



SPP – 2nd Annual Meeting

November 8-9, 2018



Mountain-Building Processes in 4-Dimensions (4D-MB)

SPP 2017

Information



- Thanks to the Senckenberg Team!
- Welcome to this year's invited speakers:
 - Claudia Piromallo (INGV, Rome)
 - Jean-Mathieu Nocquet (Geoazur, Nice)
 - Hugh Sinclair (Edinburgh)
 - Taras Gerya (ETH-Zürich)
- Welcome new members:
 - Post-doc, SPP coordination - Dr. Emanuel Kaestle (FU-Berlin)
 - Data manager – Dr. Luigia Cristiano (GFZ-Potsdam), Nov 3, 2018- May 2, 2019
 - New postdocs & PhDs – **group photo before lunch**
- Lunch – in the anteroom to the lecture hall
- Dinner – reserved for all at the *Apfelweinwirtschaft Wagner restaurant*

Meeting Program



Thursday/Donnerstag, 8th of Nov. 2018

- 9:00-9:30 Coffee
- 9:30-9:50 Greeting, Information
- 9:50-10:30 *Session A - Seismological activities*
- 10:30-12:20 *Session B - Imaging slabs and subduction (coffee 11:10-11:30)*
- Lunch: 12:20-13:30** (Provided in venue)
- 13:30-15:15 *Session C1 – Surface motion & fault kinematics*
- 15:15-16:15 Breakout Session & Refreshments (see group lists)
- 16:15-17:00 Steering Committee deliberates
- 19:00** **Dinner** in town at the *Apfelweinwirtschaft Wagner*

Friday/Freitag, 9th of Nov. 2018

- 9:00-11:20 *Session C2 - Surface response & denudation* (coffee 10:15-10:35)
- 11:20-12:00 *Session D – Modelling deep structure*
- 12:00-13:00** **Lunch**
- 13:00-14:05 *Session D cont'd*
- 14:04-14:45 Reports of breakout groups
- 14:45-15:15 Final remarks & recommendations

AlpArray news

- **First AlpArray science meeting** (Zürich, 29-30th Aug 2018)
- **AlpArray Seismic Network paper** is now available online: Hetenyi et al. 2018 in *Surveys in Geophysics*
- **End of operation** of temporary AASN on March 31, 2019, AASN protective period of 3 yrs begins on that date
- 27 DSEBRA stations relocated to east, Swath D (see talk of Wolfgang Friedrich)
- Research groups – so far, 5 groups:
 - Surface wave, ambient noise, full waveform
 - Gravity
 - Receiver Functions
 - Seismicity, seismotectonics, local earthquake tomography
 - Seismic anisotropy
 - Foreseen: Seismotectonics of the Southern and Eastern Alps (Swath D)
- Post-AlpArray proposals – AdriaArray (Meier), Pan-Himalya (Hetenyi)

See AlpArray Newsletter Nr. 3, AlpArray website

Status of targeting arrays



SPP SWATH D -deployed (August 2017
–planned 2019)

SPP LOBSTER & FR -deployed (Jun
2017-Feb 2018)

EASI -finished (July 2014-July 2015,
results publ in Tectonophysics, July
2018.)

CASE -finished (ended in Sep 2018,
deployment report in Geofizika, in
press)

LISARD -finished (Jun 2016 - Sep 2018)

IVREA -deployed (Jun 2017- summer
2019, first receiver function results
obtained, two successful
supplementary gravity experiments)

**Important! All SPP members who will use
seismological data are required by
agreement to announce their research
plans (send report to **György Hetenyi**,
gyorgy.hetenyi@unil.ch)**

SPP events of the past year

- **SPP short course** „Seismic tomography for non-seismologists“ (Feb 1-2, 2018); Lectures on our website: http://www.spp-mountainbuilding.de/news/workshop_videos.html
- **SPP field trip** of the Eastern & Southern Alps (Sep 7-12, 2018); Field guide & pictures downloadable from our website: http://www.spp-mountainbuilding.de/short-course/field_trip_2018/index.html
- **Outreach**: many contributions from the GeoMar/Kiel group: <http://www.spp-mountainbuilding.de/outreach/index.html>

Note: **Child-care during meetings is subsidized by the SPP provided that at least one child of an attending SPP member is in the child-care group.**

SPP website



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Priority Programme "Mountain Building Processes in Four Dimensions (MB-4D)" SPP 2017 - 2020

NEWS

[Tectonic seminar with Othmar Müntener](#)

New header for more convenient access to important materials

Standardized maps

Need information on publications and outreach!

Schedule for 4D-MB - 1st Phase

Funding began

Now

Proposals 2nd phase

Seismology

Geodynamics

Activity Field	Activity	Preparation	1 st Funding Phase	Research Theme
A	Deployment & data acquire	UNIBRAS	DSEBRA	1, 2, 3, 4
	Model results			
	Deployment & data acquire	LOBSTER		
B	Deployment & data acquire			1, 2, 3, 4
	Model results			
D	Deployment & data acquire	SWATH		1, 2, 3, 4
	Model results			
E	Structural & thermo-chronological analysis of active & fossil fault	field		2, 3, 4
	Petrophysical studies of high-P rock	field		
	Determine burial, denudation & uplift rates	field		
F	Develop lithospheric model of the Eastern Alps	develop		1, 3, 4
	Thermo-mechanical modelling of crust & mantle	develop		
	Synthesis & Publication			

2017

2018

2019

2020

Information for coming year



Meetings of AlpArray-Research Groups

- SE Alps, meeting with OGS colleagues in Trieste, Apr-May 2019
- Surface Wave group Feb 21-22, 2019, Lyon
- Gravity group Apr 6-7, 2019, Vienna

Meetings/conferences in 2018

- DGG Jahrestagung Mar 4-7, 2019, Braunschweig
- EGU Apr 7-12, 2019, Vienna
- DGGV Sep 22-25, 2019, Münster
- Alpine Workshop Sep 2-8, 2019, Lausanne

SPP short course „Geodynamics of the Alpine chain for non-geologists“ Jan 31-Feb 1, 2019 (see below)

Preparation of 2nd round of the SPP

- Call for projects – Spring & Summer, 2019
- Submit proposals – Oct-Nov 2019

Session A



AlpArray & SPP seismological activities

- 09:30-09:50 Mark Handy - Greeting, information, update on SPP and AlpArray.
Handy, Kaestle, Weber
- 09:50-10:00 Anke Dannowski - Ligurian Ocean Bottom Seismology and Tectonics Research (LOBSTER). *Kopp, Lange, Grevemeyer, Dannowski*
- 10:00-10:10 Michael Weber - Seismology of the Western-Eastern-Southern Alps Transition (SWATH D). *Heit, Weber, Tilmann, Haberland*
- 10:10-10:20 Wolfgang Friederich - The German seismological contribution to AlpArray (UNIBRA / DSEBRA). *Friederich, Korn, Meier, Rümpker, Tilmann, Thomas, Wassermann*
- 10:20-10:30 Discussion of Session A

No break yet; break comes during Session B

Session B



Imaging slabs and subduction

- 10:30-11:00 Keynote: Claudia Piromallo (INGV, Rome) - The Mediterranean region: what have we learned from seismic tomography?
- 11:00-11:10 Felix Wolf - Towards Ambient noise studies in the Ligurian Sea
Lange, Thorwart, Grevemeyer, Wolf
- 11:10-11:30 Coffee break
- 11:30-11:45 Manuel Ditz - Imaging structure and geometry of Alpine slabs by full waveform inversion of teleseismic body waves.
Friederich, Meier, Kaus, Paffrath, Fischer, Ditz
- 11:45-12:00 Amr El-Sharkawy - Surface Wavefield Tomography of the Alpine Region to Constrain Slab Geometries, Lithospheric Deformation and Asthenospheric Flow in the Alpine Region.
Meier, Friederich, Ebbing, Tesch, El-Sharkawy

Session B



Imaging slabs and subduction

12:00-12:10 Rainer Kind - The Mid-Lithospheric Discontinuity—an artifact of data processing?

12:10-12:20 Discussion of Session B

Lunch 12.20-13:30 (provided in anteroom to lecture hall)

Session C1



Surface motion & fault kinematics

- 13:30-14:00 Keynote: Jean-Mathieu Nocquet (Geoazur, CNRS, Nice) - Present-day deformation of the European Alps: a critical review of geodetic data and models
- 14:00-14:15 Gesa Petersen & Rens Hofman - Seismicity, Motion Patterns and Stress Distribution in the Alpine Crust: Automatic Quality Control and Event Detection in the Swath-D Network. *Kummerow, Cesca, Wassermann, Plenefisch, Schlömer, Petersen, Hofman*
- 14:15-14:30 Azam Jozi Najafabadi & Vincent Verwater - Seismotectonics of the Giudicarie Belt. *Handy, Haberland, Le Breton, Jozi Najafabadi, Verwater*
- 14:30-14:40 Christoph Gruetzner - Active faulting in NE Italy and NW Slovenia – Insights from field studies, geophysics, and high-resolution DEMs. *Gruetzner, Reicherter, von Blanckenburg, Ustaszewski*
- 14:40-14:55 Jochen Hürtgen - Quaternary faulting in the Upper Rhine Graben: evidence from geomorphology and geophysics. *Reicherter, Ritter, Mader, Hürtgen*

Session C1 cont'd

Surface motion & fault kinematics



- 14:40-14:55 Jochen Hürtgen - Quaternary faulting in the Upper Rhine Graben: evidence from geomorphology and geophysics. *Reicherter, Ritter, Mader, Hürtgen*
- 14:55-15:05 Elco Luijendijk - Thermal springs and the thermal effects of fluid flow in the Alps. *Luijendijk, von Hagke*
- 15:05-15:15 Discussion of Session C
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- 15:15-16:15 Breakout session and Refreshments
- 16:15-17:00 Steering Committee (SC) deliberates

Dinner directions

**Senckenberg Frankfurt
Biodiversität und Klima
Forschungszentrum (SBIK-F)
"Maria-Sibylla-Merian-Haus"
Hörsaal, Georg-Voigt-Str. 14 - 16
60325 Frankfurt am Main**

45 min
3,4 km

43 min
3,3 km

**Apfelweinwirtschaft
Wagner**

S-Bahn

S3, S4, S5, S6 von Frankfurt (Main) Messe bis Frankfurt Südbahnhof



Session C2



Surface response and denudation

- 9:00-9:30 Keynote: Hugh Sinclair (Edinburgh) - The response of Himalayan River catchments to orogenesis, with implications for the stratigraphy of foreland basins
- 09:30-09:50 Svetlana Botsyun - Neogene Paleo-elevation and Paleoclimate of the Central Alps: Global Climate Modeling Approach. *Botsyun, Krsnik, Methner, Mutz, Mulch, Ehlers*
- 09:50-10:00 Christoph Glotzbach - Structural thermochronology along the TransAlp geophysical profile. *Eizenhoefer, Glotzbach, Kley*
- 10:00-10:15 Sarah Louis - Quantifying the timing and rate of exhumation of the eastern Subalpine Molasse by combining thermochronology data with structural models. *von Hagke, Luijendijk, Hindle, Kley, Louis*
- 10:15-10:35 Refreshments

Session C2

Surface response and denudation



- 10:35-10:55 Philip Gross & Stefan Mroczek - Understanding subduction by linking surface exposures of subducted and exhumed crust to geophysical images of slabs. *Pleuger, John, Tilmann, Yuan, Kaus, Handy, Mechie, Mroczek, Gross, Zertani*
- 10:55-11:10 Matthias Hauke & Ruth Keppler: Subduction channel vs. progressive accretion; Insights from the Western Alps / Modeled average elastic anisotropies of upper and lower crustal units in the Alps. *Froitzheim, Keppler, Hauke*
- 11:10-11:20 Discussion of Session C2

Session D



Modelling deep structure

- 11:20-11:50 Keynote: Taras Gerya (ETH Zürich) - 3D thermomechanical modeling of slab tear propagation during retreating arc-passive margin collision: implications for the evolution of Apennines
- 11:50-12:00 Alexey Petrunin - Inverse and forward multiscale numerical modeling of the Alpine orogeny. *Petrunin*
- 12:00-13:00 Lunch (Provided in anteroom of lecture hall)**
- 13:00-13:15 Jan Philipp Kruse & Frederik Link - Physics of the subduction polarity switch: Constraints from first 2D thermo-mechanical models / Crustal anisotropy in the European Alps inferred from crustal phases in receiver functions - Preliminary results. *Rümpker, Schmeling, Kruse, Link*
- 13:15-13:25 Georg Reuber - Constraining the dynamics of the present-day Alps with 3D geodynamic inverse models - model version 0.2 *Kaus, Friederich, Meier, Reuber*

Session D



Modelling deep structure

13:25-13:40 Ruth Keppler - Alpine subduction revisited – new structural and elastic wave velocity models for improved geophysical imaging towards greater depths. *Keppler, Stipp, Froitzheim, Schmidtke*

13:40-13:55 Cameron Spooner - 3D Structural Model – Preliminary results from a gravity constrained model of the Alps. *Scheck-Wenderoth, Ebbing, Sippel, Götze, Sebera, Spooner*

13:55-14:05 Discussion of Session D

14:05-14:45 Reports of breakout sessions

14:45-15:15 Final remarks & recommendations

Structure & aims of the breakout sessions

2nd SPP meeting in 2018



Breakout questions:

- Identify the 2-3 highlights of the current project?
What results are really **new**?
- Identify the 2-3 research themes that will form the core of the next SPP round.
- Propose a schedule for collaboration that addresses the fundamental aims of 4D-MB within the coming year => e.g., topical meetings

Structure & aims of the breakout sessions

2nd SPP meeting in 2018



Breakout sessions

- 1. On slabs and subduction** M. Handy (mod) & W. Friederich (rapp)
Paffrath, Fischer, Ditz; Kind; Froitzheim, Keppler, Hauke, Pleuger, Tilmann, Yuan, Mechie, Mroczek, Gross, Petrunin, Kruse, Link, Kaestle, Tesch, El-Sharkawy
- 2. From the surface to the mantle and back** B. Kaus (mod) & C. von Hagke (rapp)
Meier, Ebbing, Wolf, Kummerow, Cesca, Plenefisch, Schlömer, Petersen, Hofman, Haberland, Jozi Najafabadi, Mader, Hürtgen, Luijendijk, Botsyn, Krsnik, Sippel, Götze, Sebera, Spooner
- 3. Looking backwards & forwards in time** T. Ehlers (mod) & J. Ritter (rapp)
Le Breton, Verwater, Gruetzer, Mulch, Elzenhoefer, Glotzbach, Kley, Hindle, Rümpler, Schmeling, Reuber, Schmidtke, Scheck-Wenderoth, Lange, Thorwart, Grevemeyer, Methner, Mutz, Louis, Weber

Recommendations of Steering Committee



1. SPP meeting in 2019 => host the entire AlpArray community
 - Length - 3 days, week of Nov 4-8, 2019
 - Format – to be discussed
 - Keynote speakers – invite external colleagues
 - Location – Frankfurt Senckenberg Museum
2. Have small interdisciplinary research group sessions to integrate approaches, especially seismology and surface studies
3. Need seismological models of Alpine slabs and of target areas, however preliminary, in order to use new AlpArray data as a basis for advancing geological and projects.
4. Deliver 2 summaries by 21. December 2018:
 - All current PIs => ½ page summary of new results in phase 1
 - Old & prospective P => ½ page summary of proposal for phase 2
5. We will submit a short paper in July 2019 (e.g., EGU Solid Earth) that highlights current SPP activities, new results of 1st phase; and hypotheses to be tested in 2nd phase.

Recommendations of Steering Committee

6. Activities for early career scientists: short courses, PhD meetings, special lectures by experts



7. Outreach => send all contributions to emanuel.kaestle@fu-berlin.de

6. Gender equality activities; travel funds and child care for meeting participants, communicate possibilities in newsletter, invite key women to submit for 2nd phase, pay for child care and travel to special meetings; finance participation at *iScientist* meeting in Berlin in Sept, 2019

7. SPP phase 2:

- | | |
|--------------------------------|--------------|
| • Meeting of SPP reps with DFG | Jan 2019 |
| • Call for proposals | May 2019 |
| • Round table discussion? | Jul 2019 |
| • Submission of proposals | Nov 2019 |
| • DFG panel evaluation | Apr-May 2020 |

Preparing the next SPP round (2020-2021)



(Conversation of M. Handy with Frau Iris Sonntag (DFG) on the 22.10.2018)

When should 2nd phase of SPP be planned? Meeting with Frau Sonntag in Jan-Feb 2019; Formulate a Call for projects; DFG publishes the call in May 2019

When should proposals for 2nd phase be submitted? No later than end Nov 2019 for DFG-Review in Mar-Apr 2019

Strategy for proposing 2nd phase of SPP:

- Need 1-2 „flagship projects that demonstrate that we have attained some important goals
- Focus research themes (reduce themes compared to 1st phase)
- Emphasize need to use excellent data gained in 1st phase to answer key questions

Preparing the next SPP round (2020-2021):



What should new proposals contain? New science, NOT a continuation of existing projects

Financing of experiments in the 2nd phase:

- No money available for new instruments!
- Limited money available for relocating existing stations to fill crucial gaps in array and to answer new questions and/pr provide new info on newly discovered targets that have arisen.

Amount of money available for 2nd phase: Probably not as much money available as in the 1st phase

How long can projects from 1st phase continue? Can be extended 6-9 months beyond the formal end of the project (Mar 2020); Extensions must be justified, e.g., by late hiring of PhD in project

Important: We should encourage our community to submit more projects than in the 1st phase!

Final remarks / List of “to do-s”



1. Deliver

- All current PIs => **½ page summary of new results in phase 1**, also showing how **research themes and hypotheses in original proposal** have been addressed/tested; what new insight into the **research themes and hypotheses** have been gained by the application of new methods.
- Old & prospective P => **½ page project sketch for phase 2**

=> Send by **21. December 2018** to emanuel.kaestle@fu-berlin.de:

- ## 2. Please use standardized maps and shape files provided on SPP website! Make your data comprehensible to your unspecialized colleagues