Paleohydrology of the lost Vedic Sarasvati River during the Indus Civilization

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Abstract

Sarasvati is the most important river goddess in the Rig Veda, the oldest writings in the ancient India on hymns and legends composed during 1500 ～ 1000 BC. 'Saras' indicates water, 'vat' means rich in something(stream), and 'i' is a suffix for female nouns. The Sarasvati River was the most sacred river and goddess during the Harappan period (Indus Civilization) in the Punjab plain. Punjab means five waters(rivers) in Persian. According to the Rig Veda and the Mahabharata, a long magnificent Hindu epic composed during 200 BC ～ 400 AD, the Sarasvati River was ① a big river comparable to the Ganga and the Yamuna, ② one of five rivers in the Punjab plain, ③ a river different from the Satluj River, and ④ it flowed out from the Himalaya and reached to the sea.

The Sarasvati River flowing westward had disappeared in a period before the east−ward advance of the Aryans, who invaded into the Punjab plain from west and destroyed the native Dravidian. It have been told that the lost Sarasvati River had became an underground river and merges with the Ganga and the Yamuna at Arahabhad. Arahabhad have been an important place of pilgrimage and worshipped as 'triveni', the place where three rivers join.

Figure 1 is the chronological horizon of the main Indus cities dated by carbon 14 and relative dates. The Indus Civilization rose at Mohenjo−Daro in ca.2500 BC, then it spreaded eastward to the Punjab plain and southward to the coastal flatland within 300 years. A fact worth special mention in Fig.1 is the simultaneous fall of nuclear cities and Kalibangan in ca.1700 BC. The wet climate during the hypsithermal interval after the post −glacial warming had changed to a dry climate in the Indus valley in ca.1700 BC as shown in Fig.2 indicating estimated variations of the rainfall of Rajastan. It may be said that the Arians invaded into the Punjab plain in ca.1500BC, which was almost 200 years

after the fall of these cities.

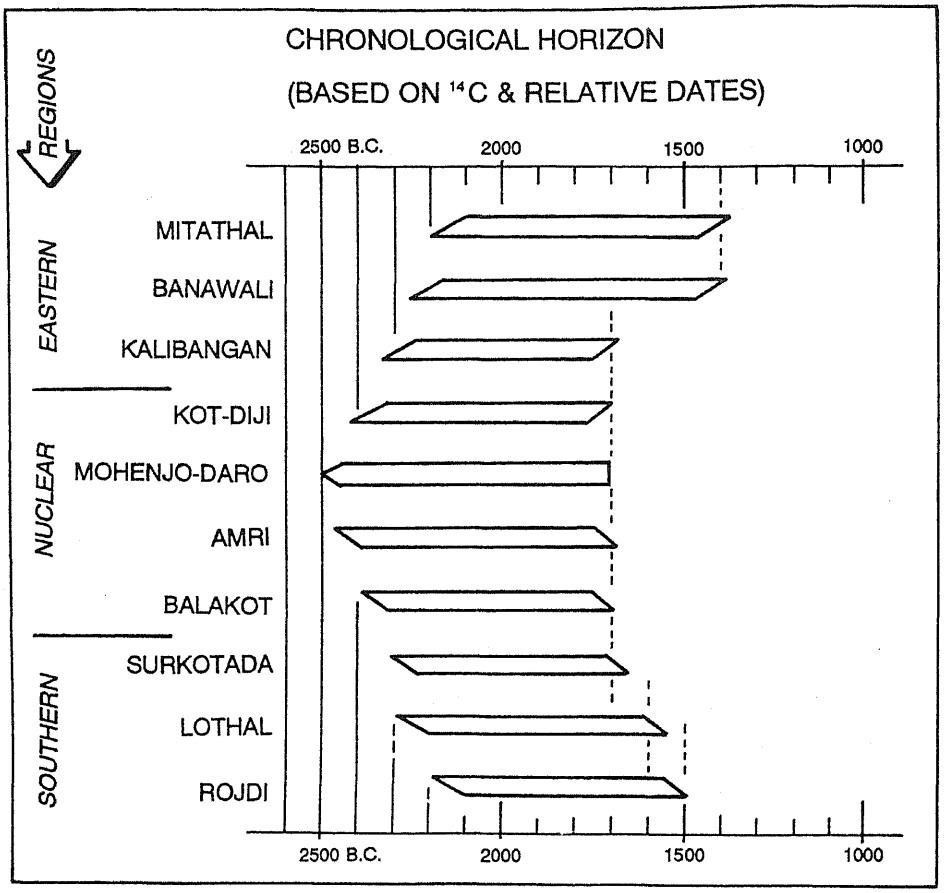

Fig.1 Chronological horizon of Indus cities(Khanna,1992)

Figure 3 shows present river systems in the Punjab plain and the Himalaya regions. Five rivers in the Punjab deciphered from the Rig Veda by the author are the Sarasvati, the Jelum, the Chenab, the Ravi and the Satluj. The author made a field work in the Punjab plain in 1997 to investigate the ancient river course of the lost Sarasvati River, which flowed out from the Himalaya and could reach to the sea. Present Saraswati River is a small tributary of the Ghagghar River(Fig.4) flowing out from the foreland hills of the Himalaya. It dries up near Sirsa though its river bed continues to the dry huge bed of the lost Sarasvati River. The Ghagghar River could not supply enough river water possible to reach the sea even under much wetter climatic condition.

Figure 4 shows the reconstructed ancient river course of the Sarasvati River based on available literatures and maps. Hakara, wahinda and nara in Fig.4 are the dried old river channels existing in the desert. Exact location of these old river channels are

examined and confirmed on the scale of 1 to 200,000 topographical maps of India and Pakistan made in the former USSR. The Paleo–Sarasvati River shown by broken lines in Fig.4 had changed its course at near Rupnagar located at the foot of the foreland hills in ca.1700 BC. As a result, the Paleo–Sarasvati River had dried up resulted in collapse of Kalibangan and many other Indus cities along the Paleo–Sarasvati River in the Cholistan desert.

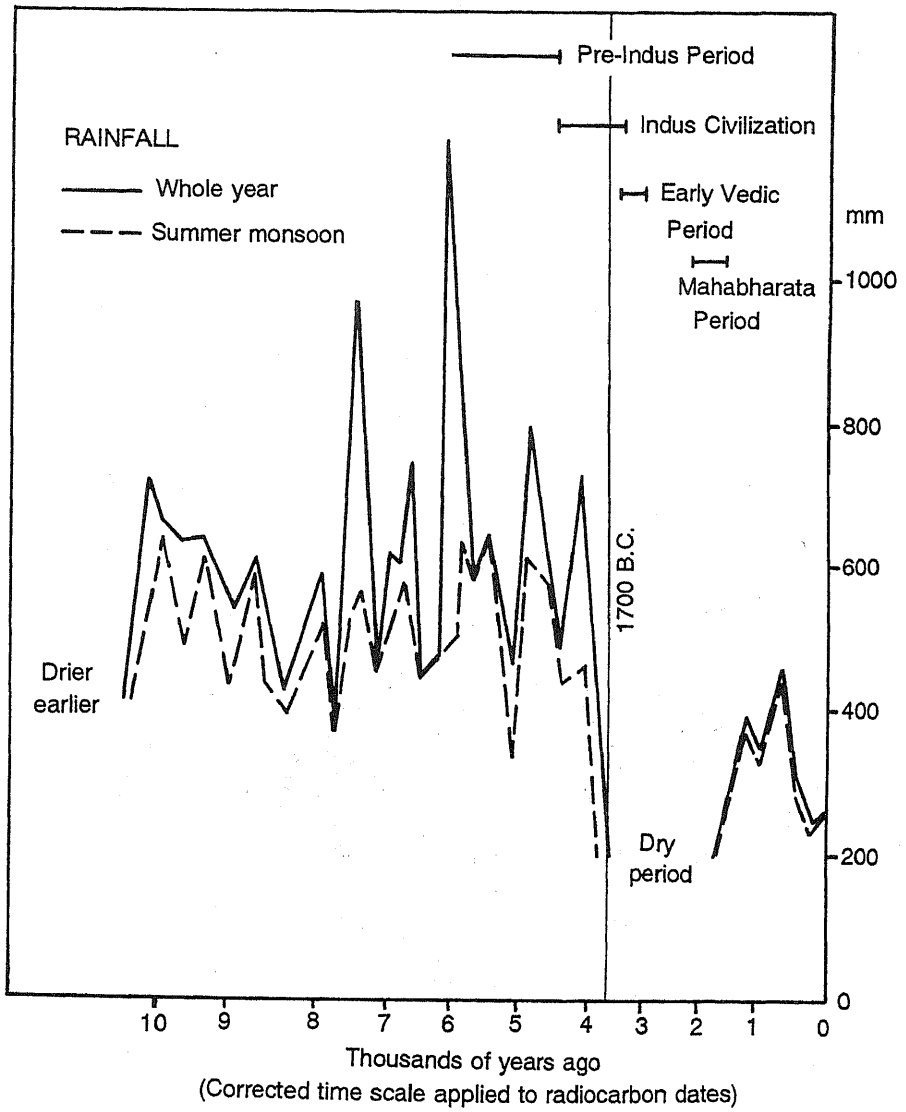

Fig.2 Estimated variations of the rainfall in Rajastan(Lamb,1982)

During the Indus Civilization the Beas River was the main river of the Satluj River. The discharge of the Satluj River had suddenly increased after joining of the Paleo–Sarasvati River in ca.1700 BC when its river course had changed to the present course of the Satluj River. The sudden increase in the discharge at Mohenjo–Daro after joining of

the Paleo–Sarasvati River to the Indus river basin in ca.1700 BC might cause to increase flood frequency of the Indus River, which then might cause to destroy the water supply system of Mohenjo–Daro. On the other hand it is presumed that the Harappans had abandoned their city due to drought. The Ravi River should bave been more sensitive to drying of climate comparing to other four rivers in the Punjab plain because it has larger percentage of flat land and smaller percentage of mountain area.

The author would like to stress the importance of changes in palephydrological conditions as an intermediate factor relating the climate change with the collapse of the Indus Civilization.

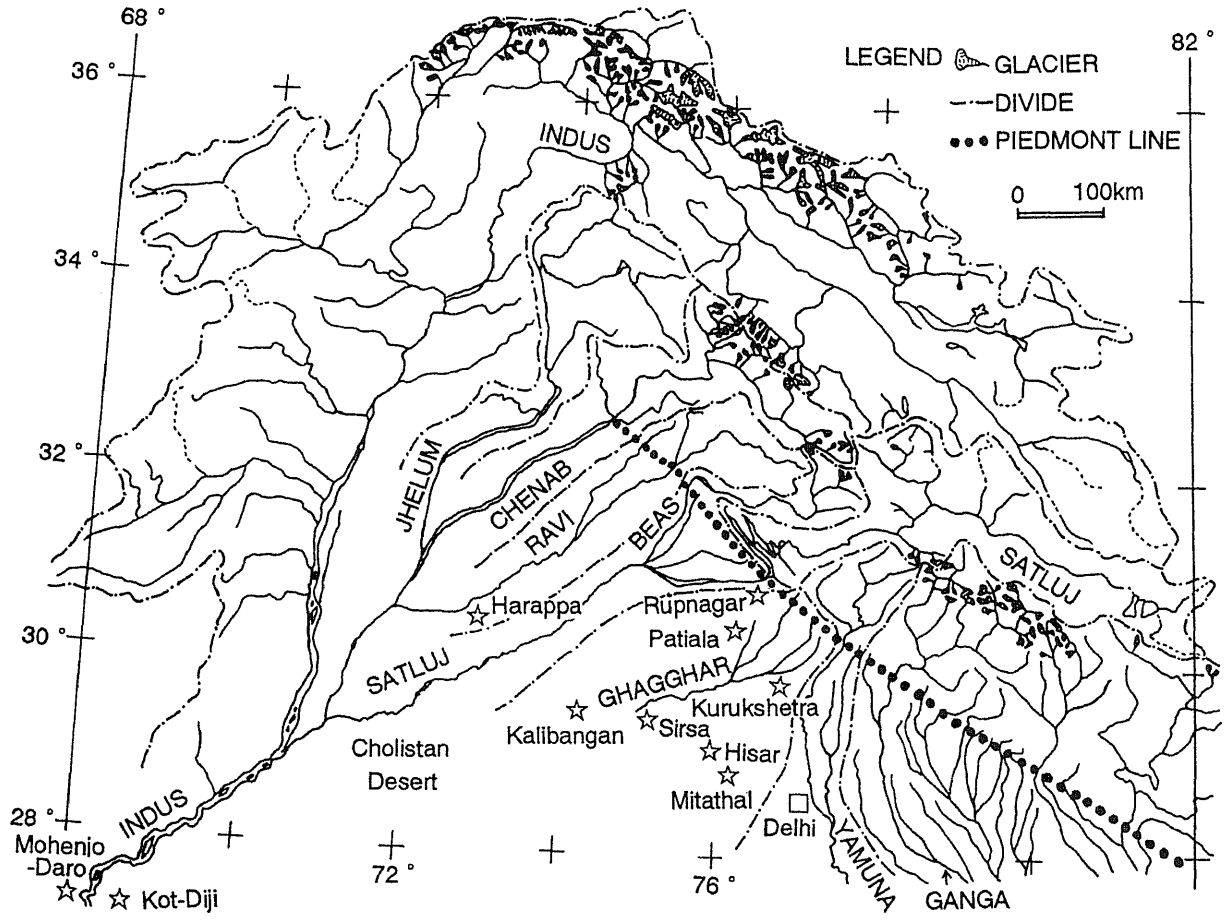

Fig.3 Present river system in the Punjab plain and Himalaya regions

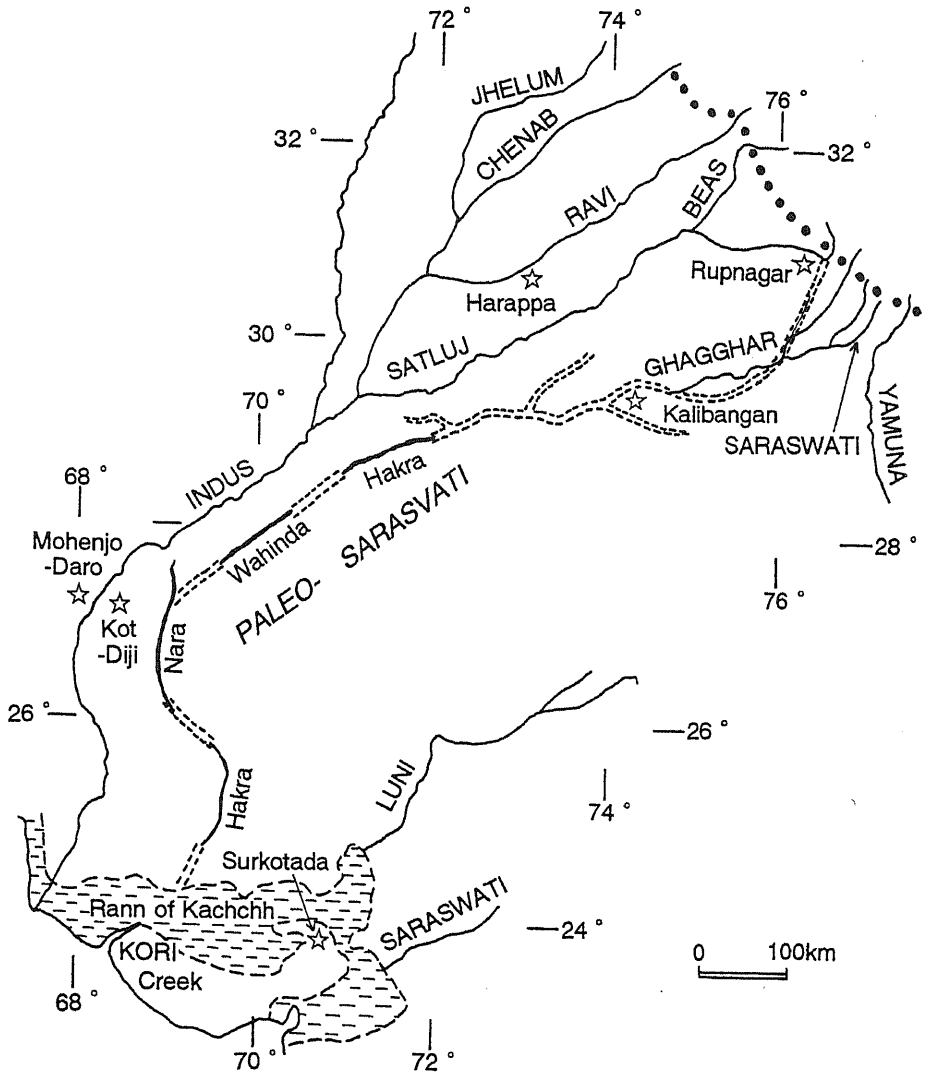

Fig.4 Reconstructed river course of the Paleo–Sarasvati River during the Indus Civilization

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