

# DR. SAVI SARA

Researcher, Geologist and Geomorphologist

*Born on 08.09.1981 in Oggiono (CO) - Italy*

## ACADEMIC AND RESEARCH RECORD

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*“My research focuses on the impact of climatic changes on sediment production and sediment transport in mountain areas. Main aim is to understand the dynamics of sediment supply, in relationships with triggering factors and possible related hazards, to better manage and protect the environment and the communities living in these regions.”*

**October 2023 – ongoing**

**RTDB researcher – Institute of Earth and Environmental Sciences, University of Pavia, Italy**

**October 2016 – September 2023**

**Researcher (Akademische Mitarbeiterin TVL-E13) – Institute of Geosciences, University of Potsdam, Germany**

**November 2014 – January 2017**

**Alexander von Humboldt Fellows – Institute of Geosciences, University of Potsdam, Germany**

**May 2013 – October 2014**

**PostDoc Researcher – Institute of Geosciences, University of Potsdam, Germany**

I have been Principal Investigator of the following projects, which have been granted after peer-review process by different Research Foundations (see following Section):

- September 2018 – May 2024  
Project “Effects of climate warming on debris flow activity and sediment supply in high mountain regions”.
- May 2014 – May 2017  
Project “Alluvial fans and fluvial system evolution: driving forces in a climatically and tectonically transient landscape”.
- May 2013 – April 2014  
Project “Evolution of a debris-flow catchment: Erosion-rate variability and implications for climatic changes in the NW Argentinean Andes”.

**Visiting Researcher at the Free University of Bolzano (Italy).**

December 2020 – August 2022

**Visiting Researcher at the University of Minnesota (MN – USA), St. Anthony Falls Laboratory.**

October- December 2015

**May 2009 – February 2013**

**PhD in Earth Science – University of Bern, Switzerland**

Thesis title: Spatial and temporal variability of debris flow processes in the Alps: relationships with various boundary conditions. Part of the TopoEurope project supported by the European Science Foundation (ESF) under the EUROCORES Program (SedyMont – IP1).

Final grade: Summa con Laude. Supervisor Prof. Fritz Schlunegger

**April – August 2008**

**Post graduate Researcher – CNR-IDPA, University of Milano-Bicocca, Italy**

Project “GIS and decision making systems in the analysis of hydrogeological risks for real-time emergency management”

September 2004 – November 2007

**Master in Geology – University of Milan, Italy**

Thesis title: Stratigraphical and structural analysis of Jocotitlan Volcano (Mexico): Tectonic influence on lateral collapses and volcano evolution.

Final Grade: summa con Laude. Supervisor Prof. Gianluca Groppelli

March – June 2006

**Undergraduate Researcher - Universidad Nacional Autonoma de Mexico (UNAM), Mexico**

Project “Instability of volcanic structures and relationships with local and regional tectonic settings: reduction of volcanic hazard for collapses”

September 2001 – December 2004

**Bachelor in Geology – University of Milan, Italy**

Thesis title: Transform structures and volcanoes instability: comparison between analogical simulations and real events.

Final Grade: summa con Laude. Supervisor Prof. Gianluca Groppelli

*\*, Parental leave with project interruption from Nov. 2021 until Nov. 2022  
Parental leave from Aug. 2017 until Aug. 2018 (with no active working contract)*

## LEADERSHIP IN SCIENTIFIC RESEARCH PROJECTS

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I have been Principal Investigator (i.e., I have designed and written the proposal and developed the project) in the following projects (awarded after peer-review process):

**2018 - 2023**

DEUTSCHE FORSCHUNGSGEMEINSCHAFT (DFG) GRANT for the project: “Effects of climate warming on debris flow activity and sediment supply in high mountain regions”; 36 months of salary for the Principal Investigator (PI) + **74,470 € for research costs** + **63,700 € for University costs**.

Publications produced so far:

- **Savi, S.**, Pitscheider F., Engel M., Coviello V., Strecker M.R., and Comiti F. (**in review**). Sediment export from an Alpine proglacial area under a changing climate: budgets, rates, and geomorphological processes. Submitted to *Geomorphology*.
- Engel M., Coviello V., **Savi S.**, Buter A., Andreoli A., Miyata S., Marchetti G., Scorpio V., Rathburn S., Nicholson L., and Comiti F. (**2024**). Meltwater driven sediment transport dynamics in two contrasting Alpine proglacial streams. *Journal of Hydrology*, 635, 131171. Doi: <https://doi.org/10.1016/j.jhydrol.2024.131171>
- **Savi, S.**, Buter, A., Heckmann, T., Theule, J., Mao, L. and Comiti, F. (**2023**). Multi-Temporal Analysis of Morphological Changes in an Alpine Proglacial Area and Their Effect on Sediment Transfer. *CATENA*, ISSN 0341-8162, v 220(B), 106701, <https://doi.org/10.1016/j.catena.2022.106701>
- Coviello V., Vignoli G., Simoni S., Bertoldi W., Engel M., Buter A., Marchetti G., Andreoli A., **Savi S.**, Comiti F. (**2022**). Bedload fluxes in a glacier-fed river at multiple temporal scales. *Water Resources Research*, 58 (10); DOI: <https://doi.org/10.1029/2021WR031873>
- Buter A., Heckmann T., Filisetti L., **Savi S.**, Mao L., Gems B., Comiti F. (**2022**). Effects of catchment characteristics and hydro-meteorological scenarios on sediment connectivity in glacierised catchments. *Geomorphology* 402, 108128, <https://doi.org/10.1016/j.geomorph.2022.108128>
- **Savi S.**, Dinale R., and Comiti F. (**2021b**). The Sulden/Solda glacier (Eastern Italian Alps): fluctuations, dynamics, and topographic control over the last 200 years. *Geogr. Fis. Dinam. Quat.* 44, 15-30, DOI 10.4461/GFDQ.2021.44.2
- **Savi S.**, Comiti F., and Strecker M.R. (**2021a**). Pronounced increase in slope instability linked to global warming: a case study from the Eastern European Alps. *ESPL*, 2021, 1-20; DOI: 10.1002/esp.5100.

## 2014 - 2017

ALEXANDER VON HUMBOLDT POST-DOCTORAL FELLOWSHIP for the project “Alluvial fans and fluvial system evolution: driving forces in a climatically and tectonically transient landscape”; 24 months of salary for the PI + **19,200 € for research costs**.

Project duration: Nov. 2014 – May 2017.

Produced publications:

- **Savi S.**, Tofelde S., Wickert A., Bufe A., Schildgen T., and Strecker M.R. (2020). Interactions between main channels and tributary alluvial fans: channel adjustments and sediment-signal propagation. *Earth Surf. Dynam.*, 8, 303–322, <https://doi.org/10.5194/esurf-8-303-2020>.
- Tofelde S., **Savi S.**, Wickert, A. D., Bufe, A., and Schildgen, T. F. (2019). Alluvial channel response to environmental perturbations: fill-terrace formation and sediment-signal disruption, *Earth Surf. Dynam.*, 7, 609–631, <https://doi.org/10.5194/esurf-7-609-2019>.
- Tofelde S., Schildgen T.F., **Savi S.**, Pingel H., Wickert A.D., Bookhagen B., Wittmann H., Alonso R.A., Cottle J., and Strecker M.R. (2017). 100 kyr fluvial cut-and-fill terrace cycles since the Middle Pleistocene in the southern Central Andes, NW Argentina. *Earth and Planetary Science Letters*, 473, 141–153. <https://doi.org/10.1016/j.epsl.2017.06.001>.

## 2014

Swiss National Science Foundation: ADVANCED POST-DOCTORAL FELLOWSHIP for the project “Alluvial fans and fluvial system evolution: driving forces in a climatically and tectonically transient landscape”; 18 months of salary for the PI (only 6 months were used due to the beginning of the A. von Humboldt Fellowship).

Project duration: May 2014 – Oct. 2014.

## 2013 - 2014

Swiss National Science Foundation: EARLY POST-DOCTORAL FELLOWSHIP for the project “Evolution of a debris-flow catchment: Erosion-rate variability and implications for climatic changes in the NW Argentinean Andes”; designed together with Prof. Manfred Strecker and Prof. Taylor Schildgen; 12 months of salary for the PI.

Project duration: May 2013 – April 2014.

Produced publications:

- **Savi S.**, Schildgen T.F., Tofelde S., Wittmann H., Scherler D., Mey J., Alonso R., and Strecker M.R. (2016). Climatic modulation of sedimentary processes: The Del Medio debris-flow fan, NW Argentina, *JGR: Earth Surface*, 121, 2424–2445. <https://doi.org/10.1002/2016JF003912>.
- Schildgen T.F., Robinson R.A.J., **Savi S.**, Phillips W.M., Spencer J.Q.G., Bookhagen B., Scherler D., Tofelde S., Alonso R.N., Kubik P.W., Binnie S.A., and Strecker M.R. (2016). Landscape response to late Pleistocene climate change in NW Argentina: Sediment flux modulated by basin geometry and connectivity, *JGR: Earth Surface*, 121, 392–414. <https://doi.org/10.1002/2015JF003607>.

## INTERNATIONAL COOPERATION

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### 2023

Second Proposer for the COST ACTION SeDyChange, as a continuation of the DENUCHANGE IAG Working Group (<http://www.geomorph.org/denuchange-working-group-4/>).

### 2020

Joining the River Basin Group at the Free University of Bolzano (Italy) under the guidance of Prof. Francesco Comiti.

## 2015

Joining the project “Alluvial River Dynamics” of Prof. Andrew Wickert at the St. Anthony Falls Laboratory, Minnesota (USA).

## 2009-2013

Part of the “SedyMont” ESF project under the EUROCORES Program (Included collaborations and partnership with Switzerland, Austria, Italy, Germany, and Norway).

## WINNERS OF MINOR GRANTS AND FELLOWSHIPS

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### 2008

POST-GRADUATED RESEARCH FELLOWSHIP, Lombardy Region (Italy): 5 months of salary for the PI.

Project duration: April 2008 – August 2008.

Produced publications:

- **Savi S.**, M. De Amicis, S. Frigerio, S. Sironi And S. Sterlacchini, (2009). Utilizzo delle tecniche GIS e di Sistemi di Supporto alle Decisioni (DSS) nell’analisi dei rischi idrogeologici nella gestione delle emergenze in tempo reale. *Rendiconti online Soc. Geol. It.*, Vol. 8 (2009), 131-133.

### 2006

UNDERGRADUATE RESEARCH FELLOWSHIP, Conacyt (Mexico): 4 months of salary for the PI.  
March 2006 – June 2006

## PUBLICATIONS IN PEER-REVIEWED JOURNALS

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1. Engel M., Coviello V., **Savi S.**, Buter A., Andreoli A., Miyata S., Marchetti G., Scorpio V., Rathburn S., Nicholson L., and Comiti F. (2024). Meltwater driven sediment transport dynamics in two contrasting Alpine proglacial streams. *Journal of Hydrology*, 635, 131171. Doi: <https://doi.org/10.1016/j.jhydrol.2024.131171>
2. **Savi S.**, Buter, A., Heckmann, T., Theule, J., Mao, L. and Comiti, F. (2023). Multi-Temporal Analysis of Morphological Changes in an Alpine Proglacial Area and Their Effect on Sediment Transfer. *CATENA*, ISSN 0341-8162, v 220(B), 106701, <https://doi.org/10.1016/j.catena.2022.106701>
3. Coviello V., Vignoli G., Simoni S., Bertoldi W., Engel M., Buter A., Marchetti G., Andreoli A., **Savi S.**, Comiti F. (2022). Bedload fluxes in a glacier-fed river at multiple temporal scales. *Water Resources Research*, 58 (10); DOI: <https://doi.org/10.1029/2021WR031873>
4. Buter A., Heckmann T., Filisetti L., **Savi S.**, Mao L., Gems B., Comiti F. (2022). Effects of catchment characteristics and hydro-meteorological scenarios on sediment connectivity in glacierised catchments. *Geomorphology* 402, 108128, <https://doi.org/10.1016/j.geomorph.2022.108128>
5. **Savi S.**, Dinale R., and Comiti F. (2021). The Sulden/Solda glacier (Eastern Italian Alps): fluctuations, dynamics, and topographic control over the last 200 years. *Geogr. Fis. Dinam. Quat.* 44, 15-30, DOI 10.4461/GFDQ.2021.44.
6. **Savi S.**, Comiti F., and Strecker M.R. (2021). Pronounced increase in slope instability linked to global warming: a case study from the Eastern European Alps. *ESPL*, 2021, 1-20; DOI: 10.1002/esp.5100.
7. **Savi S.**, Tofelde S., Wickert A., Bufe A., Schildgen T., and Strecker M.R. (2020). Interactions between main channels and tributary alluvial fans: channel adjustments and sediment-signal propagation. *Earth Surf. Dynam.*, 8, 303–322, <https://doi.org/10.5194/esurf-8-303-2020>.
8. Tofelde, S., **Savi S.**, Wickert, A. D., Bufe, A., and Schildgen, T. F. (2019). Alluvial channel response to environmental perturbations: fill-terrace formation and sediment-signal disruption, *Earth Surf. Dynam.*, 7, 609–631, <https://doi.org/10.5194/esurf-7-609-2019>.
9. Tofelde S., Schildgen T.F., **Savi S.**, Pingel H., Wickert A.D., Bookhagen B., Wittmann H., Alonso R.A., Cottle J., and Strecker M.R. (2017). 100 kyr fluvial cut-and-fill terrace cycles since the Middle Pleistocene in the southern Central Andes, NW Argentina. *Earth and Planetary Science Letters*, 473, 141–153.

10. **Savi S.**, Schildgen T.F., Tofelde S., Wittmann H., Scherler D., Mey J., Alonso R., and Strecker M.R. (2016). Climatic modulation of sedimentary processes: The Del Medio debris-flow fan, NW Argentina, *JGR: Earth Surface*, 121, 2424–2445.
11. Schildgen T.F., Robinson R.A.J., **Savi S.**, Phillips W.M., Spencer J.Q.G., Bookhagen B., Scherler D., Tofelde S., Alonso R.N., Kubik P.W., Binnie S.A., and Strecker M.R. (2016). Landscape response to late Pleistocene climate change in NW Argentina: Sediment flux modulated by basin geometry and connectivity, *JGR: Earth Surface*, 121, 392-414.
12. **Savi S.**, Delunel R., and Schlunegger F., (2015). Efficiency of frost-cracking processes through space and time: An example from the eastern Italian Alps. *Geomorphology*, 01/2015; 232.
13. **Savi S.**, Norton K.P., Delunel R., Akçar N., Picotti V., Brardinoni F., Kubik P.W., and Schlunegger F., (2014). Quantifying sediment supply at the end of the last glaciation: Dynamic reconstruction of an alpine debris-flow fan. *Geological Society of America Bulletin*, v. 126 no. 5-6 p. 773-790.
14. **Savi S.**, Norton K.P., Picotti V., Brardinoni F., Akçar N., Kubik P.W., Delunel R., and Schlunegger F. (2014). Effects of sediment mixing on 10Be concentrations in the Zielbach catchment, central-eastern Italian Alps. *Quaternary Geochronology*, 19, 148-162.
15. **Savi S.**, Schneuwly-Bollschweiler M., Bommer-Dennis B., Stoffel M., and Schlunegger F. (2013). Geomorphic coupling between hillslopes and channels in the Swiss Alps. *Earth Surface Processes and Landforms*, v. 38, p. 959–969.

#### Other publications:

1. **Savi S.**, Castino F., Tofelde S., Wittmann H., and Schildgen T.F., (2017). Determination limits for cosmogenic 10Be and their importance for geomorphic applications. *Earth Surf. Dynam. Discuss.*, doi:10.5194/esurf-2017-30
2. **Savi S.** (2013). Sediment supply dynamics through space and time: a multi-approach analysis of transient landscapes. Ph.D. Thesis, University of Bern, Switzerland.
3. **Savi S.**, M. De Amicis, S. Frigerio, S. Sironi And S. Sterlacchini, (2009). Utilizzo delle tecniche GIS e di Sistemi di Supporto alle Decisioni (DSS) nell’analisi dei rischi idrogeologici nella gestione delle emergenze in tempo reale. *Rendiconti online Soc. Geol. It.*, Vol. 8 (2009), 131-133.

## MEETINGS AND CONFERENCES

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I have been co-convenor and chairperson at the following EGU Meetings:

- [EGU2024](#), NH3.1 “Debris flows: advances on mechanics, monitoring, modelling and risk management”
- [EGU2023](#), NH “Debris flows: advances on mechanics, monitoring, modelling and risk management”
- [EGU2022](#), NH3.1/GM3.16/HS13.14 "Debris flows: advances on mechanics, controlling factors, monitoring, modelling and risk management"
- [EGU2021](#), NH3.2/GM3.3/HS9.7 "Debris flows: advances on mechanics, controlling factors, monitoring, modelling and risk management"
- [EGU2018](#), GM7.1/NH11.19/SSS13.31 "Hillslope geomorphology, slope and fluvial denudation, and landscape responses to global environmental changes"
- [EGU2017](#), GM4.3/HS11.15/NH8.12/SSS2.30 “Hillslope and fluvial denudation, source-to-sink fluxes and sedimentary budgets under changing climate and other perturbations”
- [EGU2016](#), GM3.2/SSS2.20 “Hillslope and fluvial denudation, source-to-sink fluxes and sedimentary budgets under changing climate and other perturbations”
- [EGU2015](#), GM6.2 “Hillslope geomorphology, denudational slope processes and slope response to climate change”

I have participated at the following conferences:

*With oral presentation*

- [4th DENUCHANGE workshop](#), Rome September 2024, “The aftermath of an extreme precipitation event on sediment transport in the Ortles-Cevedale massif (Eastern Italian Alps)”
- [EGU2023](#), “Glacial hot spots for sediment supply during global warming: a case study from the Eastern Italian Alps”
- [EGU2021](#), “Global warming, slope stability, and the dynamization of geological hazards in high mountain regions: a case study from the Eastern Alps”
- [Annual Glaciology Meeting 2021](#), “The Sulden glacier (Eastern Italian Alps): Post-LIA history of glacier and proglacial dynamics”
- [AGU2012](#), “Holocene activity of an alpine debris-flow catchment: does climate control erosion rate variability?”
- [EGU2012](#), “How does sediment mixing affect 10Be concentrations in alluvial sediments? A case study from a small catchment of the Alps, Zielbach, Alto Adige, Italy”

*With poster presentation*

- EGU Meetings in 2010, 2011, 2014, 2016
- AGU, 2014
- INQUA, 2011

Given seminars/presentations:

- [IAG Webinar 2023 for western Europe](#), “Proglacial areas: sediment sources or sediment storage? What should we expect for the future?”, **INVITED SPEAKER**.
- [Landscape Live Online Seminar 2021](#) (EGU Geomorphology division; <https://www.landscapeslive.org/>) “Effects of climate warming on slope instability and debris flow activity in high mountain regions”, **INVITED SPEAKER**.
- University of Florence, Italy, [2016](#), “Surface Processes in Mountain Environments”, **INVITED SPEAKER**.
- St. Anthony Falls Laboratory, Minneapolis (USA), [2015](#), “Fluvial network response to environmental perturbations - an experimental approach”, **INVITED SPEAKER**.
- GFZ Potsdam, Germany, [2015](#), “A modern analog of past climatic impacts on sedimentary processes and landscape evolution: The Del Medio catchment, NW Argentina”, **INVITED SPEAKER**.

## TEACHING AND SPECIALIZATION COURSES

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**Since 2023:** Responsible for the course “Advance geoinformatics approaches to assess the Earth Critical Zone – GIS module” of the LM74 (Master degree) of the University of Pavia.

Supervision:

1 Bachelor Thesis

### 2013-2023

Courses taught:

- Geology 2 (Bachelor degree – University of Potsdam)
- Deformation of sedimentary rocks, mapping and profiling (Bachelor degree, field course – University of Potsdam)
- Seminars on “Tectonics and climate” (Master degree – University of Potsdam)
- Data acquisition through GPS techniques and Photogrammetry (Master degree, field course – University of Bern)
- Geographic Information Systems (Master degree, practical course – University of Bern)
- Geological mapping of volcanic areas (Bachelor degree, field course – University of Milan)

Supervision:

Assistant to 3 PhD students; co-supervisor of 1 bachelor thesis.

Specialization courses:

ERASMUS+, Teaching experience at the University of Florence, Italy (November 2016).

**Management skills for research and university** – University of Potsdam, Germany (2016).

**International Teaching Professionals**, for teaching in English at university level to non-native speakers – University of Potsdam, Germany (2015-2016).

## WORKING COMPETENCES

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- Very good experience in fieldwork (for mapping, sampling, and digital measurements – dGPS and Total Station GPS) and lab-work (dendrochronology, cosmogenic nuclides, sampling preparation).
- Very good knowledge of GIS for terrain analysis and database management. Knowledge of photogrammetric and remote sensing techniques and software; good programming skills (Matlab - good, Python - basic).
- Abilities to work with physical and numerical modelling.
- Very good knowledge of office and adobe software.
- Fluent English in both written and spoken forms (C1 level – IELTS examination done in 2020) remarked by several scientific publications and awarded scientific research projects. Large working experience in international environments.
- I am used to work both in team and autonomously; I am problem-solving oriented, for both technical and logistic problems.

## SKILLS

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