Seismic and Geodetic Monitoring of Interseismic Strain Build up in the Nepal Himalaya

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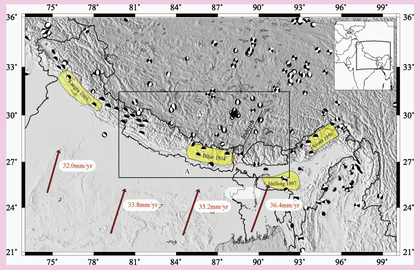
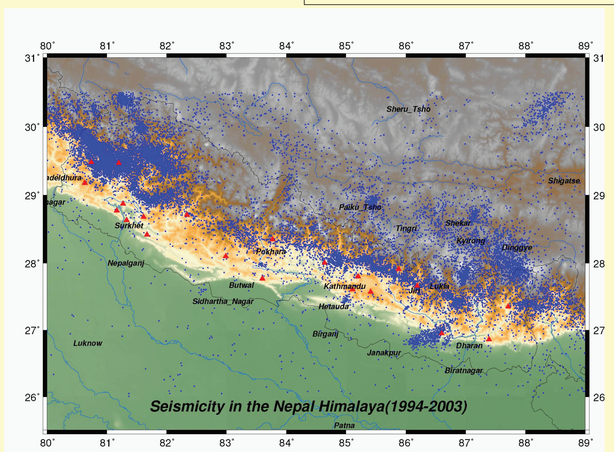
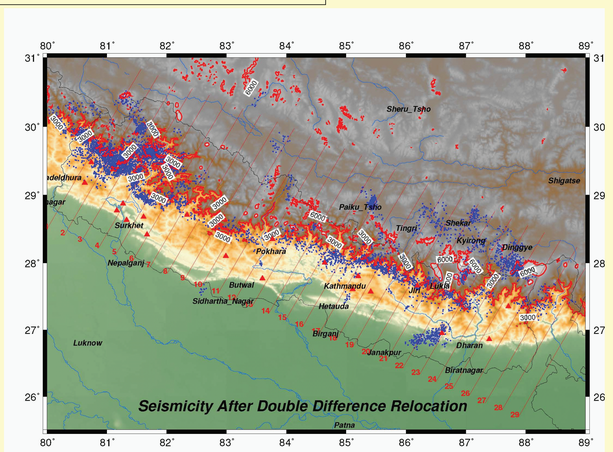


Velocity of India w.r.t. Eurasia. The Himalaya has produced 4 great earthquakes in the last 100 years (rupture area in yellow color).The region between 1905, Kangra Earthquake and 1934, Bihar-Nepal Earthquake has not ruptured in that period of time. Historical data lacks in the region at least since 1800 and this region stands as next great threat to the region

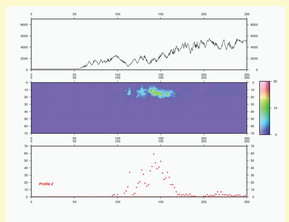
SEISMICITY OF NEPAL HIMALAYA

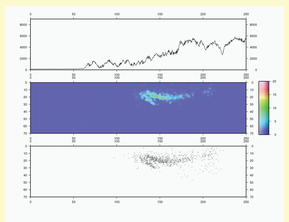


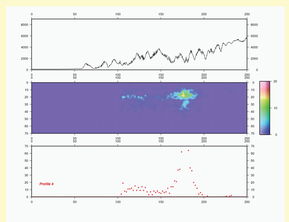
Seismicity in the Nepal Himalaya and Its adjacent Area (Ml>1.0)



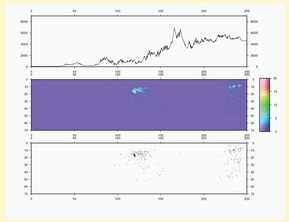
Seismicity after double difference relocation and profile lines across the seismicity belt (~along N23E).

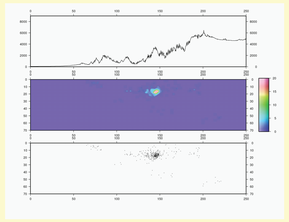


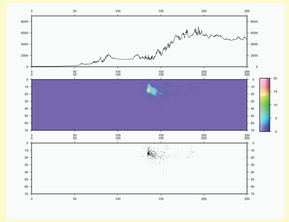




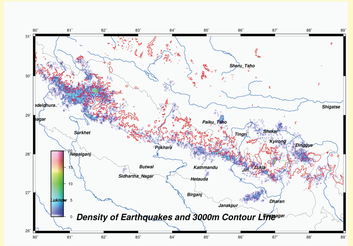
Sections along profile lines 2, 3, and 4 in Western Nepal



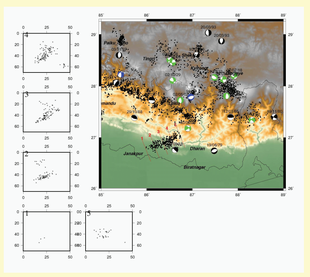




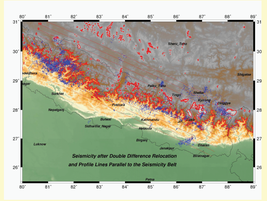
Sections along profile lines 16, 17, and 18 in Center and Eastern Nepal

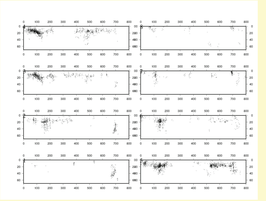


Density distribution of earthquakes



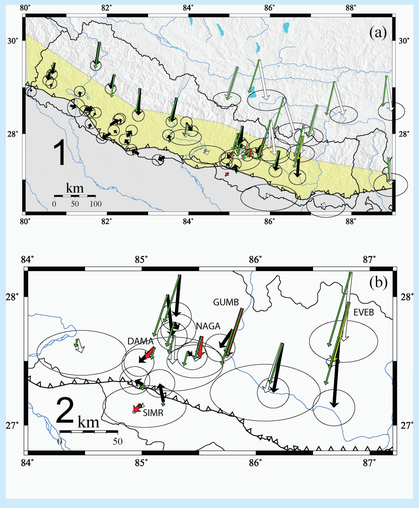
Udayapur earthquake cluster and sections across it



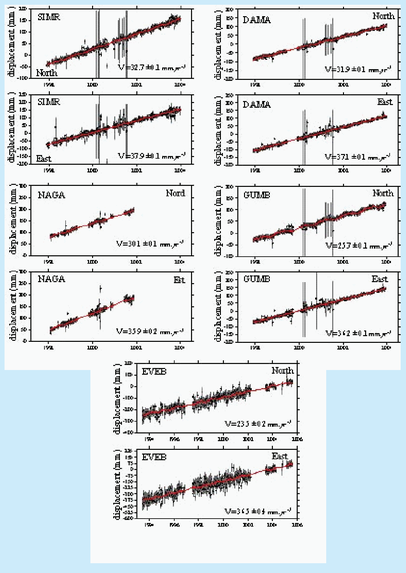


Profile lines and corresponding sections along the Nepal Himalaya

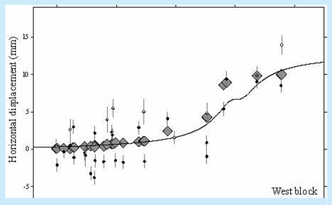
GEODETIC DEFORMATION ACROSS THE HIMALAYA



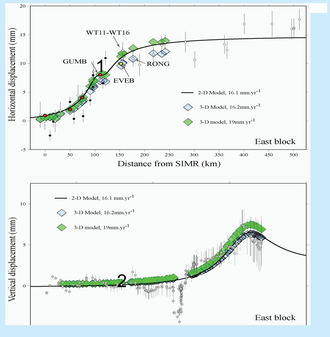
Horizontal velocities across Nepal Himalaya as monitored by GPS



Displacements relative to ITRF, 2000

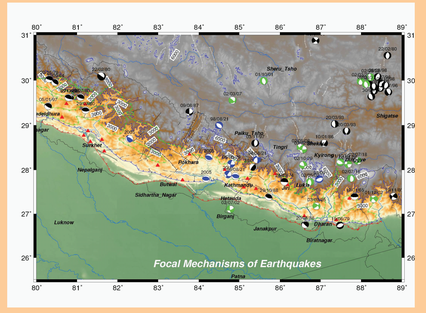


Horizontal displacement in West Nepal

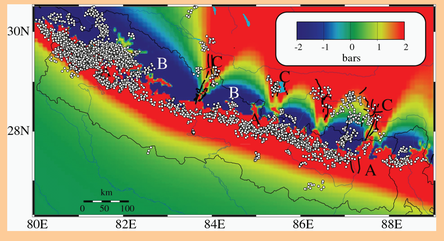


Displacements in Centre and East Nepal

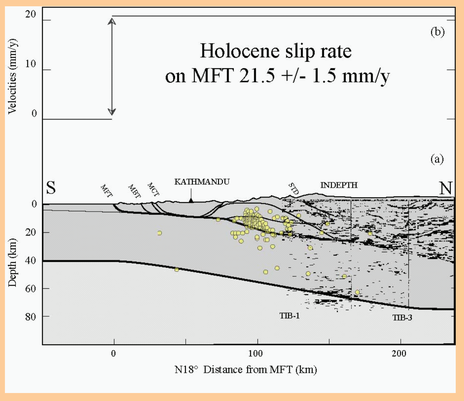
Relationship Between Seismicity and Deformation



Fault Plane Solutions. (Black: HARVARD; BLUE: NSC/Nepal, GREEN: CIRES/Colorado)



Coulomb stress variation across the Nepal Himalaya and the crustal seismicity. The coulomb stress decreases when elevation gets higher than ~3000 m



Schematic Geological Cross Section Across the Himalaya of Central Nepal. Notice the shallow seismicity coincides with a relatively steep ramp along the Main Himalayan Thrust, which is characterized by interseismic deformation as depicted by vertical and horizontal displacements from GPS survey. This region also coincides with steep gravity gradient across the same region.

The seismicity is attributed to the interseismic deformation in the crust due to strain build up driven by aseismic creep in depth.