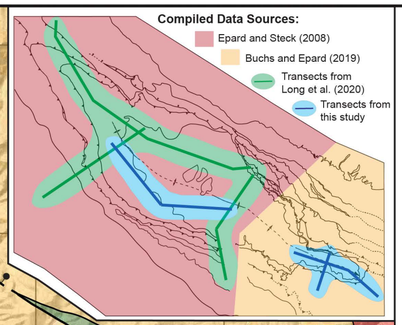
77.6°E 77.7°E 77.8°E 77.9°E 78.0°E 78.1°E 78.2°E 78.3°E 78.4°E 78.5°E 78.6°E 78.7°E 78.8°E

33.7°N 33.6°N 33.5°N 33.4°N 33.3°N 33.2°N 33.1°N 33.0°N 32.9°N 32.8°N



GUIDE TO ROCK UNITS

NORTH HIMALAYAN NAPPES

Tethyan Himalayan sedimentary rocks of the Mata nappe

TH Pz-Mz — Paleozoic-Mesozoic unmetamorphosed sedimentary rocks and greenschist-facies metasedimentary rocks with interpreted Paleozoic-Mesozoic protoliths. Dominantly limestone, mudstone, and sandstone, and their greenschist-facies equivalents.

TH Z-C — Greenschist-facies metasedimentary rocks with interpreted Neoproterozoic-Middle Cambrian protoliths (including the Neoproterozoic-Lower Cambrian Haimanta Group and the Middle Cambrian Karsha Formation). Dominantly phyllite, slate, and metapsammite.

THrg — Rupshu granite - Ordovician: 483±1 Ma (U-Pb zircon - Girard and Bussy, 1999)

THng — Nyimaling granite - Ordovician: 460 + 8 Ma (Rb-Sr whole rock - Stutz and Thöni, 1987)

Tetraogal nappe

TTN — Metasedimentary rocks of the Tetraogal nappe - Includes schist, phyllite, marble, quartzite, and metabasite that are intepreted as metamorphosed equivalents of Neoproterozoic, Paleozoic, and Mesozoic Tethyan Himalayan sedimentary rocks.

Tso Morari nappe

TMNm — Metasedimentary rocks of Tso Morari nappe - dominantly schist and metapsammite, with lesser quartzite and marble, interpreted as metamorphosed equivalents of Neoproterozoic, Paleozoic, and Mesozoic Tethyan Himalayan sedimentary rocks

TMNo — Granitic orthogneiss of Tso Morari nappe (often referred to as the "Tso Morari granite," "Tso Morari gneiss," or "Puga orthogneiss" in earlier studies) - Variably sheared granitic orthogneiss, interpreted to represent Ordovician (479 ± 2 Ma; UPb zircon; Girard & Bussy, 1999) granitoids that intruded Tethyan Himalayan sedimentary rocks

e — Eclogite boudins (omphacite + garnet + glaucophane + rutile)

LB — Ladakh batholith (103 - 47 Ma) (Honegger et al., 1982 Schärer et al. (1984); Girard & Bussy (1999)) Granodiorite, diorite, granite, tonalite and volcanics

IM — Indus Molasse Group (Paleogene) - sandstone, siltstone mudstone, conglomerate

Nidar ophiolite

NOs — Sedimentary rocks - conglomerate, radiolarite, sandstone, and argillite

NOb — Dominantly pillow basalts and basaltic andesites, with lesser basalt and basalitic andesite flows

NOg — Gabbro, with local basalt, dunite, and wehrlite

NOh — Harzburgite and dunite

Drakkarpo nappe

DNc — Changlung melange: Volcano-sedimentary conglomerate and sandstone (matrix); turbidites

DNr — Radlong Formation - Volcaniclastic rocks, tuff, augite-basalt, conglomerates, sandstone and serpentinite

DNg — Gya Formation - Argilite and sandstone

Karzok-Ribil nappe

KRNs — Sedimentary and volcaniclastic rocks of the Karzok-Ribil nappe - conglomerate, sandstone, quartzite, slate, volcaniclasitc rocks, tuff, dolomitic breccia, and local augite basalt

KRNo — Ophiolitic rocks of Karzok-Ribil nappe - serpentinites, gabbros, hornblendite, pyroxenites, pillow lavas, and radiolarites, with local volaniclastic rocks and conglomeratic limestone

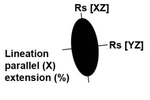
Contacts:

- Lithologic Contact
- Lithologic Contact (inferred)
- Thrust Fault
- Thrust Fault (inferred)
- Normal Fault
- Normal Fault (inferred)

Samples:

- 13 TMS-18 samples from Long et al., 2020
- 29 TMN-23 samples from this study
- 21 Samples from Dutta and Mukherjee, 2021

XY Strain Ellipses:



Structural Measurements

- 5 Mineral Stretching lineation (this study)
- 15 Tectonic foliation (this study)
- Tectonic foliation (Long et al., 2020)
- 22 Sedimentary Bedding (Long et al., 2020)
- 6 Mineral Stretching lineation (Long et al., 2020)
- 52 Crenulation cleavage (Long et al., 2020)
- 18 Overturned bedding (Long et al., 2020)
- S_2 Tectonic foliation (Epard and Steck, 2008)
- Mineral Stretching lineation (Epard and Steck, 2008)
- 38 Tectonic foliation (Buchs and Epard, 2019)
- 20 Bedding (Buchs and Epard, 2019)
- 28 Magmatic layering (Buchs and Epard, 2019)

Peak and Deformation Temperatures:

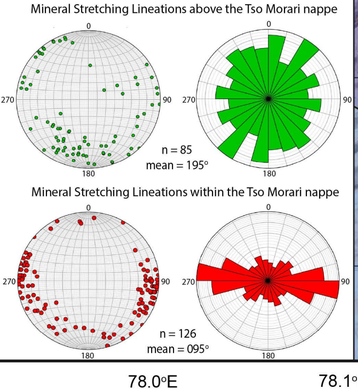
311±19 Raman spectroscopy of carbonaceous material thermometry (°C) ± 95% Confidence Interval

401±50 Quartz c-axis opening angle deformation temperature (°C) ± 50°C

Quartz Crystallographic Preferred Orientation (CPO) Intensity Parameters:

B=0.80 Cylindricity (*B*) of Quartz CPO samples

Jpf=4.02 Density Norm (Jpf) Quartz CPO samples



Tso Kar · Startsabuk Tso · Kiagar Tso · Tso Morari · Ryul Tso · Kyun Tso · Zildat-Ribil Fault

Scale 1: 150,000 — 0 10 20 km