Local Seismic Tomography of the Garhwal Himalaya, India

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We present 3-D seismic velocity and Poisson's ratio variations of the Garhwal Himalaya using local earthquake tomography. We used 890 local earthquakes from 41 temporary broadband seismic stations operated during April 2005 to May 2008. The station configuration included CMG-3T seismometer and REFTEK 130 data logger recording waveforms at 50 samples per sec in continuous mode. We observe 6-7 km thick zone of low- Vp, low-Vs and high Vp/Vs in the upper crust beneath Himalaya frontal trust (HFT) and attribute to sediments in the region. This low-Vp zone smoothly dips in the north and suddenly dips significantly beneath Main Central Trust (MCT). The dipining of this low-Vp can be expression of upper part of the down going Indian crust. P wave velocities in mid crust are generally low, while the corresponding S velocities are high. It appears that the cause of much of this complexity may be due to the change in velocity distribution in the upper 6 km to below 20 km depth. Therefore, 6 - 20 km depth zone may be viewed as a transitional layer containing contributions from structure above and below it.