


PERSONAL INFORMATION

Hamid Sana

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POSITION

Postdoctoral Researcher (JPL, NASA) and Research Asst. (IRSM)

WORK EXPERIENCE

2020–Present

Postdoctoral Researcher

Jet Propulsion Laboratory (NASA), Caltech, Pasadena (United States)

2021–Present

Research Assistant

Institute of Rock Structure and Mechanics (IRSM), Czech Academy of Sciences, Prague (Czech Republic)

2017–2019

Postdoctoral Fellow

Institute of Rock Structure and Mechanics (IRSM), Czech Academy of Sciences, Prague (Czech Republic)

EDUCATION AND TRAINING

2016

PhD - Geology and Geophysics

ADDITIONAL INFORMATION

Research Field

Solid Earth and Geological Sciences

Peer Reviewed Articles

Klimes, J., Novotný, J., Cochacin Rapre, A., Balek, J., Zahradníček, P., Strozzi, T., **Sana, H.**, Frey, H., René, M., Štěpánek, P., Meitner, J., Junghardt, J., 2021. Paraglacial rock slope stability under changing environmental conditions, Safuna Lakes, Cordillera Blanca Peru. **Frontiers in Earth Science**. (Accepted).

Sana, H., Stepancikova, P., Szemeitat, A., and Stemberk, J. 2021. Macroseismic intensity re-evaluation of the 11 June 1895 Mid-Silesia earthquake, Poland. **Seismological Research Letters**, (<https://doi.org/10.1785/0220200359>).

Sana, H. 2019. A probabilistic approach to the seismic hazard in Kashmir basin, NW Himalaya. **Geoscience Letters**, 6:5. (<https://doi.org/10.186/s40562-019-0136-0>).

Sana, H., Nath, S. K., and Gujral, K.S. 2019. Site response analysis of the Kashmir valley during the 8 October 2005 Kashmir earthquake (M_w 7.6) using a geotechnical dataset. **Bulletin of Engineering Geology and the Environment**, 78: 2551 (<https://doi.org/10.1007/s10064-018-1254-1>).

Sana, H., Bhat, F.A., and Sana, S. 2018. The ancient temples of Kashmir turned from marvel to ruin by earthquakes: a case study of the Pattan twin temples (883-902 AD). **Seismological Research Letters**, 90(1), 358-365. (<https://doi.org/10.1785/0220180270>).

Sana, H. 2018. Seismic microzonation of Srinagar city, Jammu and Kashmir. *Soil Dynamics and Earthquake Engineering*, 1 5, 578-588. (<https://doi.org/10.1016/j.soildyn.2018.09.028>).

Sana, H., and Nath, S. K. 2017. Seismic Source Zoning and Maximum Earthquake Prognosis of the Greater Kashmir Territory, NW Himalaya. *Journal of Seismology*, 21(2), 41 -424 (DOI: 10.1007/s10950-016-9608-2).

Sana, H., and Nath, S. K. 2016. Liquefaction Potential Analysis of the Kashmir Valley Alluvium, NW Himalaya. *Soil Dynamics and Earthquake Engineering*, 85, 1 -18. (<https://doi.org/10.1016/j.soildyn.2016.03.009>)

Sana, H., and Nath, S. K. 2016. In and Around the Hazara-Kashmir Syntaxis a Seismotectonic and Seismic Hazard perspective. *Journal of Indian Geophysical Union*, 20 (5), 496-505. (<https://tinyurl.com/y8xcgueb>).

Ahmad, B., **Sana, H.**, and Alam, A. 2014. Macroseismic intensity assessment of 1885 Baramulla earthquake of northwest Kashmir Himalaya. *Quaternary International*, 321, 59-64. (<https://doi.org/10.1016/j.quaint.2013.12.043>).

Bhat F. A., Bhat I. M, **Sana, H.**, Mohd Iqbal, Akhtar R. 2013. Identification of geomorphic signatures of active tectonics in the West Lidder Watershed, Kashmir Himalayas Using Remote Sensing and GIS. *International Journal of Geomatics and Geosciences*, 4(1),164- 176. (<https://tinyurl.com/ya57u2bq>).

Under Review/Preparation

Sana, H., et al. Detecting active faults in intramountain basins using Electrical Resistivity Tomography: A focus on Kashmir Basin, NW Himalaya. *Journal of Applied Geophysics* (Under Review).

Paleoseismology of Mariánské Lázně fault in Czech Republic (under preparation)

Paleoseismology of Aramu fault in Bulgaria (under preparation)

Conferences

Sana, H., Fielding E., Liang, C., and Z. Yunjun, (2021). Strain accumulation along various faults in the Kashmir Himalaya from InSAR. **European Geoscience Union General Assembly 2021**, 19-30 April 2021. Online Everywhere. Accepted.

Sana, H., Taborik, P., Bhat, F.A., Flasar, J., and P. Stepancikova, (2019). Detecting Active faults in intramountain basins using Electric Resistivity Tomography. Poster Presentation at 2019 **SCEC Annual Meeting**, SCEC Contribution 9700. Palm Springs California, US.

Reicherter, K., J. Hürtgen, S. Baize, T. Rockwell, S. Pena-Castellnou, J. van der Wall, W. Abbas, C. Weismüller, **H. Sana**, F.Cinti, H. Jomard, M. Cushing, G. Seitz, K. Diederichs, A. Eulen, S. Mader and J. R. Ritter, (2019). The eastern Rhine Graben Boundary Fault: first results from paleoseismological trenching. **Bi-annual meeting of the French Association of Quaternary Geologists (AFEQ-CNF INQUA), Paris** (3-4th of February 2020).

Reicherter, K., J. Hürtgen, S. Baize, T. Rockwell, S. Pena-Castellnou, J. van der Wall, W. Abbas, C. Weismüller, **H. Sana**, F.Cinti, H. Jomard, M. Cushing, G. Seitz, K. Diederichs, A. Eulen, S. Mader and J. R. Ritter, (2019). The eastern Rhine Graben Boundary Fault First results from paleoseismological trenching. **7th International Colloquium on Historical Earthquakes & Paleoseismology Studies 4** - 6 November 2019, Barcelona, Spain.

Štěpančíková, P., Fischer, T., Hartvich, F., Tábořík, P., Rockwell, T., Stemberk, J., **Sana, H.**, and Szameitat, A., 2018. Historical surface-breaking earthquake in central Europe? **6th Colloquium on Historical Earthquakes & Paleoseismology studies** / Book of Abstracts, 24-25 October, Han-sur-Lesse, Belgium.

Sana, H., Štěpančíková, P., and Szameitat, A. (2018). A preliminary note on the macroseismic intensity re-evaluation of the 1 June 1895 central Silesia earthquake, Southwestern Poland. **PATA DAYS 2018: 9th International Workshop on Paleoseismology, Active Tectonics and Archeoseismology**, 24th - 29th June, Thessaloniki, Greece.

Štěpančíková, P., Flasar, J., Stemberk, J., Bretislav, B., Kalvoda, J., **Sana, H.** (2018). Neotectonic activity reflected in morphology along the Mariánské Lázně fault and in the adjacent Cheb basin (Bohemian Massif, central Europe). **PATA DAYS 2018: 9th International Workshop on Paleoseismology, Active Tectonics and Archeoseismology**, 24th - 29th June, Thessaloniki, Greece.

Sana, H. (2018). Seismic Hazard Assessment of the Kashmir Basin, Northwestern Himalaya. *Journal of Applied Geophysics*, 152, 1-10. (<https://doi.org/10.1016/j.jappgeo.2018.07.011>)

Probabilistic Approach. **Seismology of the Americas Meeting 2018**, Latin American and Caribbean Seismological Commission, **Seismological Society of America**, 14–17 May 2018 Miami, Florida. **Seismological Research Letters**, 89(2B), 826-827.

Radulov, A., Yaneva, M., Štěpančíková, P., Gerdjikov, I., Rockwell, T., Donkova, Y., **Sana, H.**, Flašar, J., and Nikolov, N. (2017). Structural evidence for hard linkage between the Predela and Haramibunar faults in Southwestern Bulgaria. **Geosciences** 2017, 7 December, Bulgarian Geological Society, Sofia, Bulgaria.

Sana, H. (2017). Ground response analysis during the 8 October 2005 Kashmir earthquake (Mw 7.6): implication for historical and paleoearthquake deterministic hazard assessment. **PATA DAYS 2017: 8th International Workshop on Paleoseismology, Active Tectonics and Archeoseismology**, 13th - 16th November, Blenheim, New Zealand.

Stepancikova, P., Fischer, T., Hartvich, F., Taborik, P., Rockwell, T., Stemberk, J., Siroky, J., and **Sana, H.** (2017). Late Quaternary activity of slow-slip intrplate Marianske Lazne fault as revealed by trenching and shallow geophysical survey, Bohemian Massif (Czech Republic, Central Europe). **PATA DAYS 2017: 8th International Workshop on Paleoseismology, Active Tectonics and Archeoseismology**, 13th - 16th November, Blenheim, New Zealand.

Sana, H. (2017). Liquefaction as a seismic hazard, an example from the Kashmir Himalaya. **Geomorph 2017**, 4th Central European Geomorphology Conference, October 9-13, 2017, University of Bayreuth, Germany.

Sana, H. (2017). Synthetic ground motions of the 8 October 2005 Kashmir earthquake (Mw 7.6): a stochastic finite fault element approach. Poster Presentation at 2017 **SCEC Annual Meeting, SCEC Contribution 7850**. Palm Springs California, US.

Sana, H., Mukhtar, G.A. and Nath, S.K. (2015). Seismicity analysis of Chenab Valley Seismic Zone, NW Himalaya: the seismogenic source of Kirthai-I Hydro Electric Project. **Journal of Engineering Geology**, special publication, 1235-1240.

Sana, H., and Nath S.K. (2014). Maximum Credible earthquake estimation for the Kashmir valley, NW Himalaya. **International Geographical Union (IGU) Commission Conference**, Srinagar, Kashmir, India.

Book Chapters and Reports

Fault Database of Czech Republic for Seismic Hazard Assessment of Nuclear Facilities. **Seismic Ground Motion Assessment Project (SIGMA 2)**

Detailed Project Report on Kirthai-I Hydroelectric Project in Chenab valley, NW Himalaya (Contributed Regional Seismicity, Regional Tectonics, and Project Geology Chapters)

Synthetic ground motions of the October 8, 2005 Kashmir earthquake (Mw 7.6): An inference to the site response and seismic hazard of Kashmir basin, NW Himalaya. **Sana, H.** (2021). In, **Basics of Computational Geophysics**, 3-12 pp, Elsevier.

Liquefaction as a seismic hazard: Scales, examples and analysis, **Sana, H.** (2021). In, **Basics of Computational Geophysics**, 153-163 pp, Elsevier.

Awards and Fellowships

CSIR-UGC (Junior and Senior) Research Fellowship 2009 **PhD Fellowship**.

Czech Academy of Sciences (Czech Republic) **Postdoctoral Fellowship** 2017.

Fulbright **Postdoctoral Fellowship** (USA) 2020.

Institute of Rock Structure and Mechanics (IRSM), **Czech Academy of Sciences travel and stay grant** to attend and present paper at Southern California Earthquake Center (SCEC) Annual Meeting 2017, 10-13 September, Palm Springs, California, US.

INQUA travel grant 2017 to attend and present paper at PATA Days 2017: 8th International Workshop on Paleoseismology, Active Tectonics and Archeoseismology, 13-16 November 2017 in Blenheim, New Zealand.

German Science Foundation (DFG) travel and stay grant to present paper at GeoMorph 2017, 4th Central European Geomorphology Conference, 9-13 October 2017, Bayreuth, Germany.

Institute of Rock Structure and Mechanics (IRSM), **Czech Academy of Sciences travel and stay grant** to attend and present paper at Seismological Society of America (SSA) Annual Meeting 2018, 14-17 May, Miami, Florida, US.

Institute of Rock Structure and Mechanics (IRSM), **Czech Academy of Sciences travel and stay grant** to attend and present paper at PATA Days 2018: 9th International Workshop on Paleoseismology, Active Tectonics and Archeoseismology, 24-29 June 2018, in Possidi, Greece.

Skills

- Operating systems: Windows and Linux (Ubuntu)
- Technical Softwares and languages: Matlab, PYTHON, Origin, ArcGIS, ERDAS, SARSCAPE (ENVI), SNAP, ISCE2, MintPy

COMET InSAR Training Workshop (2018); The Centre for Observation & Modelling of Earthquakes, Volcanoes, & Tectonics, School of Earth and Environment, University of Leeds, Leeds, UK.

Summer School on Paleoseismology, Active Tectonics and Archeoseismology (2018); PATA days 2018, Possidi, Greece.

ShakeMap Workshop (2018); United States Geological Survey (USGS), Miami, US.

Workshop on Nonlinear Shallow Crustal Effects (2017); Organized by Southern California Earthquake Center (SCEC), California, US.

InSAR Interferometry training (2017); Neotectonics and Geo-Hazards Centre, RWTH Aachen University, Aachen, Germany.

Field Experience

- 2019 Itoigawa-Shizuoka Tectonic Line, **Japan**, Active tectonic field trip
- 2019 NW Kashmir fault, **Kashmir Himalaya**, Electric Resistance Tomography, Thermochronology sampling and Paleoseismic trenching.
- 2018 Aramu fault, **Bulgaria**, Paleoseismic trenching.
- 2018 Idrija fault, Idrija, **Slovenia**, Paleoseismic trenching.
- 2018 Kassandra peninsula, eastern Chalkidiki and Mygdonia graben, **Greece**; active fault field trip
- 2017 Palakariya basin, Gotse Delchev basin and Sofia basin in **Bulgaria**.
- 2017 Central Apennine Fault system, **Italy**, epicentral area of 1997 Umbria- Marche, 2009 L'Aquila and 2016 Amatrice earthquakes
- 2017 Cheb basin, **Czech Republic**, paleoseismic trenching
- 2016 Kyoto basin, **Japan**, Active fault field trip
- 2014 Chenab Valley, **NW Himalaya**, field trip with the Jammu and Kashmir State Power Development Corporation
- 201 -2012 **Kashmir Himalaya**, PhD Research
- 2008 Panjal traps, Kashmir Himalaya, M.Sc field work
- 2008 Deccan traps, South India, M.Sc field work

Memberships

American Geophysical Union (AGU)
European Geoscience Union (EGU)

References

1. **Dr. Petra Štěpančíková**, Head of Department, Department of Neotectonics and Thermochronology, Institute of Rock Structure and Mechanics (IRSM), Czech Academy of Sciences, Prague, Czech Republic.
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2. **Dr. Josef Stemberk**, Director, Institute of Rock Structure and Mechanics (IRSM), Czech Academy of Sciences, Prague, Czech Republic.
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3. **Prof. Tom Rockwell**, Professor of Geology, Department of Geological Sciences, San Diego State University, California, US.
email: trockwell@mail.sdsu.edu
4. **Dr. Eric Fielding**, Principal Scientist, Radar Science and Engineering, Jet Propulsion Laboratory (NASA), California Institute of Technology, California, US.
email: eric.J.Fielding@jpl.nasa.gov

Personal

Date of Birth: May 05, 1987
Citizenship: Indian
Family: Unmarried
Languages English: Foreign language. Fluent speaker, reader and writer
Urdu: Foreign language. Fluent speaker, reader and writer
Arabic: Basic Knowledge. Functional speaker, reader and writer
Kashmiri: Native-language.

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