

# EVIDENCE OF RIVER SARASWATI'S EXISTENCE FOUND?

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Ancient settlement: Nearly two-thirds of the 1,500 archaeological sites related to the Harappans occur on the dried up banks of the present-day Ghaggar river. | Photo Credit: [V V KRISHNAN](#)

The Indus valley civilisation which flourished in present day northwestern India and adjacent Pakistan was the largest and oldest urban civilisation in the world. Nearly two-thirds of the 1,500 archaeological sites of the Harappans occur on the dried up banks of the Ghaggar river. Today, the Ghaggar is a seasonal, monsoon-fed river originating in the sub-Himalayas. The question arises about the role played by the Paleo Ghaggar, ancient counterpart of this river, in the lives of the Harappans. Did the Harappans live on the banks of a perennial river, mighty and fed by the glacial rivers arising in the Higher Himalaya, or was Paleo Ghaggar also a monsoon-fed and seasonal river that rose in the sub-Himalaya?

These questions are tied to another. The Rig veda mentions a mighty, snow-fed river Saraswati on whose banks the literature was supposed to be derived. Was this then a description of the Paleo Ghaggar, making it the mythological Saraswati River itself? These questions are sought to be answered in a paper published in *Scientific Reports*.

Researchers from Physical Research Laboratory (PRL), Ahmedabad, and Indian Institute of Technology Bombay, have analysed sand from 3-10 metres below surface of modern Ghaggar and found that it was indeed a perennial river, fed by glacial rivers in the past.

“Coarse-grained white or grey sands that contain abundant white mica are typical of glacier-fed Higher Himalayan rivers such as the Ganga, Yamuna and Sutlej... We found such sand layers 3-10 metres below the surface on both sides of the modern Ghaggar in a stretch of 300 kilometres up to the Pakistan border,” explains Jyotiranjana S. Ray of PRL. “Presence of this sand itself is an indication of existence of a powerful river in the past.”

The team identified the source of these sands by studying the strontium-neodymium isotopic ratios. They also measured the ages of the mica samples in the sand by argon-argon dating method. “We found that the isotopic ratios and Ar-Ar ages overlap with those of the rocks of the Higher Himalaya, thus we establish that these sands have been transported by the river from Higher Himalaya to the plains,” says Dr Ray.

Further, the team established the depositional ages of the samples by radiocarbon dating and optical dating of mollusk shells found in the deposit. The researchers thus established that the ancient Ghaggar transported sands from glaciated regions of the Higher Himalaya. “Any river that originates from such region remains active round the year – doesn’t depend on the monsoonal rains only,” explains Dr Ray.

The key result of the paper is that the river Ghaggar had two distinct perennial phases: one during 80,000-20,000 years ago and the other during 9,000-4,500 years ago.

“The paper contains excellent isotopic geochemical data on the sediments of the river Ghaggar. On the basis of their data the authors show that the Sutlej River was flowing into the Ghaggar River to make it perennial for the Early Harappans,” says Jayant Kumar Tripathi of School of Environmental Sciences, Jawaharlal Nehru University, Delhi, who is an expert in the field. In a

2004 paper in *Current Science*, he has studied the later phase of the river Ghaggar. “However, what made mature Harappans to stay back on the Paleo Ghaggar, remains unanswered in their paper,” Prof. Tripathi adds commenting on the recent work.

The authors write in the paper that the revived perennial condition of the Ghaggar, between 9,000 and 4,500 years ago can be correlated with the Rig vedic Saraswati, and that it “likely facilitated development of the early Harappan settlements along its banks”.

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