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Jonas Ruh receives the 2019 Paul Niggli Medal

The Paul Niggli Medal is Switzerland's most prestigious award for young earth scientist who made outstanding contributions in the research fields of mineralogy, geochemistry, petrology, resource geology or solid-earth geophysics. The Paul Niggli Medal honours and supports young ambassadors of Swiss geoscience, who are either Swiss citizens or obtained at least two of their academic degrees in the Swiss university system (BSc or MSc and usually their PhD).

The Board of the Paul Niggli Foundation decided in their session of 7 June 2019 to award the Paul Niggli Medal for the year 2019 to Jonas Ruh, in recognition of his outstanding research contributions in the area of subduction processes and formation of accretionary wedges.

Maria Schönbächler (ETH Zürich)
On behalf of the Foundation Council of the Paul Niggli Stiftung

1 Citation

After his birth and basic schooling in Lucerne, Jonas obtained his BSc and MSc in geology at the ETH Zürich. There, he recognized his strong passion for tectonics, geodynamics and numerical modelling. He continued his academic education by conducting a cross-disciplinary observation- and numerical modeling-based PhD project in the field of geodynamics of accretionary wedges at ETH Zürich, which resulted in several influential peer-reviewed papers and an excellent PhD thesis "Towards understanding long-term accretionary wedge dynamics: An integrated modelling and field study" for which he received the ETH Silver Medal for outstanding doctoral theses in July 2015. Jonas then was selected as the best candidate for a prestigious postdoc position at the University Paris VI opened in the framework of an international EU-funded Marie Curie International Training Network "ZIP—Zooming in Between Plates", where he performed an outstanding study of deep subduction processes. Jonas was then awarded an SNSF Advanced PostDoc Fellowship and worked at the Institute of Earth Sciences "Jaume Almera" in Barcelona, where he combined field geology and numerical models to deepen his understanding of accretionary systems. Since his heart remained with Switzerland, he returned to ETH Zürich in 2019 as an Oberassistent in the Structural Geology and Tectonics group.

Jonas Ruh's scientific interests are very broad and aim at understanding coupled geodynamical and tectonic processes on both local and regional scales by using a truly cross-disciplinary approach combining field observations with laboratory studies and numerical modeling. In particular, Jonas developed a novel quantitative tectonic model for the growth of the Simply Folded Belt of the Zagros Mountains and showed that their basement behaves as a rigid floor. He was also the first to numerically model dynamics of accretionary wedges in three dimensions (3D), thereby pioneering a new very challenging geodynamic modeling research direction and developing a first quantitative 3D model for the evolution of the tectonic boundary between Zagros and Makran regions. Jonas Ruh was also the first to systematically model and explain physical controls of deep oceanic crust slicing in subduction zones—a process of global significance, which was previously hypothesized on the basis of geological and petrological data. He was the first to systematically investigate in 3D the effect of subducting seamounts on the tectonic structure of coastal regions and triggering large submarine avalanches. His recent pioneering work explained quantitatively the development of "minibasin"-type structures in shales. In addition, Jonas contributed to the development and testing of novel geodynamical modeling tools combining long-term tectonics and landscape evolution.

We congratulate Jonas for being a world leading young geoscientists, who attacks first order problems to provide

us fundamental insights. On 22 November, 2019, Jonas received the truly deserved Paul Niggli Medal during the 17th Swiss Geoscience Meeting in Fribourg. We wish you continuing joy, enthusiasm, innovation and success, Jonas, in your life and your future research!

Taras Gerya and Jean-Pierre Burg (ETH Zürich)

2 Response

I am greatly honored and very fortunate to receive this year's Paul Niggli Medal awarded by the Swiss Society of Mineralogy and Petrology. Considering the list of former recipients of this prestigious medal, its importance for the development of a young researcher's career cannot be overestimated. I would like to thank the committee of the Paul Niggli Foundation for having taken into consideration the nomination and for its decision to award me with this invaluable medal. I gratefully take the following paragraphs as an opportunity to thank and acknowledge a wealth of colleagues and friends that have accompanied and supported me along my joyful career thus far.

First and foremost, I am deeply indebted to Taras Gerya and Jean-Pierre Burg for their generous citation and unconditional support since the beginning of my PhD thesis back in 2010. I recognize that not all early career researchers have the incredibly good fortune of two excellent and trusting mentors as I do. After having completed my master's degree in geochemistry at the ETH, I was very lucky that Jean-Pierre was looking for a potential PhD student that was keen to spend long field seasons investigating the dynamics of the Makran accretionary wedge in southeastern Iran. During months of field work and hundreds of coffees in E-floor, Jean-Pierre not only taught me to be precise and patient, but I also learned about the importance of principles and their meaning in a scientific environment. An important part of my PhD project was to precisely date syn-kinematic sedimentary sequences by magnetostratigraphy. From the first day on, I felt warmly welcomed at the Laboratory of Natural Magnetism of the ETH led by Ann Hirt. Despite hundreds of difficult measurements, she kept my motivation high by providing a great, positive atmosphere in the laboratory, which ultimately led to a successful joint publication. Already during the first two-month-long field season in Iran, Jean-Pierre discussed with me the potential and importance of numerical modelling for understanding the complex structural evolution of the Makran. Soon after returning from the field, I sat together with Boris Kaus, who taught me one of the most important concepts during my PhD: After several weeks of trying to fix a bug in the numerical code, I finally dared to write him that I could not find the error. His answer was "write me again in 2 weeks". One week later I solved the issue by myself. I learned what is most important when carrying out a PhD thesis: self-confidence. Later into my PhD, I had the chance to work with Taras and to learn and apply his three-dimensional code to investigate the mechanics of fold-and-thrust belts. It was and still is a great privilege to have access to such amazing scientific tools that stand at the forefront of our discipline.

After four wonderful years as a PhD student in structural geology, I was offered a Marie Currie fellowship as a numerical modeler to work on subduction zones with Evgenii Burov, Laetitia Le Pourhiet and Philippe Agard at the UPMC in Paris. I want to thank all of them for the time in Paris that opened my eyes in both personal and scientific ways. It was a great pleasure to be part of this cross-disciplinary project with the possibility to travel across the world investigating subduction zones and always come back to the wonderful Paris enjoying Absinthe with Laeti or see a concert at the Limonaire with Philippe. As a secondment within the fellowship, I had the chance to spend 6 months at the Institute of Marine Sciences in Barcelona together with Valentí Sallarès and César Ranero to work on seamount subduction. I thank them for welcoming me with open arms and allowing me to realize and test my own ideas with absolute support.

From early 2016 on, I joined Jaume Vergés and his group at the Institute of Earth Sciences in Barcelona with an advanced SNSF PostDoc fellowship. During maybe the best 3 years of my life, this fellowship allowed me to migrate independently across disciplines to eventually find my way back to structural geology. Whether strolling around satellite images looking for minibasins with Jaume, spending hours in the magnetic laboratory with Luis or discussing cross-sections with Pablo, they all set the foundation for long-lasting collaborations.

In January 2019, I returned as an Oberassistant to the Structural Geology and Tectonics group at the ETH, now led by Whitney Behr. It is a privilege to work in such a prosperous environment with this young and motivated group of researchers and I thank Whitney for entrusting me with undergraduate teaching and for letting me deploy my own scientific ideas.

Last but not least, there are of course many people that were not mentioned above that I would like to thank for their unconditional support throughout the last years. My parents, family members, friends from home, Zurich, Paris, Barcelona and all over the world and members of all institutes I was happy enough to work and spend time with.

Jonas Ruh (ETH Zurich)

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