# Return of Kosi River induced by Tibet earthquake

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## Abstract

Seismotectonics and change in river courses were correlated. Following the elastic rebound theory before the occurrence of the earthquake the subsurface rocks accumulates the energy by the tectonic movement. The Kosi river barrage was brocken due to the tectonic forces accumulation in the south of Tibet Himalayas. Kosi river originates from Tibetan Himalayas and any disturbance in Tibet plateau has the potential to change the river course.

Introduction: A strong earthquake measuring 6.8 magnitude struck Tibet on Monday 25th August 2008. The China Earthquake Network Center (CENC) reported that a 6.8-magnitude earthquake shook Zhongba County, Xigaze which is situated in the western region of Tibet. It is reported that the quake occurred at a depth of 10 km (6.2 miles) in a sparsely populated area with an elevation of 5,500 meters.Seismological Bureau of Tibet Autonomous Region reported that the quake was felt in Zhongba, Cuoqin, and Gaize County, with the strongest felt in Cuoqin. The alignment of the faults in Tibet platue has connection with the Kosi river.Kosi River, is a transboundary river between Nepal and India and is one of the largest tributaries of the Ganga. Kosi river originates in Tibetan Himalayas at a height of 18,000 feet and drains a catchment of 22988 sq. miles in mountainous terrain with a length of only 450 miles. The river along with its tributaries, drains a total area of 69,300 sqkm up to its confluence with the Ganga in India (29,400sqkm in Tibet, 30,700 km² in Nepal and 9,200 sqkm in India), a part of Tibet (China) including the Mount_Everest region as well as the eastern one third of Nepal.The river basin is surrounded by the ridges separating it from the Brahmaputrain the north, the Gandaki in the west, Mahananda in the east and by the Ganga in the south.

Mechanism: In geology, the elastic rebound theory was the first theory to satisfactorily explain earthquakes. It has been hypothetically established that before the occurrence of tectonic earthquake the strata gets uplifted in one part and goes down in other portion. This is popularly known as “elastic rebound theory”(Figure.1). The elastic rebound theory is an explanation for how energy is spread during earthquakes. As plates shift on opposite sides of a fault are subjected to force, they accumulate energy and slowly deform until their internal strength is exceeded. At that time, a sudden movement occurs along the fault, releasing the accumulated energy, and the rocks snap back to their original undeformed shape[1]. Tectonic uplift is a geological process most often caused by plate tectonics which increases elevation. The opposite of uplift is subsidence, which results in a decrease in elevation. Uplift may be orogenic or isostatic.

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Orogenic uplift is the result of tectonic plate collisions and results in mountain ranges or a more modest uplift over a large region. The Himalaya were (and are still being) formed by the collision of two continental plates, the Indian and Eurasian Plates. This ongoing collision produced the Tibetan Plateau as well as the Himalaya and associated ranges.

The change of the Kosi river and occurrence of earthquake in Tibet platue were syngenetic. A Quaternary fault system has been identified in the region which is an echelon pattern of surface faults associated with hidden fault (Figure.2). These faults were inferred as lineament Satellite images of this terrain support the presence of various geomorphic which have their origin in both the lateral and vertical movement of fault-bounded slices, as well as in the persistent strike-slip. The movement of these strata has influenced the Kosi river to shift from its course[2].

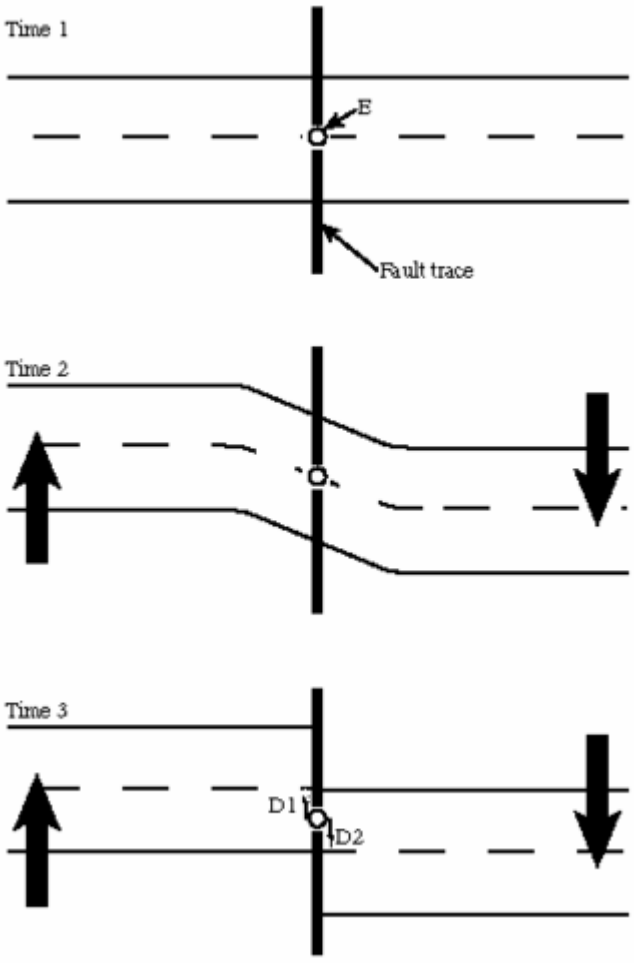


**Figure.1. Fault trace showing the possibility of elastic rebound in Tibet platue. Time 1 shows the position of land mass covering Kosi river 200 tears before the occurrence of the earthquake in Tibet region. Time 2 shows the development of stress in Kosi region in last 200 years which has shifted the river towards easter region due to the displacement of tectonic plates below the surface of the river basin.**

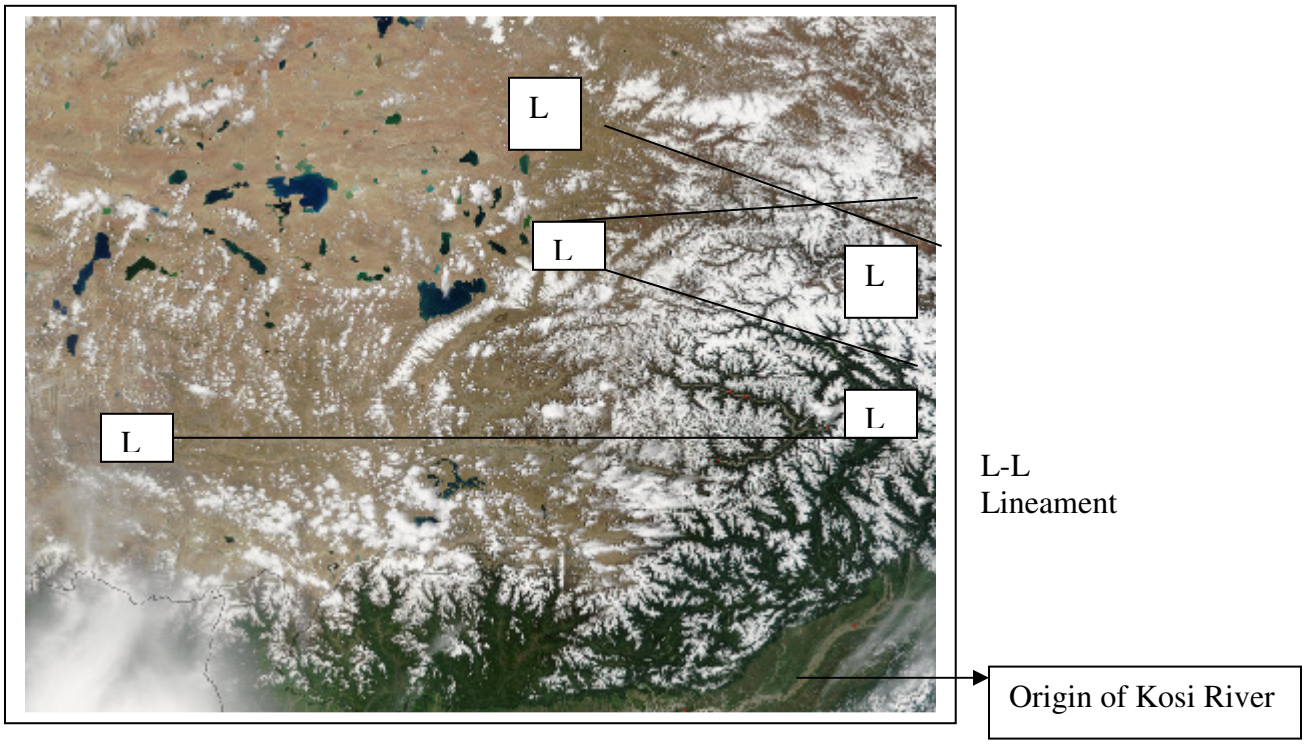


**Figure.2. Tibet Plateau showing Tectonic lineament and its relation with Kosi River**

**Result**

In this paper it is reported that the Kosi flood was initiated by the tectonic activity of Himalayas. Other Indian rivers in Indogangetic plain should be studied by using satellite data. The palaeochannel of Ganga, Yamuna rivers has to be studied along with the development of quarternary lineament in the upstream of these rivers. These studies may be useful to develop an early warning in these river courses where the Indian civilization has developed.

**References:**

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