1. Introduction

Between November 2002 and January 2003 a swarm of Mw 3 - 4 earthquakes occurred near the Nyainquentanglhe (NQTL) Detachment in southern Tibet. The swarm was preceded by an increase in cGPS velocity, which lasted from the beginning of 2001 to the end of 2002, is thought to be evidence of a slow slip event (SSE) on the NQTL detachment. If this event is an SSE, it would be the second extracratonic SSE ever observed. The goal of this project is to illuminate the nature of deformation along the NQTL by combining what is known about the surface and subsurface geology of the region with the source mechanisms of the earthquakes in the swarm, and the geometry of the fault (s) as delineated by the earthquakes in the swarm. If the source mechanisms, locations, and depths of the swarm events are consistent with the observed eastward cGPS velocity increase, it could be assumed that they were triggered by the SSE.

2. Method

Because the swarm events were too small to be detected teleseismically, their source mechanisms were determined using the Cut and Paste (CAP) inversion method. This method employs waveform model- ing techniques to produce the synthetic seismogram which best fits the data. Records from one station, LHA at Lhasa, were used to perform all the inversions because no other regional station data was available at the time of this study.

3. Results

The resulting focal mechanisms reveal that all earthquakes occurred at 3-16 km depth and their mechanisms were strike-slip, normal, or a combination of strike slip and normal with slip vectors oriented along the strike of the NQTL detachment.

4. Interpretation

The earthquakes, when initially projected onto the NW striking Yangbajain Valley Seismic Reflection profile of Cogan, 1998, appeared to cluster around a plane with a dip near that of the NQTL detachment (~30 degrees). Upon closer inspection with AnCuts 3D focal mechanism viewer, none of the 15 located earthquakes seem to be oriented along a plane striking NAD and dipping ~50 degrees. This could be an effect of errors in the determination of focal depth and/or depth errors incurred by projecting the earthquakes onto the plane.

5. Conclusion

The earthquake swarm observed along the Nyainquentanglhe Detachment in Southern Tibet was triggered by an SSE on the detachment. These events occurred on higher-angle faults within the hanging wall of the NQTL detachment. Further study of the earthquakes which occurred in the NQTL region in October 2008 will reveal more about the structure of and deformation in this region.

Bibliography