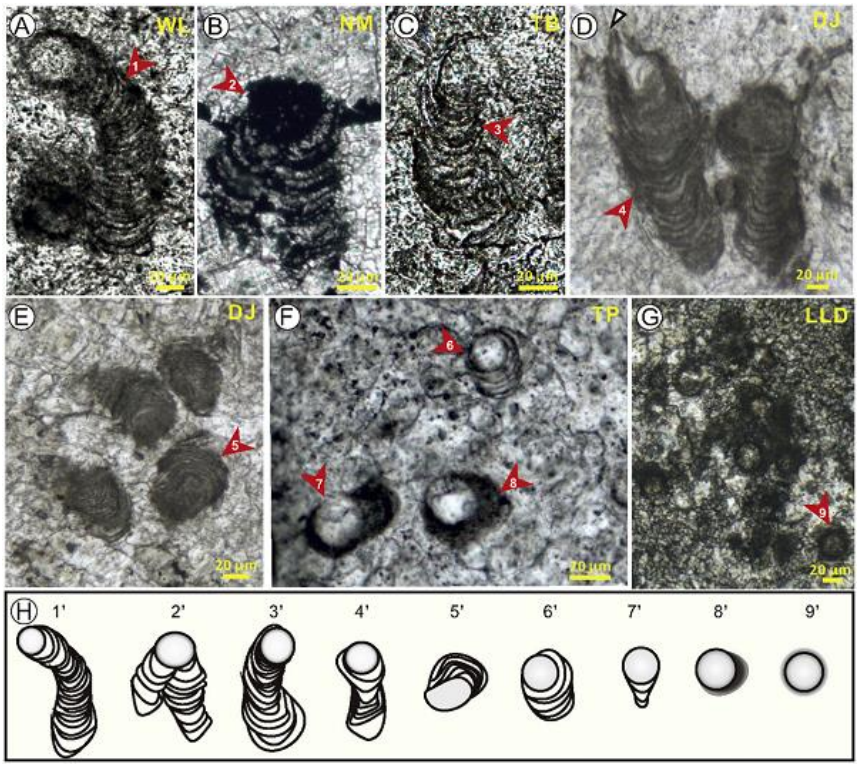
A latest Ordovician *Hirnantia* brachiopod fauna from western Yunnan, Southwest China and its paleobiogeographic significance. (*Palaeoworld*. https://doi.org/10.1016/j.palwor.2019.03.002)

A nearshore Hirnantian brachiopod fauna from South China and its ecological significance. (*Journal of Paleontology*. https://doi.org/10.1017/jpa.2019.90.)

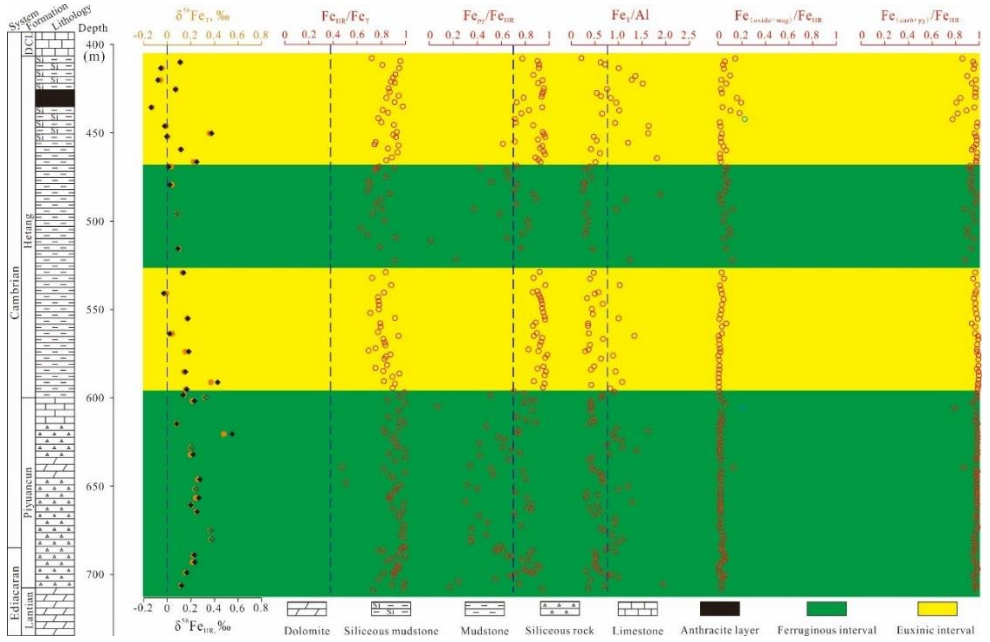
From shallow to deep-water: an ecological study of the *Hirnantia* brachiopod Fauna (Late Ordovician) and its global implications. (*Lethaia*. https://doi.org/10.1111/let.12360)



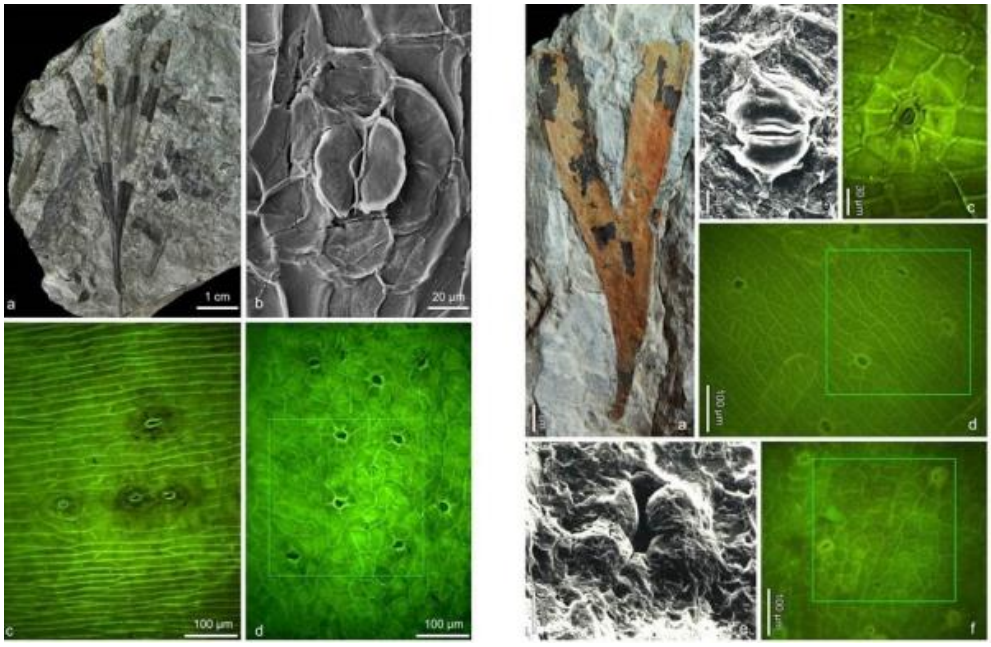
Age constraint for the earliest Famennian forest and its implications for Frasnian-Famennian boundary in West Junggar, Northwest China. (*Palaeogeography, Palaeoclimatology, Palaeoecology*. https://doi.org/10.1016/j.palaeo.2020.109749)



Polybessurus-like fossils as key contributors to Permian-Triassic boundary microbialites in South China. (*Palaeogeography, Palaeoclimatology, Palaeoecology*. https://doi.org/10.1016/j.palaeo.2020.109770)

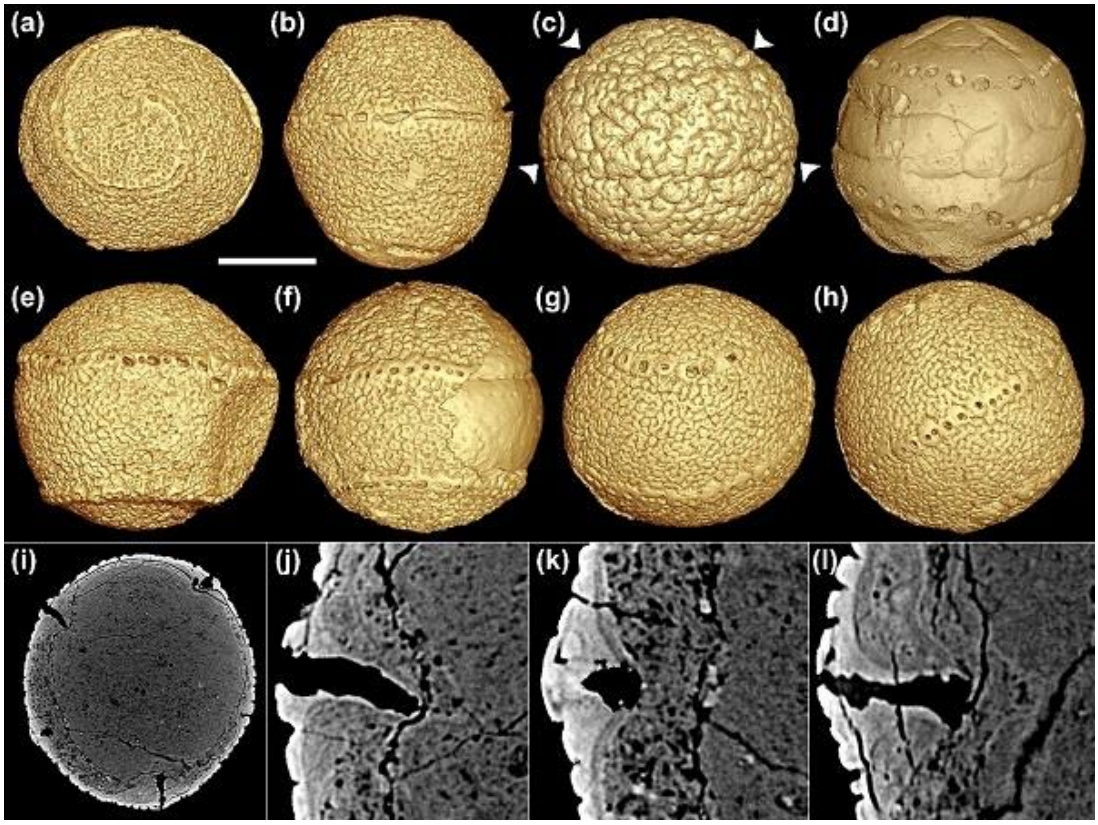


Deep-water dissolved iron cycling and reservoir size across the Ediacaran-Cambrian transition. (*Chemical Geology*. https://doi.org/10.1016/j.chemgeo.2020.119575)

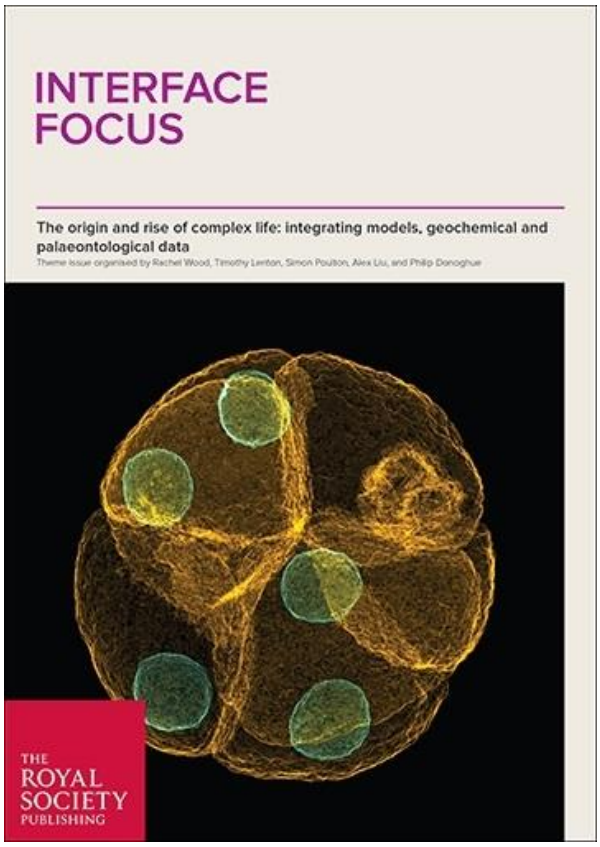


An inter-comparison study of three stomatal-proxy methods for CO_2 reconstruction applied to early Jurassic Ginkgoales plants. (*Palaeogeography, Palaeoclimatology, Palaeoecology*. https://doi.org/10.1016/j.palaeo.2019.109547)

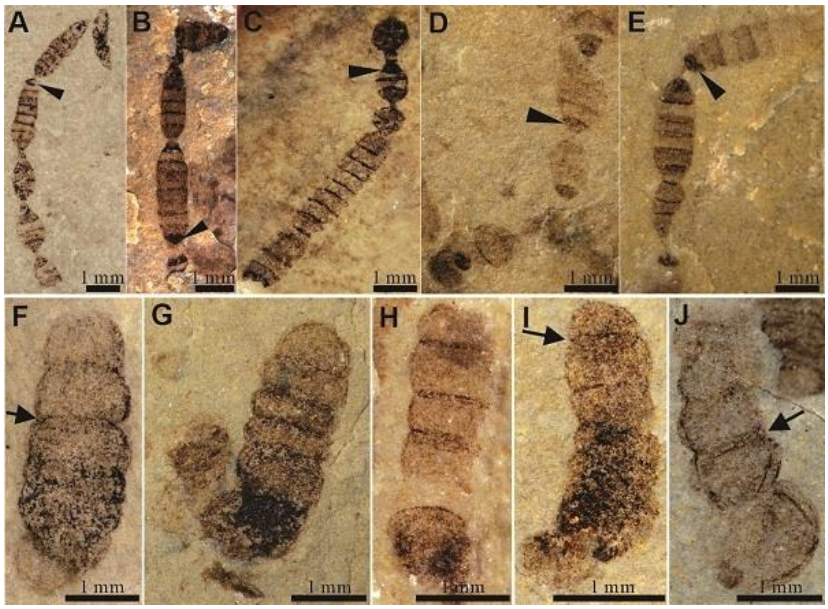
A Tale of Three Taphonomic Modes: The Ediacaran Fossil Flabellophyton Preserved in Limestone, Black Shale, and Sandstone. (*Gondwana Research.* https://doi.org/10.1016/j.gr.2020.04.003)



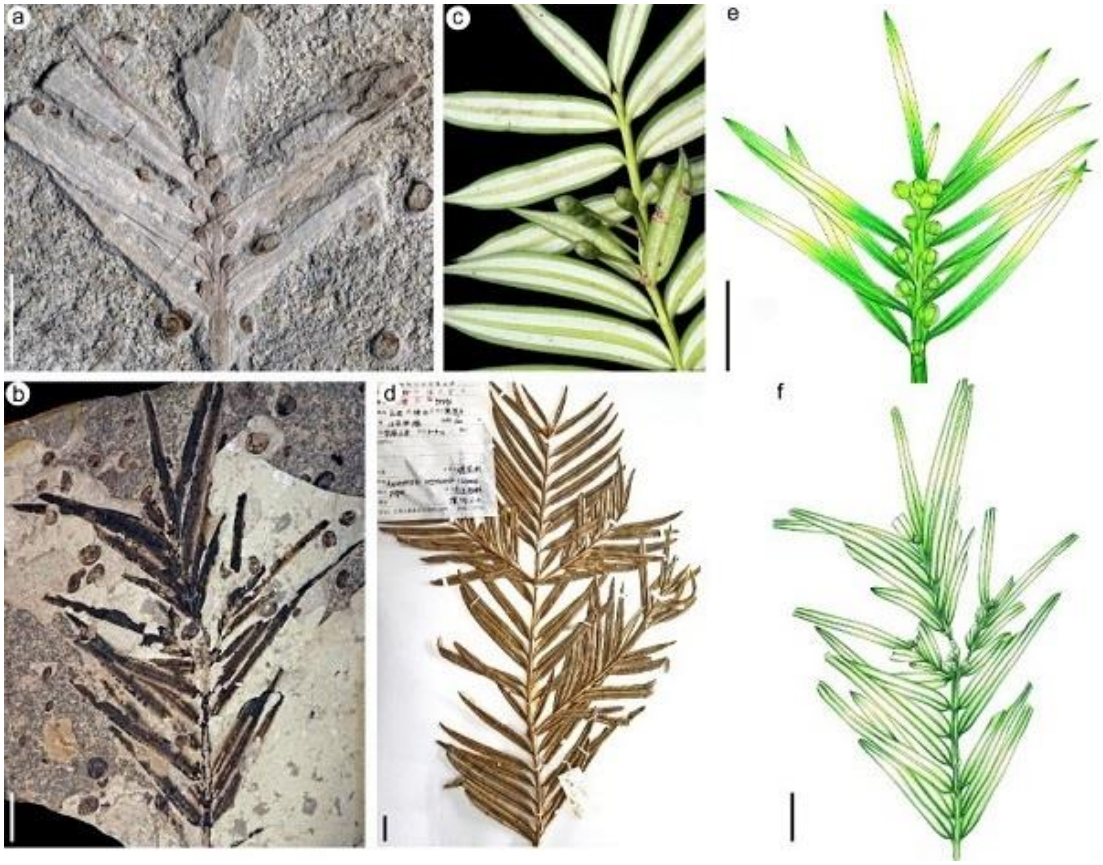
Developmental biology of Helicoforamina reveals holozoan affinity, cryptic diversity, and adaptation to heterogeneous environments in the early Ediacaran Weng'an biota (*Sci. Adv.* http://doi.org/10.1126/sciadv.abb0083)



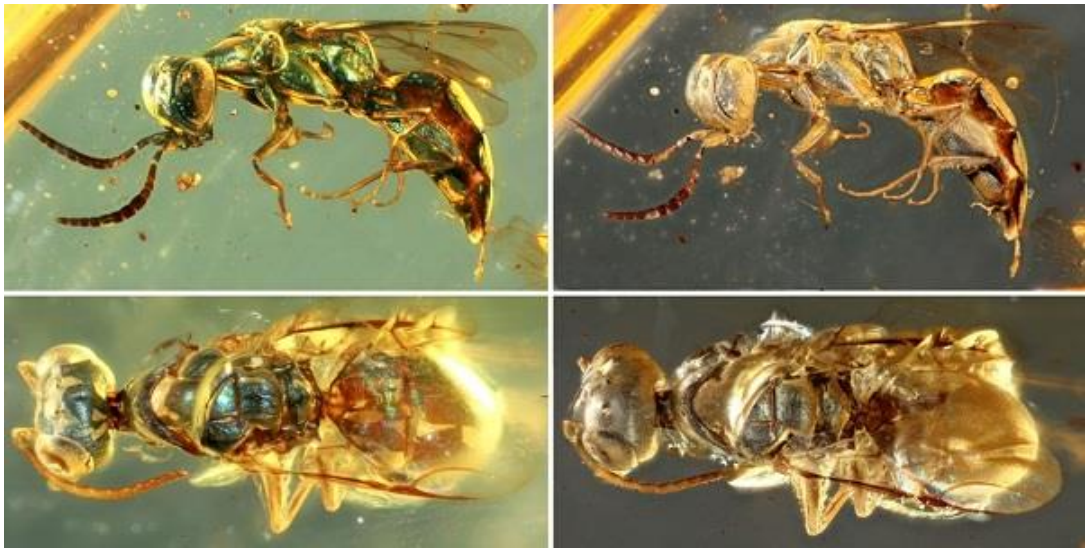
Nucleus preservation in early Ediacaran Weng'an embryo-like fossils, experimental taphonomy of nuclei and implications for reading the eukaryote fossil record. (*Interface Focus*. http://dx.doi.org/10.1098/rsfs.2020.0015)



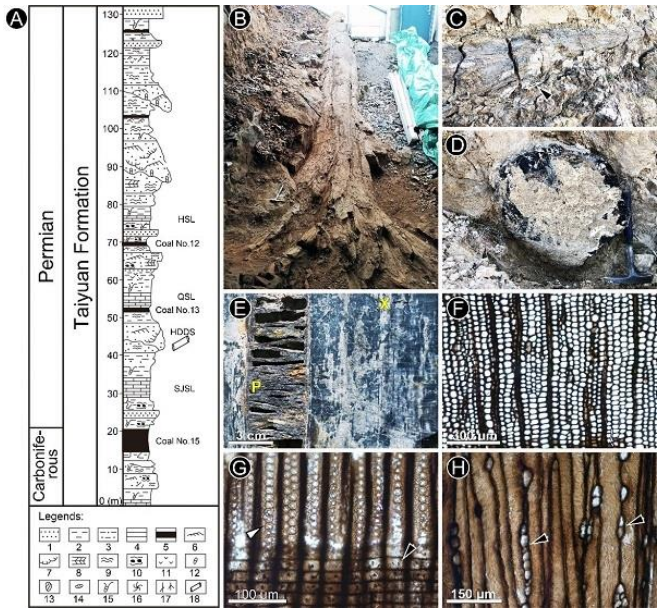
An assemblage of macroscopic and diversified carbonaceous compression fossils from the Tonian Shiwangzhuang Formation in western Shandong, North China. (*Precambrian Research*. https://doi.org/10.1016/j.precamres.2020.105801)



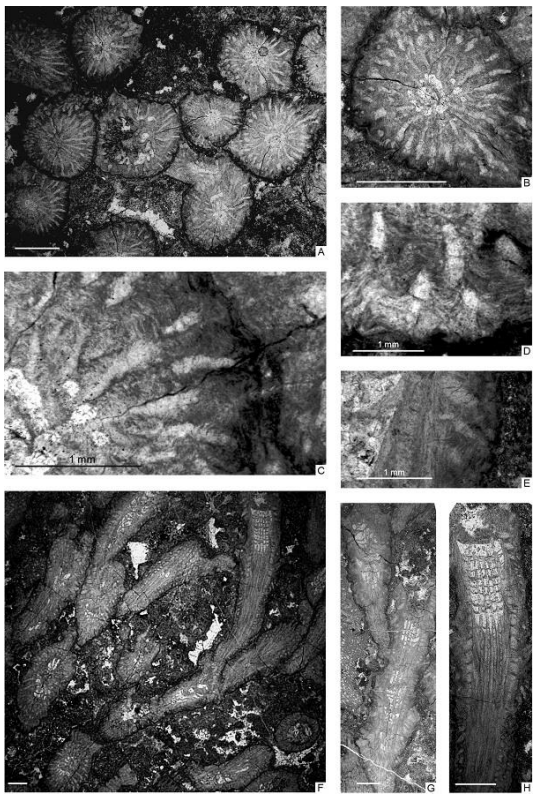
Middle-Late Jurassic fossils from northeastern China reveal morphological stasis in the catkin-yew. (*National Science Review*. https://doi.org/10.1093/nsr/nwaa138)



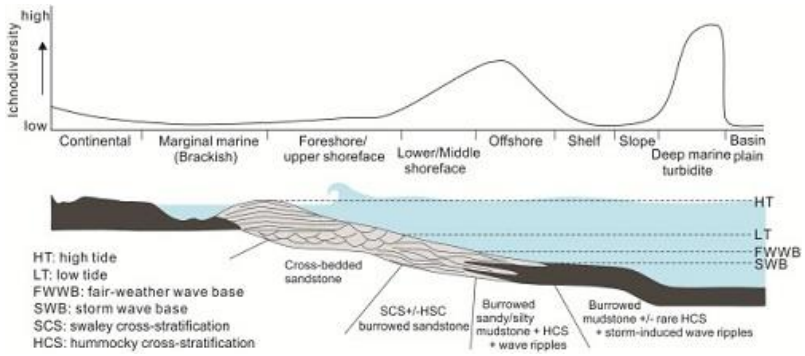
Structural colours in diverse Mesozoic insects. (*Proc. R. Soc. B.* http://dx.doi.org/10.1098/rspb.2020.0301)



Giant cordaitalean trees in early Permian riparian canopies in North China: Evidence from anatomically preserved trunks in Yangquan, Shanxi Province. (*Palaeoworld*. https://doi.org/10.1016/j.palwor.2020.04.008)



The youngest Ordovician (latest Katian) coral fauna from eastern Australia, in the uppermost Malachis Hill Formation of central New South Wales. (*Alcheringa*. https://doi.org/10.1080/03115518.2020.1747540)



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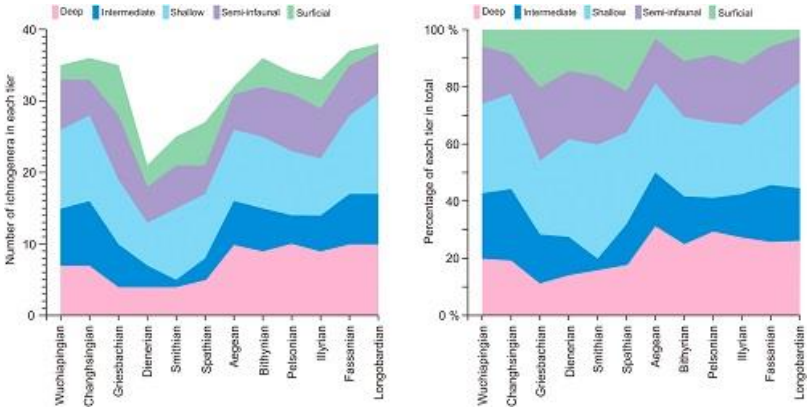

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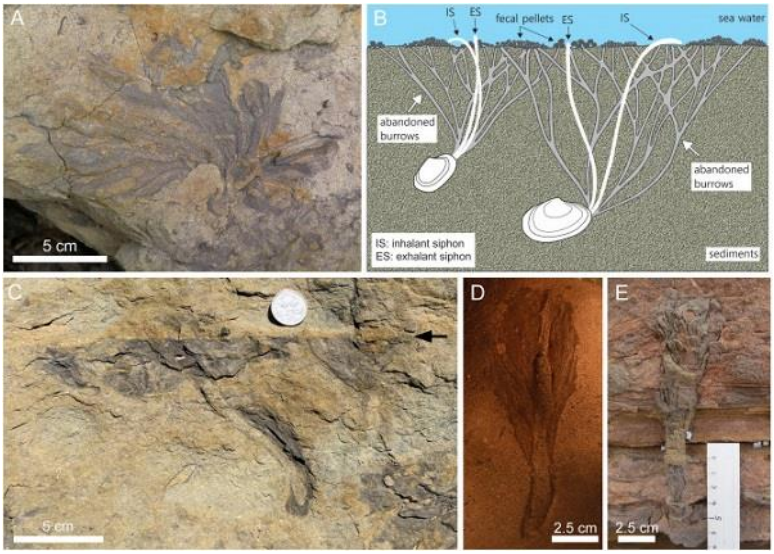

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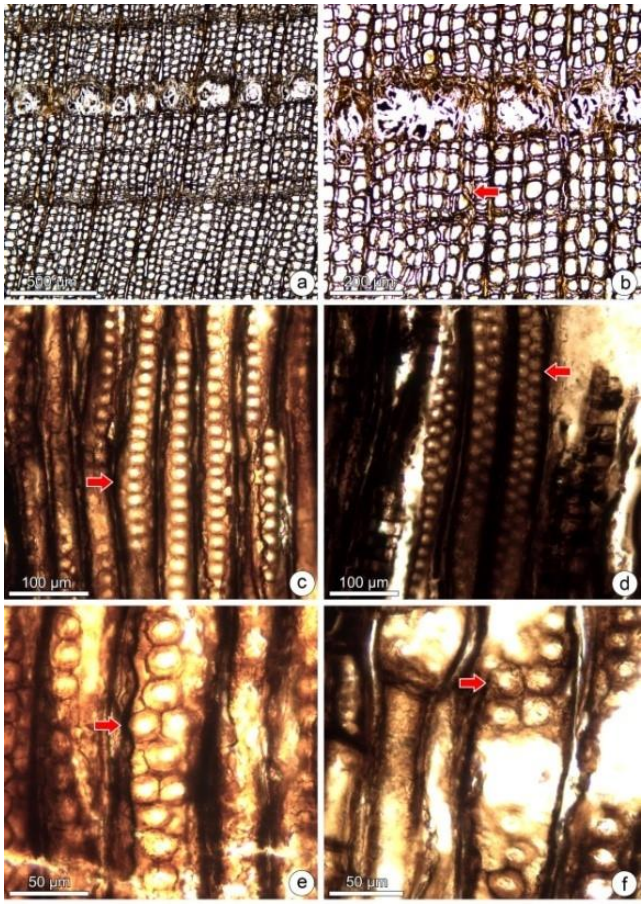
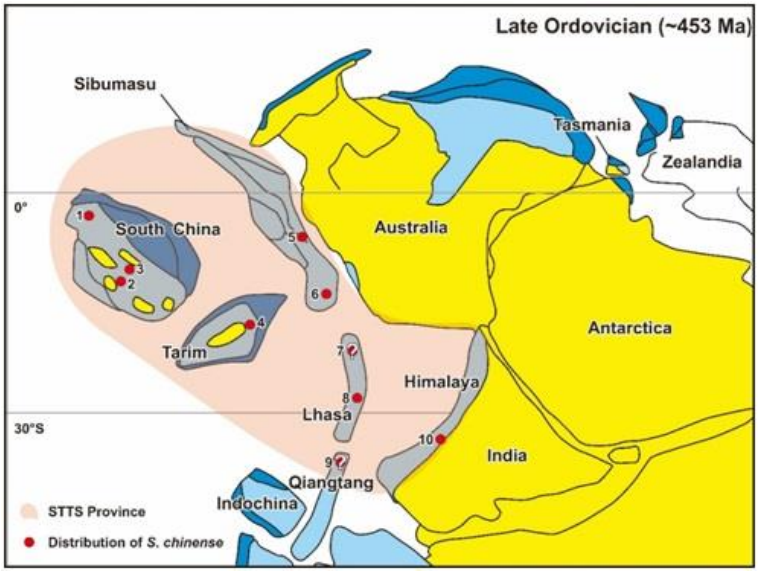


A New Species of Conifer Wood Brachyoxylon from South China and its Palaeoclimatic Implications. (*Historical Biology*. https://doi.org/10.1080/08912963.2020.1755282)



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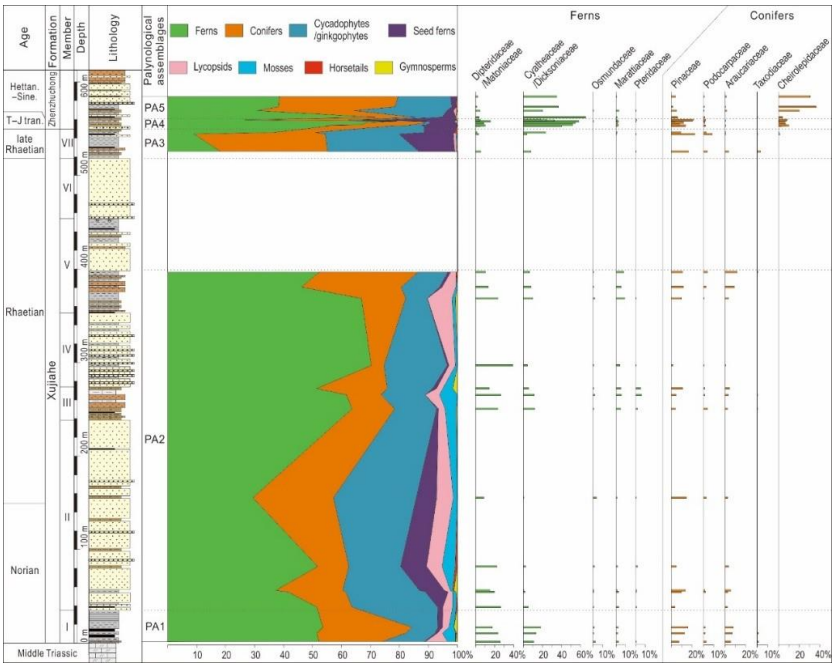

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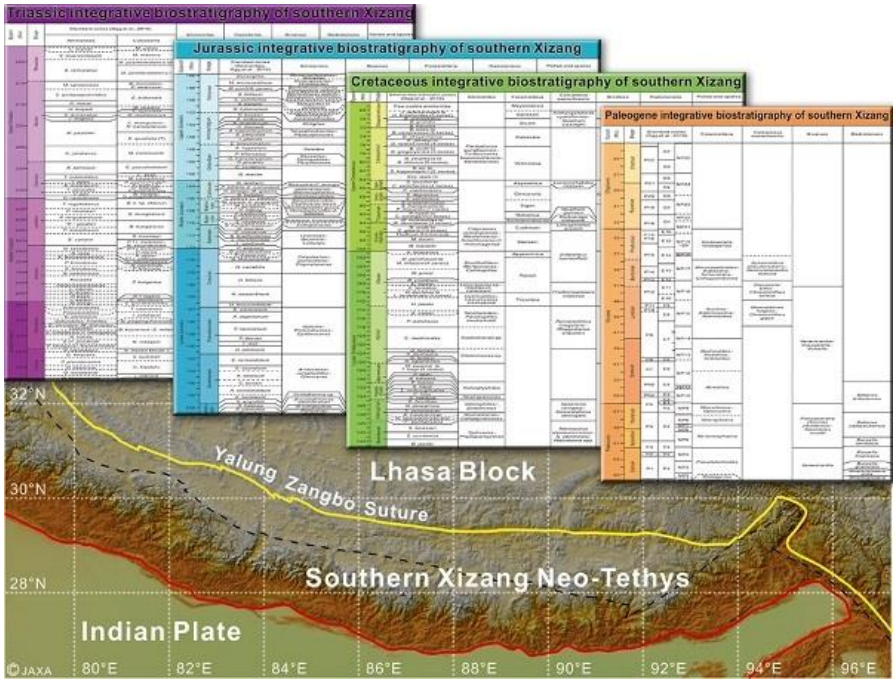
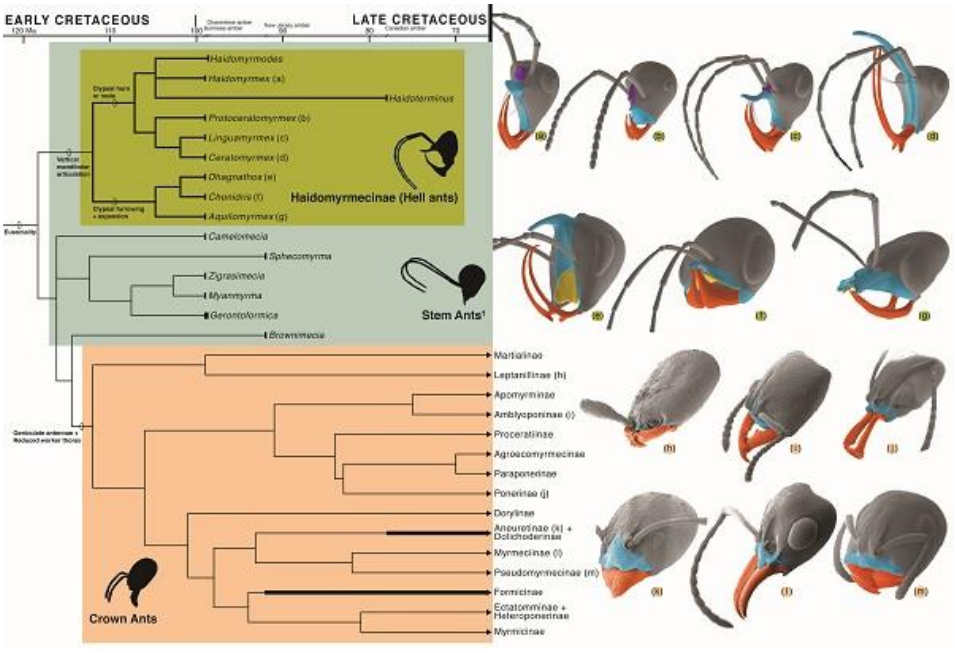


New biostratigraphic framework for the Triassic–Paleogene in the Neo-Tethys realm of southern Xizang (Tibet), China. (*Journal of Asian Earth Sciences*. https://doi.org/10.1016/j.jseaes.2020.104369)



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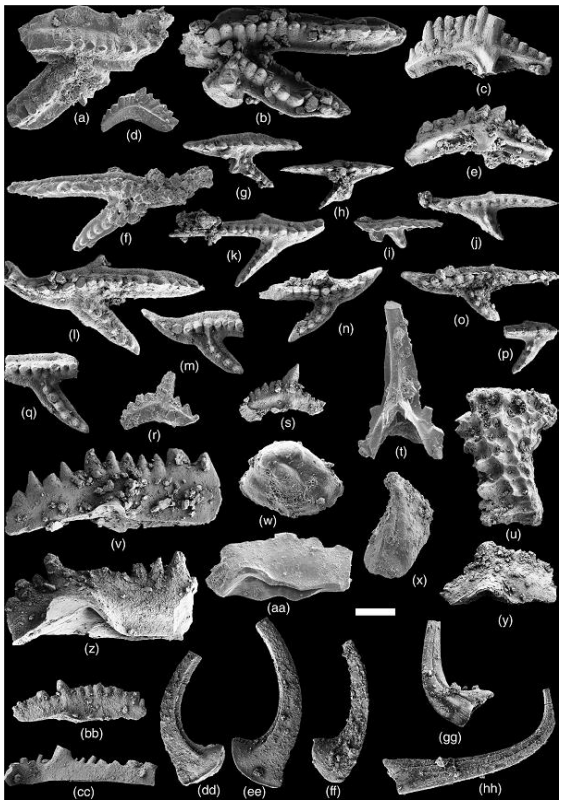

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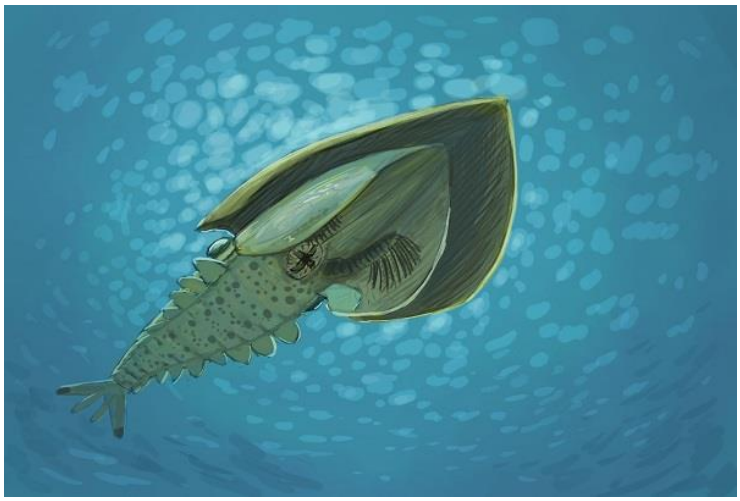

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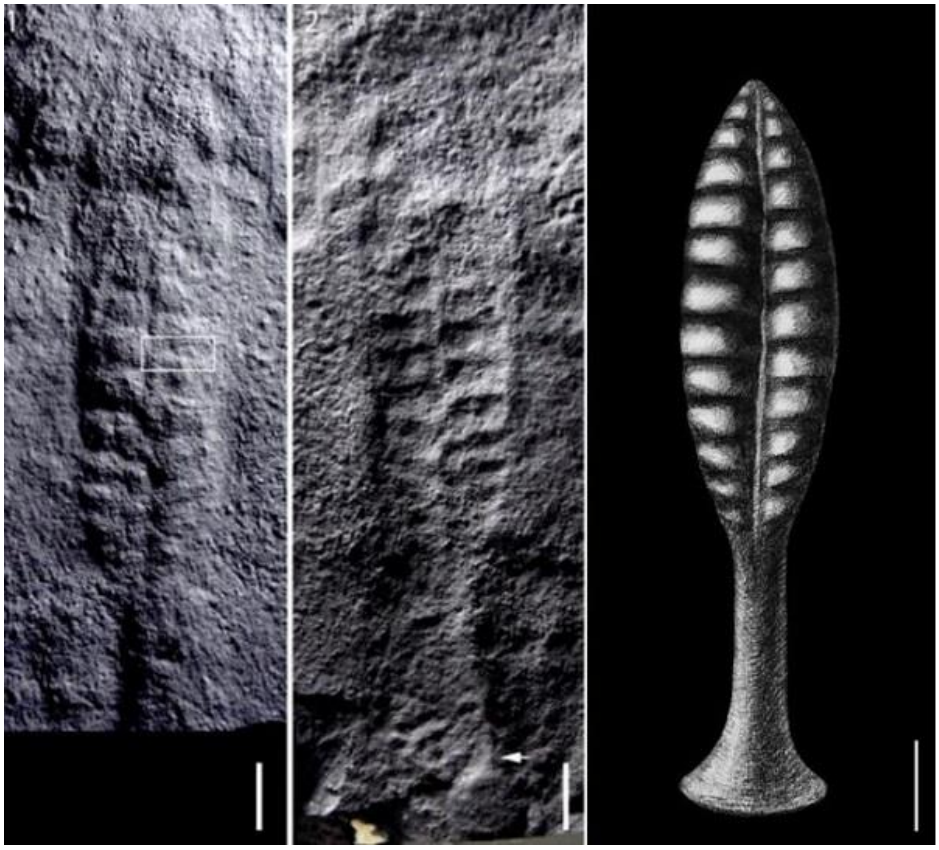

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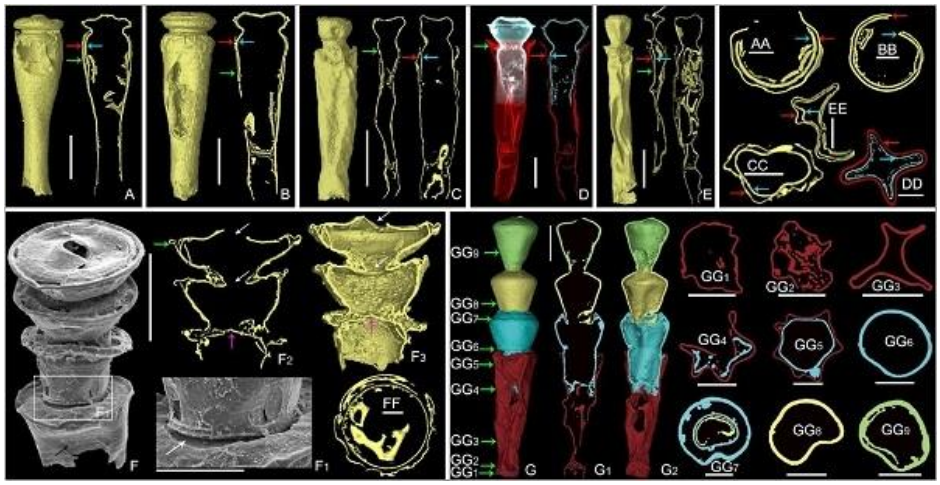

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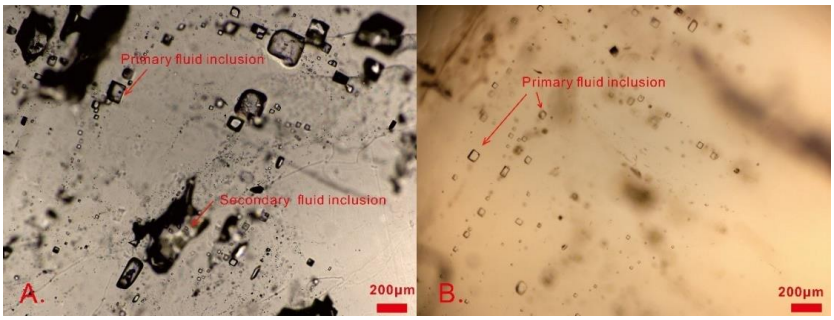

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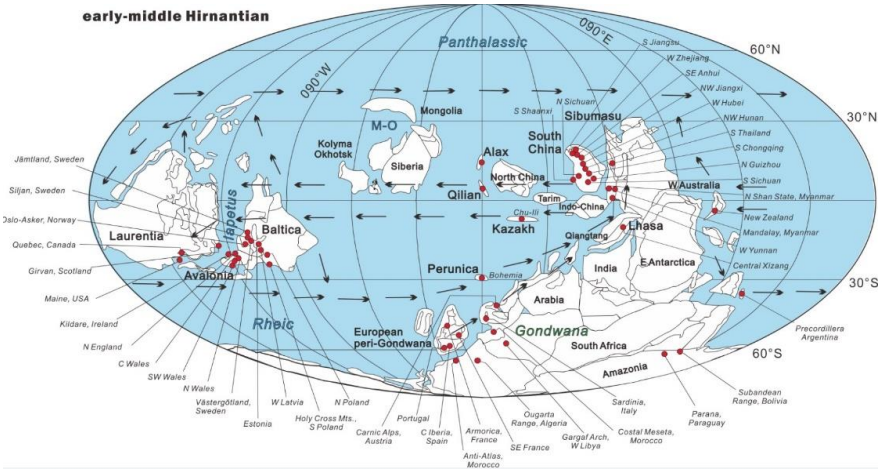

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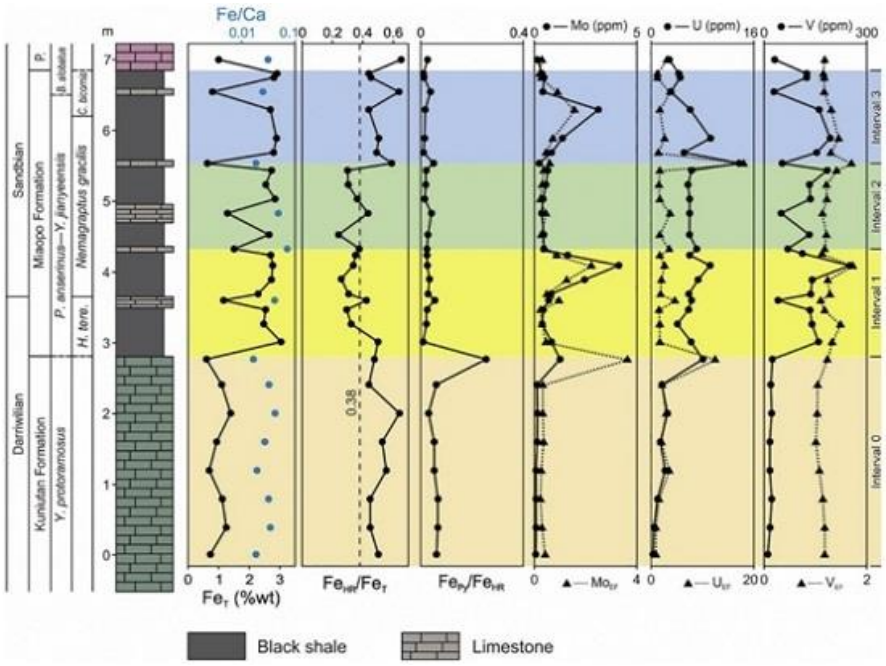
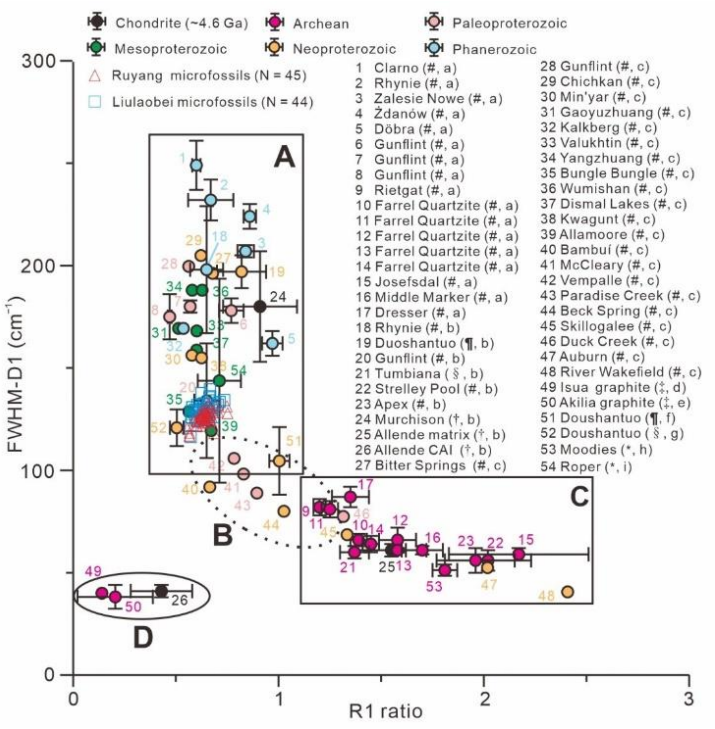


Paleo-environmental changes during the Middle–Late Ordovician transition on the Yangtze Platform, South China and their ecological implications. (*Palaeogeography, Palaeoclimatology, Palaeoecology*. https:/doi.org/10.1016/j.palaeo.2020.109991)



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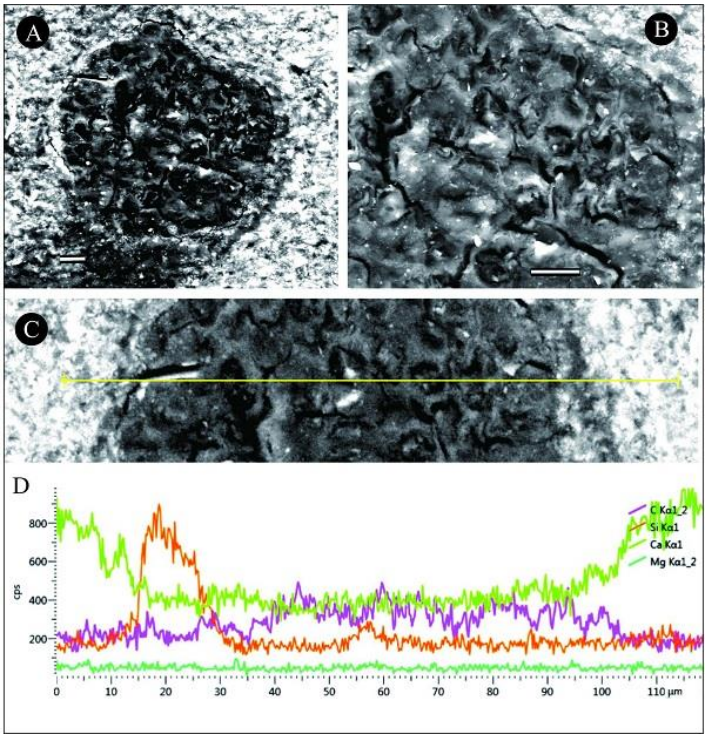

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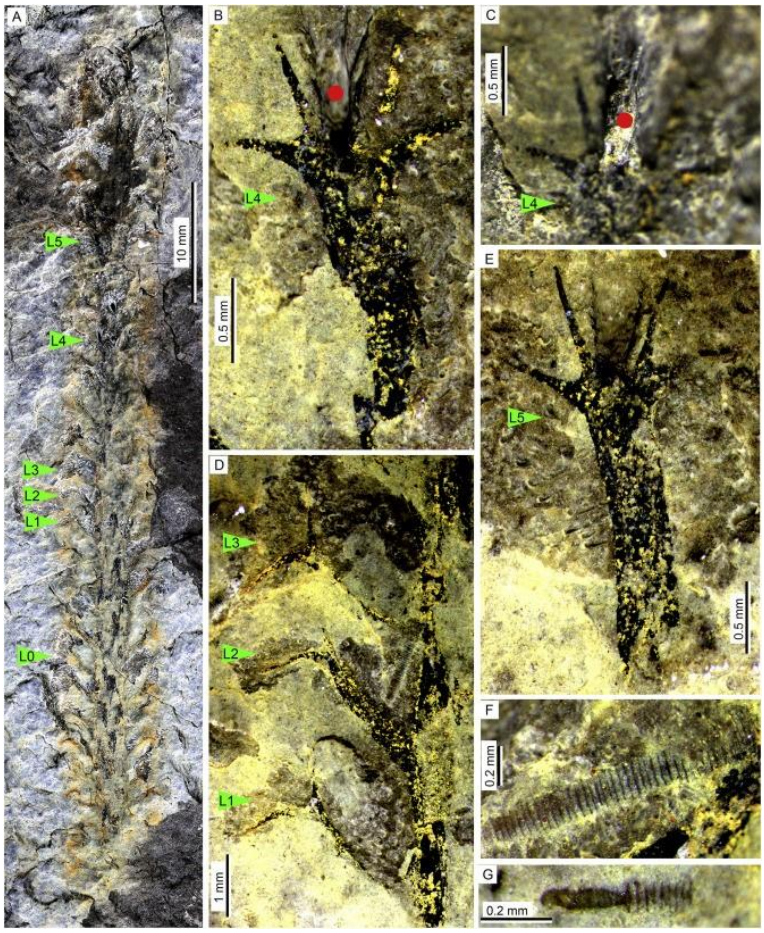

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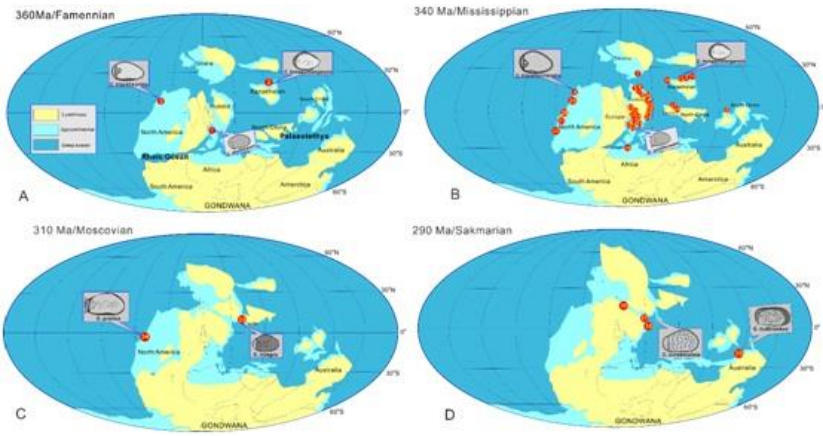

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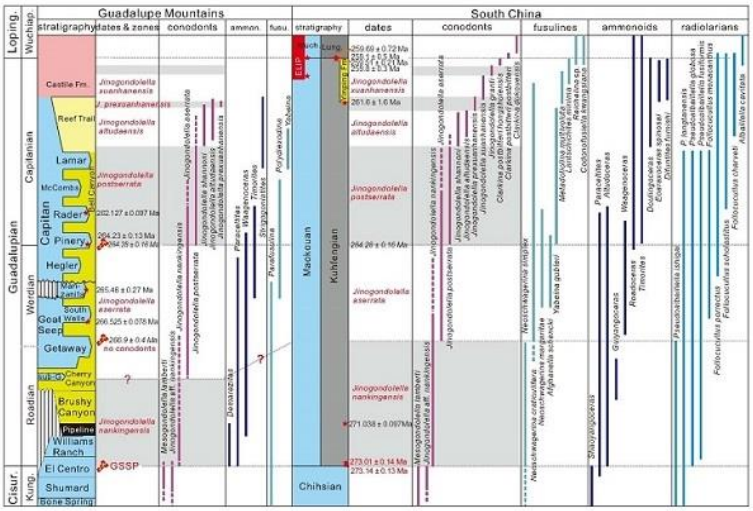

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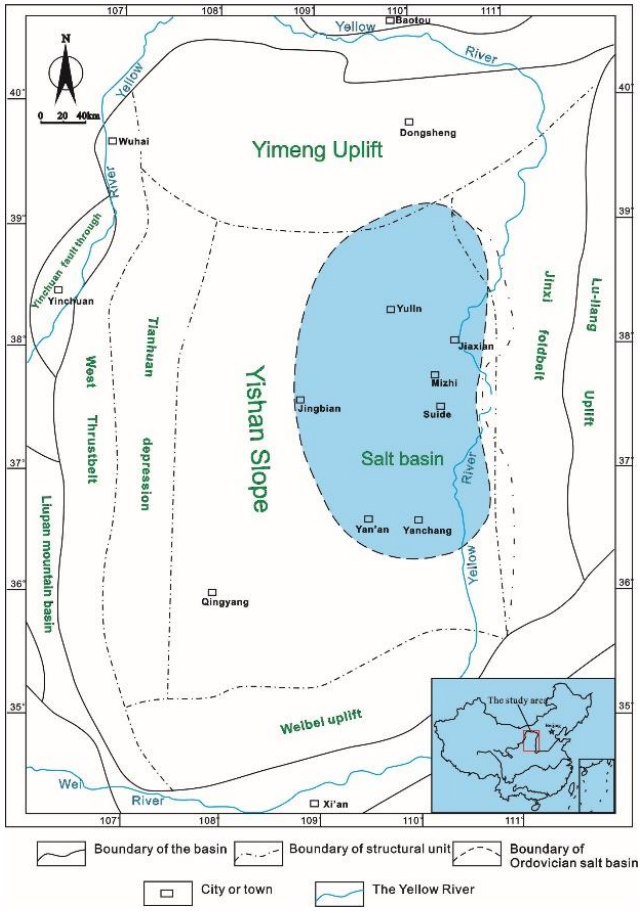

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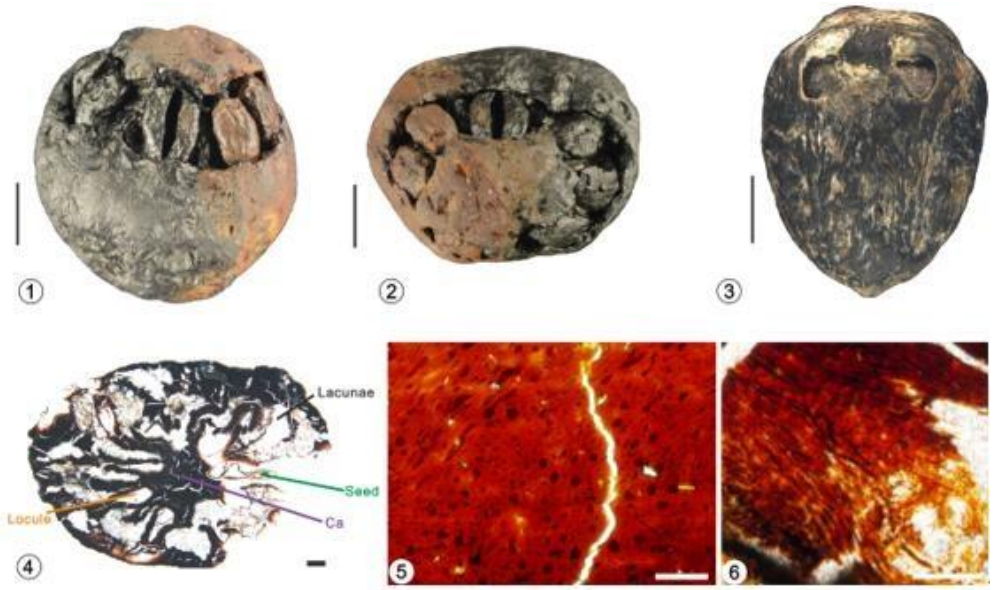

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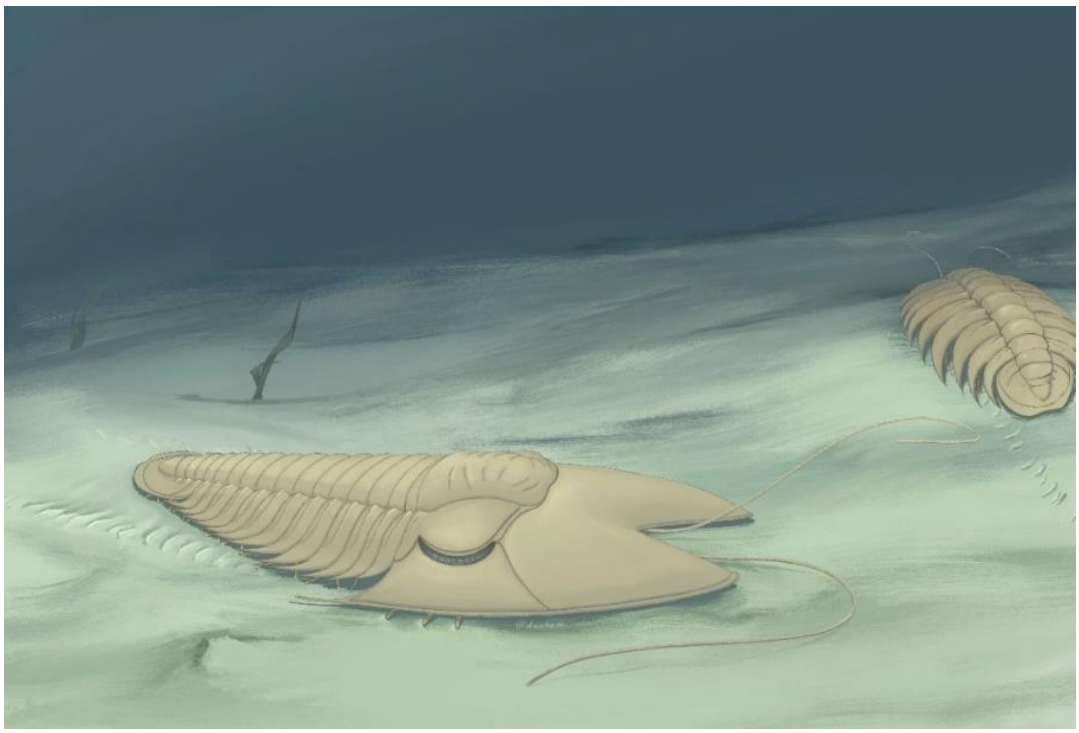

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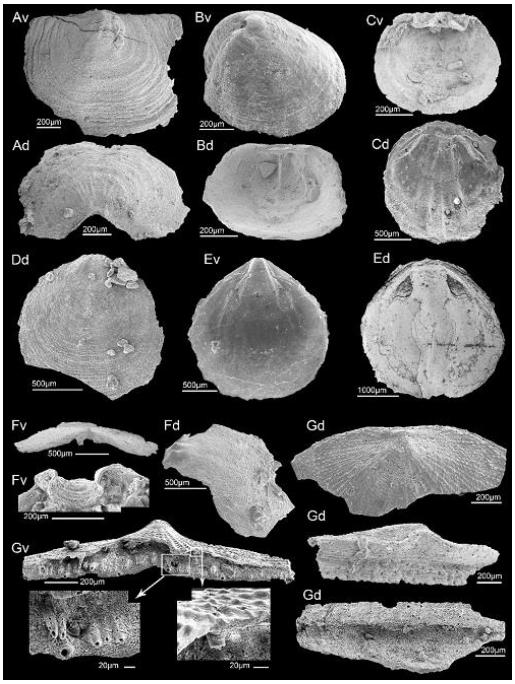

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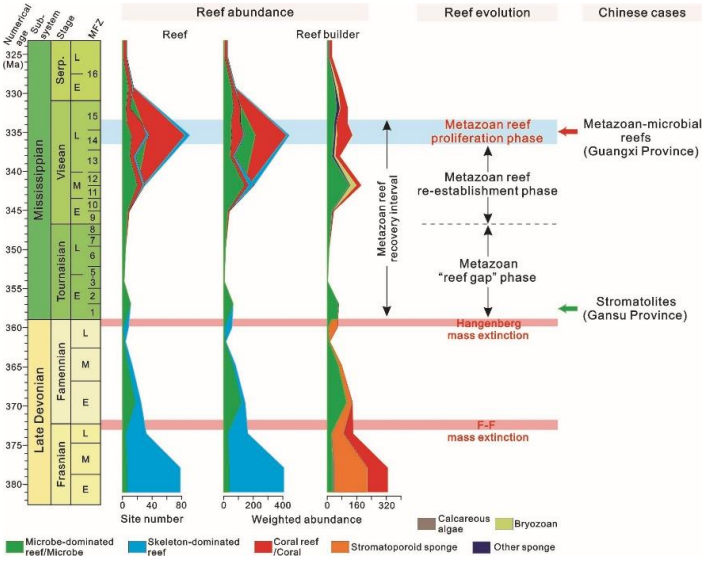

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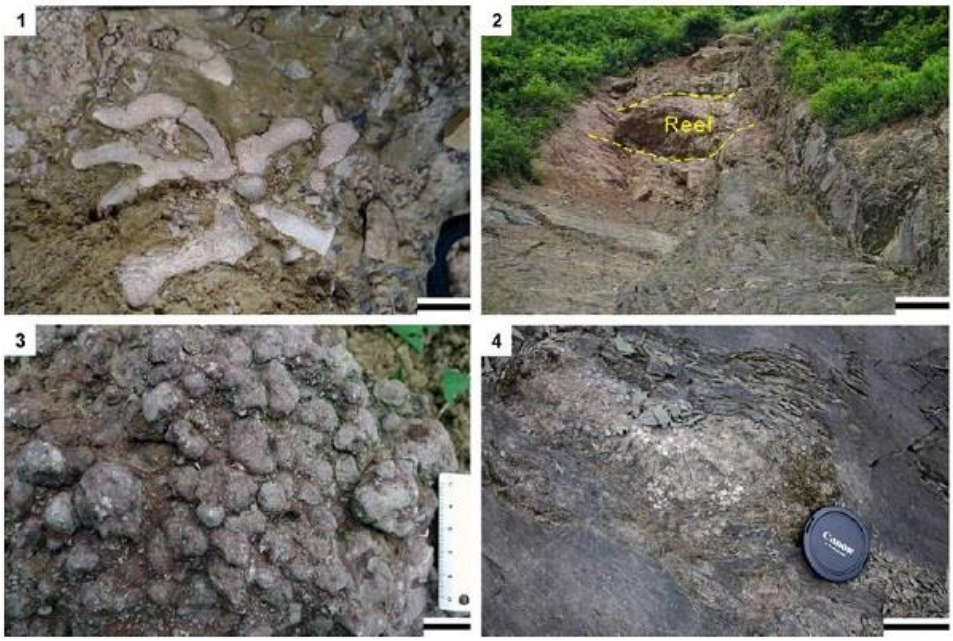

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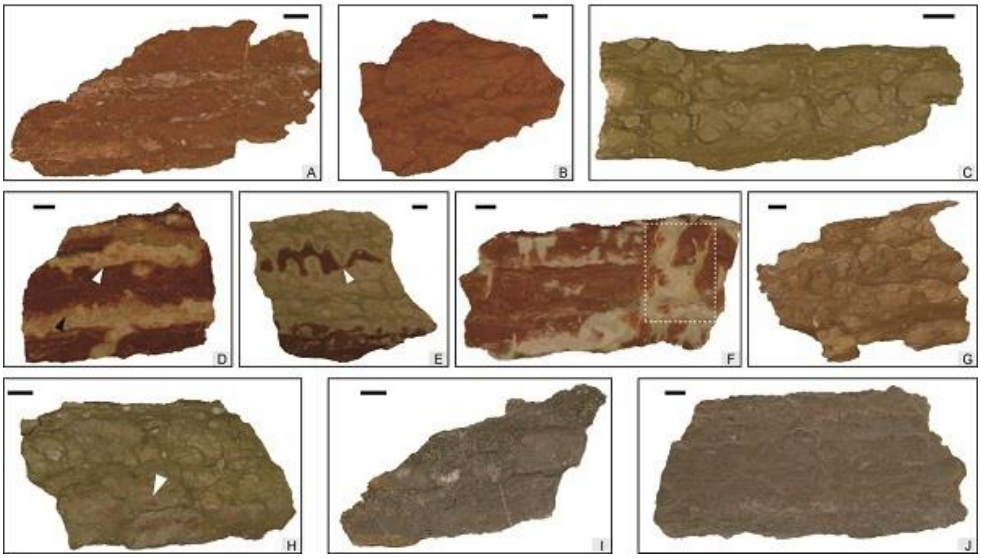
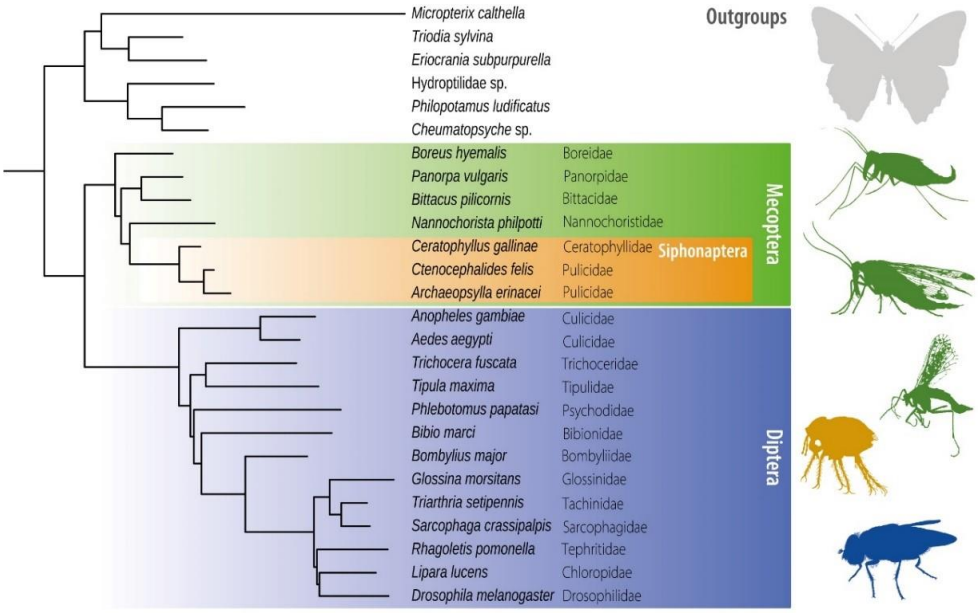


Environmental changes revealed by Lower–Middle Ordovician deeper-water marine red beds from the marginal Yangtze Platform, South China: Links to biodiversification. (*Palaeogeography, Palaeoclimatology, Palaeoecology*. https://doi.org/10.1016/j.palaeo.2020.110116)



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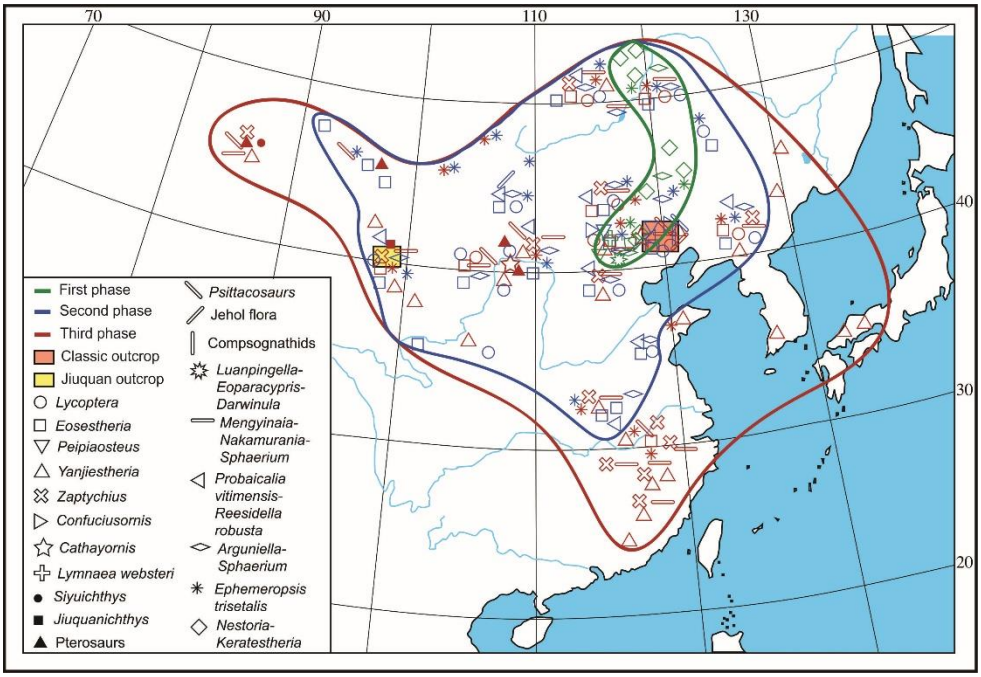
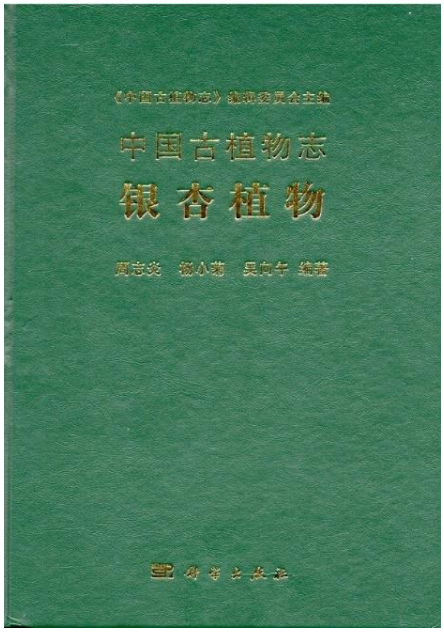


Synthesis of a chrono- and biostratigraphical framework for the Lower Cretaceous of Jiuquan, NW China: Implications for major evolutionary events. (*Earth-Science Reviews*. https://doi.org/10.1016/j.earscirev.2020.103474)

New books

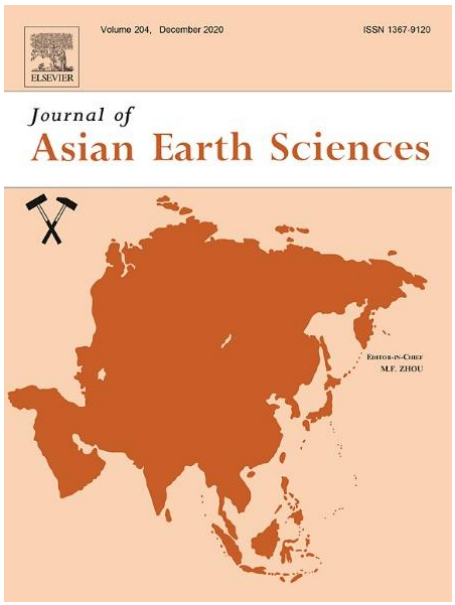


Ginkgo Plants systematically summarizes the research results of Chinese ginkgo plants over the past 100 years. As a comprehensive and systematic monograph on Chinese Ginkgo Plants, it is an important document for the Ginkgo study and will help to promote the development of paleobotany.

Book information:

ZHOU Zhiyan, YANG Xiaoju, WU Xiangwu, et al., 2020. **Ginkgo Plants.** Science Press.

ISBN: 978-7-030-64221-9.



A special issue "Evolution of the Tibetan Neo-Tethys: Stratigraphy and Palaeogeography " was published in *Journal of Asian Earth Sciences* (Volume 204) on 28 July 2020. For decades, China has given sustained support to the geological study on the Qinghai-Xizang Plateau, a series of scientific research projects have been organized and conducted on the plateau and its adjacent areas. These projects promoted the research in many aspects including palaeontology. This special issue aims to exhibit and synthesize the new advances in biodiversity and ecosystems of the Neo-Tethyan region in the Qinghai-Xizang Plateau as well as to explore the co-evolution of biotas and Neo-Tethys. Needless to say, other scientific issues in relation to the study of Neo-Tethys are also helpfully accommodated.

Related information link: (https://www.sciencedirect.com/journal/journal-of-asian-earth-sciences/special-issue/10LTVBSWR6X

NIGPAS Equipments

NIGPAS has established an internationally advanced Experiment and Technology Center, to meet the research needs of palaeontology, stratigraphy and geological environment, which now has 39 sets of large-scale facilities and equipment, with a total asset value of up to 73.65 million Yuan (about 11.6 million USD).

Since the establishment of the Experiment and Technology Center, in addition to providing high-quality services to all the institutes, it also has strongly supported for the large number of scientific research and innovation achievements over the years. Meanwhile, the Experiment and Technology Center has established the joint laboratory with other industrial companies, which has become an important technical support platform in the field of geology and palaeontology at home and abroad.

The institute is well-equipped with modern observational and analytical equipment and

facilities such as Micro-CT, field emission scanning electron microscope (Tescan MAIA3), confocal laser scanning microscope (LSM710), Horiba HR Evolution, Horiba XRF XGT-7200, Itrax Core Scanner XRF, isotope ratio mass spectrometers (MAT 253, DELTA V), ICP-OES, ICP-MS, MC-ICP-MS, TSQ Quantum GC, TIMS and peripherals in addition to fossil pretreatment laboratories.

WELCOME TO JOIN US

M.Sc., Ph.D., and Postdoctoral Programs

NIGPAS offers M.Sc. and Ph.D. degree-granting programs and a postdoctoral program in paleontology, stratigraphy, and geobiology. Undergraduate students or M.Sc. holders who are interested in applying for M.Sc. or Ph.D. programs are warmly welcome and are required to take the entrance examinations (two subjects respectively related to the particular specialities).

The postdoctoral program is open to young scientists worldwide who hold a Ph.D. degree and are under the age of 40. All Ph.D. holders of geology and related subjects who are interested in collaborating with staff members of NIGPAS are encouraged to contact us to start a new life at NIGPAS. The main research areas of our Institute include:

The Origin and Evolution of Early Life on Earth
Evolutionary Paleontology
Chronostratigraphy
Systematic Paleontology (of all invertebrate fossil groups and fossil plants)
Paleoecology, Paleogeography and Paleoclimatology
Molecular Paleobiology
Geobiology
Co-evolution of Life and Environment in deep time
Applied Paleontology and Stratigraphy

Interested applicants may contact relevant experts of our Institute or the particular office for foreign affairs of NIGPAS for more information (see contact information below).

Faculty Positions (3-5 yearly) Open: Applications invited

Recent Ph.D. holders and experienced scientists of various career levels, with research capabilities potentially enhancing or supplementing the current programs at NIGPAS (please refer to http://english.nigpas.cas.cn/rh/rps/), are invited to apply for our faculty positions. Interested persons are encouraged to send a letter of enquiry to the contact information below.

Recruitment for Senior Faculty Positions

As one of the academic leaders, successful applicant will be responsible to establish a research program in paleontology and related fields that will complement or enhance the institute current research programs. Interdisciplinary approaches are especially encouraged.

The applicant should have a demonstrable track record and abilities to develop an advanced research program in paleontology and related areas. A Ph.D. degree and former appointment at a senior level in universities or other academic institutions are required. A minimum of three years full time commitment is required for this position. For successful applicants, the institute will provide a start-up research grant (negotiable amount), necessary lab and office space, and supporting staff.

We also would appreciate your recommendation of any capable candidates. Please contact us.

Contact us

For comments and suggestions, please contact:

Office of Foreign Affairs
Nanjing Institute of Geology and Palaeontology, CAS
39 East Beijing Road, Nanjing 210008, P.R. China
Phone: 0086 25 83282105 Fax: 0086 25 83357026
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