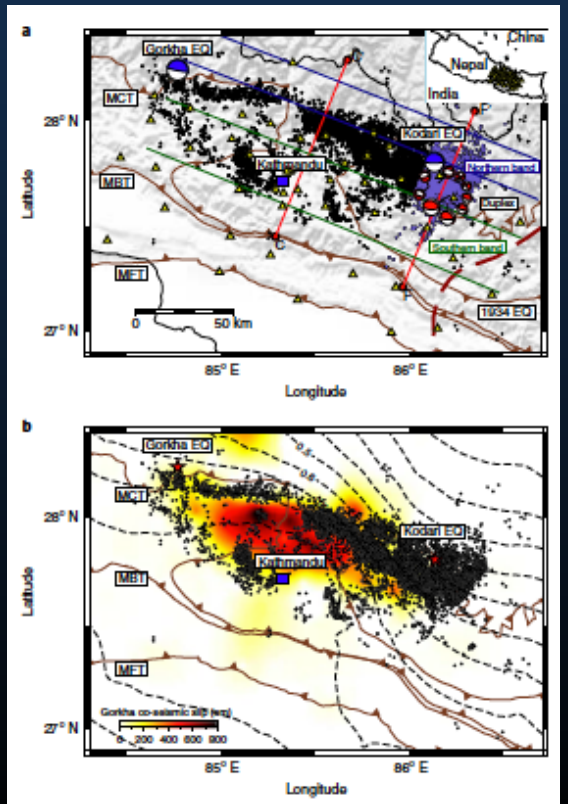
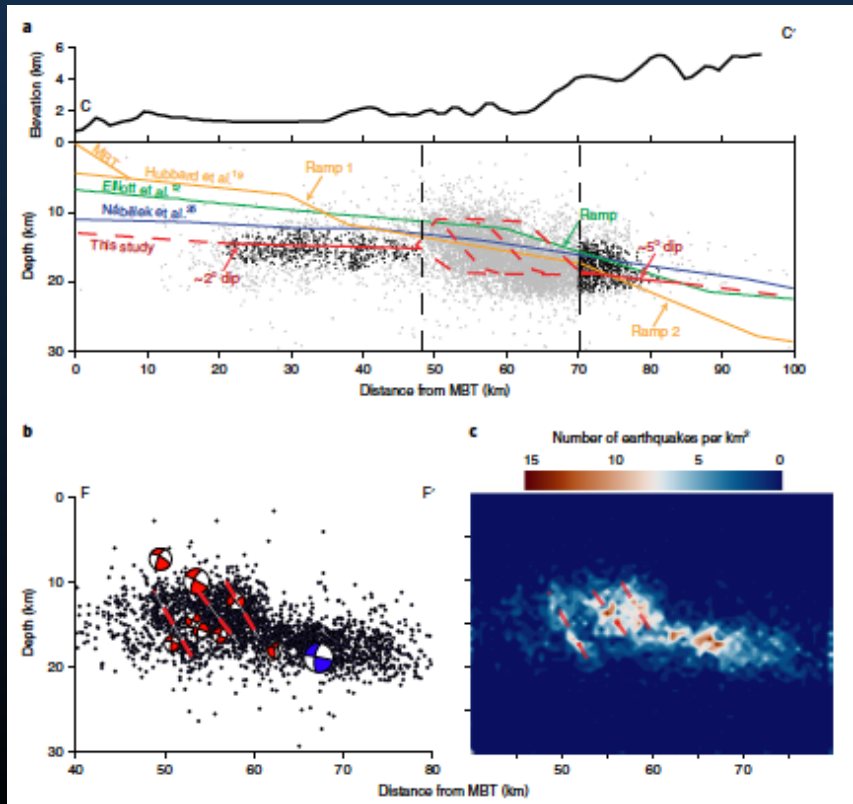
Coordinating Committee (CC): Lithospheric Seismicity and Tectonics in the Himalaya

Leaders: Marianne Karplus, Univ. of Texas at El Paso (UTEP), Aaron Velasco (UTEP), Soma Nath Sapkota (Dept. of Mines and Geology, Nepal), Dowchu Drukpa (Department of Geology and Mines, Bhutan)

Goals of the Coordinating Committee: to build connections among the global community studying earthquakes and tectonics of the Himalaya

Key Research Questions: 1) What is the geometry of the Main Himalayan Thrust? 2) What is the crustal and lithospheric composition beneath the Himalaya?, 3) What factors impact and drive faulting in the region?, 4) What is the broader geotectonic setting and how does it relate to lithospheric seismicity and tectonics?





Mendoza et al., 2019

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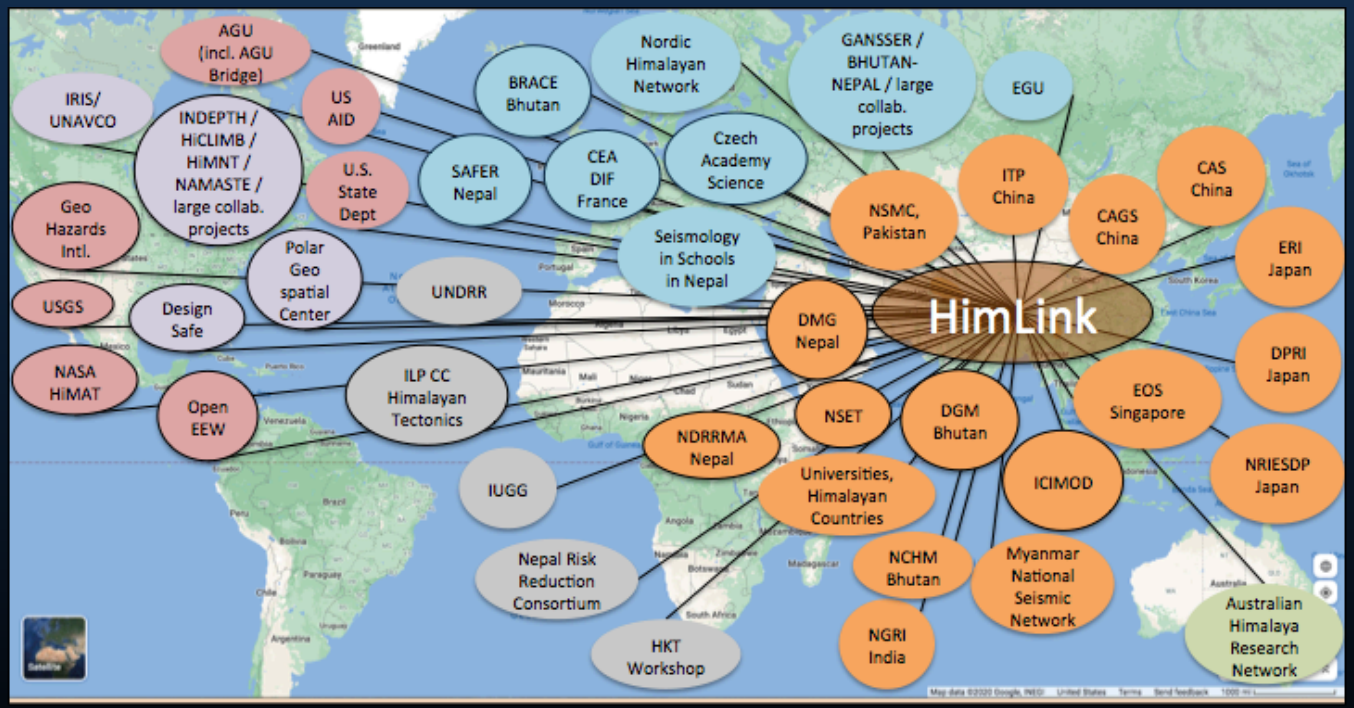
2022-23 Activities:

- Planning of a future field school in the Himalaya for students from the U.S. and Himalayan countries.
- Planning with collaborators of future seismicity and tectonics workshops in Nepal and Bhutan (for 2023-24).
- Continued submitting proposals to better fund the Coordinating Committee's research as well as networking and educational activities.
- Support for educational projects such as Seismology at School in Nepal.
- Continue research activities to contribute to our understanding of the CC research questions.



International groups we proposed to connect and support through network-building grants.

orange: Asia
gray: global
purple: NSF-funded
pink: North America
blue: Europe
green: Australia

Coordinating Committee website: https://studyearth.wixsite.com/uteplithosphere/ilp-himalayan-tectonics

Coordinating Committee (CC): Lithospheric Seismicity and Tectonics in the Himalaya

2022-23 Activities: ILP CC leads, Dr. Velasco and Dr. Karplus, were awarded an NSF center of innovation planning grant for the Center for Collective Impact in Earthquake Science (C-CIES).

C-CIES seeks to promote earthquake science innovation that is aligned with inclusivity and community engagement.

For more information, please visit our website at: https://www.c-cies.org/

These activities will support and synergize with our ILP CC.

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2022-23 Activities: Continued research on Himalayan seismicity and tectonics with several papers in preparation and future research projects in the planning stages. Nepalese and Bhutanese graduate students are working with the Coordinating Committee.

Recent Himalayan and convergent tectonics publications by CC leaders included:

Li, S., Schulte-Pelkum, V., Barnhart, W., Karplus, M., Mechanical anisotropy of the Main Himalayan Thrust from geodetic modeling and seismic imaging. Submitted to J. Geophys. Res.: Solid Earth.

Cortez, S. A., Velasco, A. A., Karplus, M., Pant, M., Gonzalez-Huizar, H., Campos-Perez, X., Husker, A., Dena, O., (2022). Ground motion analysis in Juchitan de Zaragosa, Oaxaca following the 2017 Tehuantepec, Mexico (M8.2) earthquake. Bulletin of the Seismological Society of America.

Karplus, M.S., Pant, M., Sapkota, S.N., Nabelek, J., Velasco, A.A., Adhikari, L.B., Ghosh, A., Klemperer, S.L., Kuna, V., Mendoza, M.M., Braunmiller, J. (2020). A rapid response network to record aftershocks of the 2015 M7.8 Gorkha Earthquake in Nepal. *Seis. Res. Lett.* https://doi.org/10.1785/0220190394.

Mendoza, M., Ghosh, A., Karplus, M., Nabelek, J., Sapkota, S. N., Adhikari, L. B., Klemperer, S., Velasco, A. A. (2019). Duplex in the Main Himalayan Thrust indicated by aftershocks of the 2015 Gorkha earthquake. *Nature Geoscience*, 12, 1018-1022, 10.1038/s41561-019-0474-8.

Bai, L., Klemperer, S., Mori, J., Karplus, M., Ding, L., Liu, H., Li, G., Song, B., Dhakal, S. (2019). Lateral variation of the Main Himalayan Thrust controls the rupture length of the 2015 Gorkha earthquake in Nepal. *Science Advances*, 5 (6), DOI: 10.1126/sciadv.aav0723.

Karplus, M., Klemperer, S. L., Zhao, W., Kind, R., Wu, Z., Mechie, J., Shi, D., Brown, L. D., Chen, C., Su, H., Xue, G., Sandvol, E., Ni, J., Tilmann, F., Chen, Y. J. (2019). Receiver function imaging of the lithosphere at the Kunlun-Qaidam boundary, Northeast Tibet. *Tectonophysics*, 759, 30-43, 10.1016/j.tecto.2019.03.015.

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Plans for 2023-24:

- Future field school in the Himalaya for students from the U.S. and Himalayan countries (est. May/ June 2024).
- Future seismicity and tectonics workshops organized with collaborators in Nepal and Bhutan (est. Oct. 2023 or Feb./March 2024).
- Expand connections between Center for Collective Impact in Earthquake Science (C-CIES) and this ILP CC.
- Continue submitting proposals to better fund the Coordinating Committee's research as well as networking and educational activities.
- Attend IUGG meeting in Berlin (Velasco and colleagues)
- Continue to expand ILP CC membership.
- Continue research activities to contribute to our understanding of the CC research questions.