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In memory of Dr Juan Li, a young geologist (1987–2023)

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This special issue of *Mesozoic* is dedicated to the memory of a great specialist in carbonate sedimentology, Dr Juan Li, who passed away on July 19th, 2023. Juan Li sadly left us while logging the Paleocene-Eocene thermal maximum (PETM) interval in the Tibetan Himalaya. This special issue has collected contributions to Mesozoic–Cenozoic geological studies from the Qinghai-Tibet Plateau from colleagues, friends, and fellow scientists to express our remembrance and regret.

Juan Li (Fig. 1) was born on January 15th 1987 in a village near Guangshui town, Hubei Province, China. She received her bachelor degree from Yangtze University, and PhD degree from Nanjing University in June 2016 in geology. She then worked at Guangxi University for eleven months before taking up a position as a post-doc at Nanjing University from May 2017 to October 2021. In December 2021, she became an assistant and then associate professor at the Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences.

Juan Li was a specialist of carbonate sedimentology. During her more than ten year research career, she worked to decipher the nature of paleoenvironmental and paleoceanographical events, such as Aptian oceanic anoxic event 1a (OAE1a), Paleocene-Eocene thermal maximum event (PETM), and End-Cretaceous, using comprehensive methods that included sedimentology, biostratigraphy, carbonate microfacies analysis, and sedimentary geochemistry. Her investigations lead to contributions in four main areas: (1) Sea level changes,

biotic responses, carbon-isotope variations, hydrological shifts, and the demise of carbonate platforms induced by the Paleocene–Eocene Thermal Maximum (Li *et al.*, 2017, 2020a, 2021, 2022); (2) Late Cretaceous topographic doming caused by initial upwelling of Deccan magmas (Li *et al.*, 2020b); (3) The paleoceanographic transition from OAE1a to the oceanic red bed 1 (ORB1) in central Italy (Li *et al.*, 2016); and (4) Paleogene carbonate microfacies and sandstone provenance in South Tibet as indicators for the stratigraphic response to initial India-Asia continental collision (Li *et al.*, 2015). In total, Dr Juan Li published 9 first author papers and co-authored 25 papers, which are listed at the end of this paper.

Juan Li was a committed scientist, devoting her enthusiasm and endeavor into her work. She conducted field work in Tibet ten times, spanning a total duration of over 10 months. Additionally, she visited Spain, Italy, the United States, and Croatia to undertake field surveys, collecting thousands of samples in the process. She overcame significant difficulties, hardship, and fatigue in field work. In addition, Juan Li also had an international view and maintained strong relationships with geologists in many countries. She visited the University of California, Santa Cruz, for one year in 2018–2019 funded by China Scholarship Council, in collaboration with Prof. Jim Zachos. She also took a part in the Integrated Ocean Drilling Program (IODP) in 2023. Her busy figure was a familiar sight in the office, often staying late into the night and working on weekend.



FIGURE 1. Juan Li attending the field excursion in Velebit, Croatia, in June 2023.



FIGURE 2. Juan Li in the field during 2012–2014. **A**, Juan on a field trip to the Tibetan Himalaya in 2012, provided by Wei An. **B**, **C**, Juan on a field trip to the Tibetan Himalaya in 2013, provided by Wei An. **D**, Juan in France, attending the International Association of Sedimentologists Conference in 2014, provided by Gaoyuan Sun. **E**, Juan in the Huang Shan mountains, Anhui Province, in 2014, provided by Xiumian Hu. **F**, Juan on a field trip to the Tibetan Himalaya in 2014, provided by Xiumian Hu.

Juan Li was bright, optimistic, honest, and humorous. She cared about her parents, sisters, and brother. She always ready to offer warm help to friends and colleagues. She raised a cute cat and took care of it very well.

Her promising research career and lovely life were tragically cut short in the summer of 2023, during her tenth visit to the Qinghai-Tibet Plateau. We respected, and continue to respect, her enthusiasm and love for geology.

Herewith, we also thank wholeheartedly all colleagues who served as reviewers of the contributed papers.

Below are some words from colleagues to express our memories, grief, and respect for Juan.

Xiumian Hu—As a geologist, Juan Li was just at an age when she was just beginning to fly in career. It is with great regret and sadness that her soul remains forever in the Himalayan mountains. Many years ago, when Juan Li was a first year graduate student, I gave her a limited time to translate an English article into Chinese. She returned a high-quality piece of work ahead of time, which was very impressive. She was an independent person and didn't bother others when she could do something by



FIGURE 3. Dr Juan Li in the field and office during 2015–2020. **A**, Juan attending the IGCP609 post-conference field trip in Longhushan, Jiangxi Province, South China, in 2015, provided by Xiumian Hu. **B**, Juan working in the Tibetan Himalaya in 2016, provided by Zhong Han. **C**, Juan in Yellowstone National Park, United States of America, in 2019, provided by Wei An. **D**, Juan giving an online talk during Covid-19 in 2020.

herself. During her study and work at Nanjing University, she would often work overtime in the evening and on the weekends. She would go out for field sampling year by year, and visited the United States, Spain, Croatia and other countries, having an international perspective. With her unremitting efforts, several stratigraphic section documenting the Paleocene-Eocene hyperthermal event (PETM) were successfully discovered in the Tibetan Himalaya, including Tingri, Gangba and Düela sections. Fruitful research discoveries were made and important research results have been achieved on those geological records. She published a series of academic papers and led the research direction in her field. After joining Nanjing Institute of Paleontology, Chinese Academy of Sciences, in December 2021, she set to work exploring new research fields, learning the identification methods of foraminifera, and obtaining successfully NSFC funding as sole PI. A year ago, Juan Li, with her infinite love for scientific research and immense attachment to her family and friends, left us forever, writing that life is more than a struggle! I deeply miss Juan, she will always be a member of our scientific family!

Eduardo Garzanti—Juan was the sweetest, gentlest person you may ever imagine. A young geologist of natural kindness, sincerely dedicated to microfossils, limestones, and field work to the point of not noticing perilously crumbling rocks above. She was one of the kind the dramatist of ancient Greece Meander referred to, when he wrote: “*Dies young whom the gods love the most*”.

Diyang Huang—A late night in June 2023. I just came back from field work. I met Juan Li at the stairway of our office building when she was going home after working overtime. She was surprised, and said: “Prof. Huang, I haven’t seen you for a long time. Recently, I was the only one who works overtime till late in the evening in the whole building. It would be nice and my heart would be at ease if you come back and the light of your office will be always on in the evening.”—because my office is just beneath her own. That was the last time I saw her. She asked me for some detailed information of sections in eastern Tibet just when she arrived in Tibet and told me she will do field work firstly in that area. But she went to southern Tibet finally. Juan Li was interested



FIGURE 4. Dr Juan Li in the field and laboratory during 2022–2023. **A**, In Venice, Italy, Jun 2023, provided by Tianchen He. **B**, in Dolomites, Italy, Jun 2023, provided by Tianchen He. **C**, Dubrovnik, Croatia, in June 2023, provided by Jingxin Jiang. **D**, Juan in the Dolomites, Italy, in June 2023, provided by Jingxin Jiang. **E**, Juan attending the 32nd International Association of Sedimentologists Conference in Dubrovnik, Croatia, in June 2023, provided by Jingxin Jiang. **F**, Juan in Venice, Italy, in Jun 2023, provided by Jingxin Jiang. **G**, Juan observing rock samples in the core center of Daqing Oilfield in 2022, provided by Jue Sun.

in conducting marine paleontological work in the northern Tibet area which I am familiar with. We had been planning to start PETM research in the Sanshui Basin, Guangdong Province. In 2023, she participated in the Key Program of the National Natural Science Foundation of China which I tried to apply for, but we failed then. In 2024, the program was approved, but Juan Li has left us. Our works must continue.

Shijun Jiang (on behalf of our team, including Hong Su, Yasu Wang, and myself)—We remember Dr Juan Li as our esteemed colleague and dear friend. I first met Juan in 2012 during a field expedition to southern Tibet, and we last saw her in July 2023 during our field trip in the Xigaze forearc basin, at the funeral parlor in Lhasa following her tragic passing. Juan was one of the finest women scientists in our field, known for her exceptional dedication and passion for Palaeo research. She was quiet and somewhat shy, but her enthusiasm and passion shone brightly whenever she discussed her exciting scientific findings. Juan was generous with her knowledge, often sharing valuable samples from the high-altitude Tibetan Plateau and providing timely, detailed guidance whenever we sought her assistance. Her pioneering contributions to the PETM research from the Tibetan Plateau will not be forgotten, and her untimely passing leaves a profound void in our community. We will forever cherish her contributions, her kindness, and her unwavering commitment to advancing our understanding of Earth Science. Though she is no longer with us, we always feel her presence, as if she is still advancing paleoceanographic research in the Tibetan Plateau.

Xi Chen—Dr Juan Li is such a nice person. She not only devoted herself to geology research but also served the community with great enthusiasm as being secretaries of IGCP 739 and some NSFC projects. I was always impressed by her high efficiency in working. She was warm-hearted and helped me a lot in doing field work and experiments. I deeply miss her.

David Kemp—I first met Juan in 2017, when I was kindly invited to China for a conference. She discussed enthusiastically her studies on the PETM in Tibet, and I remember being greatly impressed by the work she had done and the discoveries she had made. The next year, I moved to China to work full time. Juan will not have realized it, but my decision to move was motivated in part by meeting warm, friendly, deeply enthusiastic and skilled people like her. We enjoyed a short but productive collaboration, and I will remember her for that first meeting, and her friendliness and help in our subsequent work together.

Jiangang Wang—I met Juan Li in Nanjing University and we studied together in Prof. Hu's group for several years. She worked hard and loved geological research very much. She is one of my best friends, kindly helping

me a lot in my academic life. She studied well carbonate microfacies, focusing on the Cenozoic sequences of the Tethyan Himalaya and identifying the PETM in South Tibet. She just started a beautiful life, but suddenly left us by an accident. We deeply miss you, Juan.

Lanfeng He—I studied with Juan LI in Nanjing University in the group of Prof. HU and we had a very enjoyable learning journey together. She is devoted in geological study and spend long time in the field and laboratory. I am deeply impressed by his passion for life and the smile he often wears on his face. I will cherish her as long as I live for her efforts and achievements in the study of Tethys Himalaya sedimentology and her help to me in Xizang geological study.

Gaoyuan Sun—I have known with Juan more than ten years, since she studied in Nanjing University in 2011. In our group, she was a pioneer on carbonate sedimentology and paleo-environment analysis. Always, she was full of energy to seek out knowledge and devote herself to geological research. She was obliging, optimistic, and aspiring. Juan left us in such a sudden way, causing us to fall into immense grief. We sincerely hope you can continue your favorite research, and we all remember you, Dr Juan Li.

Wei An—The first time I met Juan was in September 2011, when she began her graduate study in Nanjing University. We spent lots of time together since then. We worked in the same office, dined in the same canteen and lived in the same dormitory building. We have been on field trips in southern Tibet, south China and western U.S.A. We also dealt with samples, picked zircons, Cr-spinels and apatites, and dated zircon grains together. In fact, our life in Nanjing University was almost the same and I have been very grateful for her continuous help and kindness. Juan had great passion for geology, both in the field and in the office. She was always prepared for discussions and group meetings. Juan lived a short but productive life, and she will be always remembered by us.

Hanting Zhong—My first collaboration with Juan was three years ago, when we were discussing 3D modeling for field trip routes at the 21st IAS in Tibet. The last time we spoke was just five days before her passing, as I was on my way to Spain and she warmly recommended typical geological sections and familiar friends there. Juan was a very sincere, resilient, and hardworking person, an excellent collaborator and friend. Today is the Mid-Autumn Festival, a day for family and friends to gather together. I miss her dearly and hope that she may now rest in peace.

Hepin Wu and Tianchen He—Dr Juan Li was not only our college classmate and colleague, but also a dear friend. She was meticulous and dedicated in her research, and kind and compassionate in life. The first time we met

her was thirteen years ago, when she shared a dormitory with Hepin. We would chat about everything under the sun, sometimes discussing scientific puzzles, and other times sharing the joys and troubles of life. After we finished PhD, we fought side by side on various research projects in China and in the UK, whilst often laughing about the silly mistakes we made as rookie drivers running red lights. We also fondly remember our busy yet fruitful and happy time together at the University of Leeds. We will always miss her and hope that in another parallel world, she is living a happy life.

Di Wang—I. First acquaintance—Optimistic and Enthusiastic. I first met Li Juan in 2011, when we were both in our first year of graduate school. At first glance, she was a shy, but very optimistic girl. When people around us needed help, she was always the first to lend a helping hand. II. Re-knowing—Courageous and Full of Energy. In the following five or six years of postgraduate life, I deeply feel that she has the characteristics of Hubei people—courageous and full of energy. She was one of the brightest graduate students to publish her own academic papers, and also one of the earliest to get a doctoral degree. After her work, she also continued the very hardworking state, is very early to the office, late at night from the office back almost everyday. III. Deep impression—Young Female Scientist. After her graduation, especially during her work at Nanjing University, we became extraordinarily familiar. Not only because of the friendship of classmates over the years, she also become colleagues on the road of scientific research. She continued to innovate and break out of her comfort zone in research. It is still hard for me to believe that such a brilliant young female scientist has left us.

Jue Sun—Gibran once said that the meaning of life lies in the mutual illumination between people. Many thanks to Juan for being such a good friend. She was strong, brave and kind. Her devotion to scientific research has inspired me to do the same. When I think of her, I think of how she always puts the interests of others first, and I think about all the things we could have done together should there have been more time given to us. She will remain within my heart. Her memory will always be cherished.

Tao Li—I was in Rome for the INQUA congress when I received the heartbreaking news. It is still hard to believe, especially since we had just scheduled our research plan for the PETM topic and were eager to continue our collaboration once we returned to Nanjing. I reached out to several colleagues at our institution and at Nanjing University, hoping that the news was not true. Unfortunately, it was. Juan was a sedimentologist whose exceptional dedication to her field made significant contributions through her insightful work. We were both colleagues and friends from our time at Nanjing University

before we each moved to NIGPAS. Her hard work and positive attitude toward life inspired not only me but also everyone who had the honor of working with her. Juan, may you rest in peace, and your spirit will continue to inspire us as we move forward.

Xin Li—We started to be familiar with each other since 2021 after she got the job in the Nanjing Institute of Geology and Palaeontology. I respect her diligence and passion for research. She always worked till late in the night (around 10 pm) even on the weekend. She enjoyed field work and never complained about the difficulty. I am impressed by her pleasant personality during the last three years. She offered a lot of help and encouragement for me both in research and life.

Xia Wang—I first met Juan in 2017, when my doctoral supervisor and I participated in the 6th National Sedimentological Congress in Nanjing. Juan was our contact person; she was accommodating and kind. I met Juan again in 2023 for the Croatian field trip; we talked a lot about possible future collaboration, our passion for carbonate, and her cat. I appreciate that we met again, even though we haven't had much chance to talk in the past few years. We will never forget that a female geologist dedicated her life to chasing the answers to the PETM.

Zhong Han—In 2013, the year I graduated from undergraduate studies, I embarked on my first fieldwork in Tibet, and started a collaborative journey with Juan Li. We shared similar research interests and Juan provided invaluable support throughout my scientific journey, including topic selection, fieldwork, laboratory analyses, and paper writing. She also extended her care, support, and guidance to me in life and studies, benefiting me greatly. Juan Li made significant contributions to understanding the responses of carbonate platforms during the Paleocene-Eocene Thermal Maximum (PETM) in the Eastern Tethys region. She confirmed the PETM's stratigraphical position, as well as the sedimentological and biological responses in the Eastern Tethys, laying a solid foundation for further in-depth research on PETM mechanisms and global comparisons. She was a positive and optimistic person who was passionate about her work, and also helpful and kind to others. We have lost a truly remarkable colleague and will remember her forever.

Shijie Zhang—In the early stages of my scientific career, Dr Juan Li provided me with immense help, particularly in identifying carbonate thin sections. My first English-language academic paper was a collaboration with her. Her meticulous and proactive approach to her works had a direct influence on me, especially during a period when I was contemplating abandoning my research career. Just two days before her unfortunate passing last year, we spoke on the phone, making plans to visit the Tarim Basin together and enjoy some local delicacies. Her death was a profound shock to me and has transformed my

outlook on life, prompting me to reflect deeply on how to navigate our brief and unpredictable existence. I am profoundly grateful to Dr Juan Li for her assistance on my research journey, for being a role model in my career, and for inspiring me to rethink and transform my approach to life.

Wendong Liang—Juan is such an erudite and helpful person. We worked together in the same group for two years and although we did not have the same research interests, I benefited greatly from each of her work reports and academic presentations. I was awed by her full work enthusiasm and independent and efficient working ability. Miss her hotpot treats, her terrible driving skills, her cat—Fuxiting, and miss her forever innocent smile.

Wen Lai—Dr Juan Li was a gifted and hard-working scholar, and an outstanding colleague who was eager to support and care for her juniors. She shall be sorely missed for her noble character and sincerity.

Anlin Ma—I have known Juan for ten years, and we were in the same research group at Nanjing University for almost eight of those years. She was a truly kind person, always caring for me and the other students in many ways beyond just research. My wife and Juan were from the same hometown and became close friends, so her passing has been a significant shock for our family. We still can't believe it. We will always remember her smile, kindness, and wisdom.

Yiwei Xu—I have known Juan Li for eight years, as we shared the same academic advisor, Professor Xiumian Hu. Juan was not only exceptionally dedicated to her scientific work, always approaching it with utmost seriousness, but she was also a person of great kindness and generosity. She consistently extended selfless support to others, including myself. When I was preparing my first manuscript and grant application, she meticulously reviewed them and provided numerous insightful suggestions. Though she is no longer with us, the impact of her support and friendship will always remain in my memory.

Weiwei Xue—The first contact I had with Dr Juan Li was in the summer of 2016 in Nanjing, before I began my graduate studies. She had just completed her PhD at Nanjing University and was about to start her role as a lecturer at Guangxi University. Dr Juan Li was a dedicated, generous, and kind person, always willing to help others. Whether it was my PhD work or making important career decisions, Dr Juan Li was there to support and guide me. I vividly remember her invaluable assistance with sedimentary microfacies analysis for my first paper, which was later published in MPG. What stands out most in my memory, though, are the many times she brought our research group together for meals. Whether at restaurants or at her home, where she would cook for us and let us play with her cat, Fuxitin, she cared for us like a big sister, strengthening our group's bond and

making us feel at home. Dr Juan Li's passing on July 18, 2023, a date that also marks my birthday, is a loss I will never forget. As the movie *Coco* reminds us, as long as the living remember the departed, they continue to live on. I will always remember and cherish Dr Juan Li.

Dingjun Wen—I first met Juan Li in the microscopy room at the School of Earth Sciences and Engineering at Nanjing University. She gave the impression of being meticulous and patient in her work. As a result, during her graduate and postdoctoral periods, she published several high-quality research papers on the Paleocene-Eocene thermal maximum (PETM). Lastly, I want to thank her for the encouragement and help she provided during my doctoral studies.

Jingxin Jiang—Juan and I come from the same research group, and we both focus on the PETM event. Therefore, I get more help from her. When I first went to Tibet to get my PhD research material in September 2017, Juan helped me complete the fieldwork, even though she suffered the challenges of altitude sickness then. During the subsequent stages of my PhD dissertation, Juan also provided me with tremendous support. She just like my second mentor, and every paper I have published so far has benefited from her guidance. In life, Juan was also a very warm-hearted person, often inviting us for gatherings and even cooking for us herself. Yet, she was incredibly hard on herself, always holding herself to the highest standards. Alongside her own meticulous work, she willingly took on the heaviest workload in our team without ever complaining. Her unwavering dedication to research and her positive approach to life left a deep impression on everyone around her.

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Appendix: Papers published by Dr Juan Li

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