

Call for Proposals

No. 16

14 March 2019

Priority Programme “Mountain Building Process in Four Dimensions (4D-MB)” (SPP 2017)

The Senate of the Deutsche Forschungsgemeinschaft (DFG, German Research Foundation) established the Priority Programme “Mountain Building Process in Four Dimensions (4D-MB)” (SPP 2017) in 2016. The programme is designed to run for six years. The present call invites proposals for the second three-year funding period (2020–2023).

Scope: This Priority Programme forms an integral part of the international AlpArray mission to image the structure of the Alps from their surface down to several hundred kilometers depth in the mantle. It tests the hypothesis that reorganisations of Earth’s mantle during the collision of tectonic plates have both immediate and long-lasting effects on crustal motion, fault kinematics, earthquake distribution and surface evolution. It challenges conventional wisdom by recognising that linked processes between Earth’s surface and mantle beneath mountain belts can only be explained by integrating 3D imaging of the entire crust-mantle system with geologic observations and modelling to enable us to look both backwards and forwards in time, the 4th dimension. This requires a multi- and interdisciplinary approach that integrates geophysics, tectonics, petrology, geochronology, basin- and surface studies.

Proposals are invited for two research themes:

Theme 1: Reorganisations of the lithosphere during mountain building will help to understand how the present shape of lithospheric slabs were born and their shape changed in time and space. The detailed view of these deep structures afforded by innovative geophysical methods can yield fresh insight into the structure and rheology of the lithosphere, especially as they relate to the response of the surface to changes of lithospheric structure (Theme 2). This theme will resolve the question of whether deep structure preserves early stages of mountain-building (subduction, collision) or primarily reflects the imprint of later events (indentation, lateral escape). Determining this will constrain rates of structural change in the crust and mantle, and help us understand how subducted continental and oceanic lithosphere are preserved during exhumation to the surface.

Theme 2: Surface and crustal responses to changes in mountain structure on different time scales will shed new light on the debate over the competition of climate and tectonics during mountain building. It will take on the challenge of distinguishing the effects of deep-seated events (including slab-tearing, -breakoff and polarity reversal, Theme 1) and surface processes (e.g., climate change, glaciation) on erosion patterns, uplift rates, and basin sedimentation. Identifying spatial and temporal patterns of faulting and seismicity will provide an overall motion picture from the present back in time. It will help us understand whether earthquakes, fault and ground motion are related

to the current tectonic regime of the Alps or if a new pattern is being established in response to today's kinematics.

The seismological data base for these research themes was generated in the first phase of the Priority Programme by the AlpArray station network (AASN) and its complementary densified station arrays. These include linear arrays across the Eastern Alps (EASI), the northern Dinarides (CASE) and the programme's own network covering the tectonic junction of the Southern Alps, Eastern Alps, Carpathians, Pannonian Basin and Dinarides (SWATH D). The field is now open to integrate this rich seismological data set with structural, petrological, geochronological and/or surface studies. Geodesy, basin studies, numerical modelling and tectonic reconstructions will play a key role in analysing the dynamics of the lithosphere over different time scales. Limited, follow-on geophysical experiments can be proposed to fill data gaps in target areas previously specified in the first phase of the programme.

Study Area: This Priority Programme focuses on the Alps and takes advantage of its exposure of different stages of orogenesis, from subduction preserved in the Alpine nappes and basins, to ongoing collision and indentation in the east, and post-collisional rebound in the west. Special (but not exclusive) emphasis is placed on the tectonically most active parts of the orogen where the aforementioned swaths of closely spaced seismometers have been deployed for high-resolution subsurface studies. The focus of the programme does not include earthquake prediction or engineering studies, but the data are open to use by all researchers.

Linked Investigations: We seek integrated geological studies with direct relevance to one or more of the research themes. Therefore, projects proposals are expected (but not required) to include principal investigators from different disciplines (e.g., tectonics, petrology, basin analysis, geochronology, geodynamics modelling, seismology). It is further expected that projects will show how the intended work is tied to data acquired in the first phase of the programme.

Priority Programme colloquium: A meeting to present, discuss and coordinate research proposals will be held at the Seminaris Campus Hotel in Berlin on the **4/5 June 2019** (details to be announced on the programme's website). Potential applicants are expected to make a concise (5 minutes, 3 slides) presentation of their proposal at this meeting. Please register for the meeting by the **1 May 2019** with emanuel.kaestle@fu-berlin.de.

Proposals must be written in English and submitted to the DFG by **30 October 2019**. Please note that proposals can only be submitted via elan, the DFG's electronic proposal processing system. In addition to submitting your proposal to the DFG, please send an electronic version (pdf format) to emanuel.kaestle@fu-berlin.de.

Applicants must be registered in elan prior to submitting a proposal to the DFG. You will normally receive confirmation of your registration by the next working day. Note that you will be asked to select the appropriate Priority Programme call during both the registration and the proposal process.

If you would like to submit a proposal for a new project within the existing Priority Programme, please go to Proposal Submission – New Project – Priority Programmes and select “SPP 2017 – 4D-MB” from the current list of calls. Previous applicants can submit a proposal for the renewal of an existing project under Proposal Submission – Proposal Overview/Renewal Proposal.

In preparing your proposal, please read the programme guidelines (form 50.05, section B) and follow the proposal preparation instructions (form 54.01). These forms can either be downloaded from the DFG website or accessed through the elan portal.

Further Information

More information on the Priority Programme is available under:
www.spp-mountainbuilding.de

The elan system can be accessed at:
<https://elan.dfg.de/en>

DFG forms 50.05 and 54.01 can be downloaded at:
www.dfg.de/formulare/50_05
www.dfg.de/formulare/54_01

For scientific enquiries please contact the Priority Programme coordinator:
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For registration for the colloquium in Berlin and for the electronic version (pdf format) of the proposal please contact:
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Questions on the DFG proposal process can be directed to:
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