



Geomorphological examination on the drastic change in river system of Ghaggar River during mature Harappan period, northern India

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Huge urban civilization, such as Mohenjo-daro and Harappa, which flourished in the Indus Valley between 2500 -1900 BCE, were abandoned during the following post-urban Harappan period. Many reasons for the declination of Harappan culture have been estimated since 19th century, for example invasion of hostile ethnic groups, huge earthquake, devastative flooding, climate change etc. "The Lost Saraswati" hypothesis would be one of the major estimations for the declination. The mighty Saraswati river described in 'Rig veda' as a powerful goddess of large river, is believed to have disappeared after glorious period of Harappan culture. One of the leading candidates for present remnant of lost Saraswati river is Ghaggar-Hakra river that originates in the Lower and Sub Himalayas of northern India. It flows westerly in the Punjab plain and disappears into Cholistan desert as a dried river bed. It is now quite seasonal river which has shallow and wide river bed. Naruse(1974) and Yashpal et al.(1980) said the Ghaggar river had used to connect with glacial area in the Higher Himalayas through the Sutlej or Yamuna river channels, however been disconnected by piracy due to crustal uplift or rejuvenation of adjacent river. We have tried to examine the hypothesis from the view point of chronology of flood plains and sand dunes distributed along the Ghaggar river. First we compared the width of present flood plain of large rivers originated in glacial area such as Indus, Jherum, Sutlej or Beas river with that of the Ghaggar river, and got to know that the width of flood plain became wider in proportion to the volume of average annual discharge. It means that present size of flood plain of the Ghaggar river must be formed by present volume of average annual discharge. Next we measured the oldest age of sand dunes limiting the both sides of present flood plain by using OSL dating method. Finally we resulted that the Ghaggar river was not the mighty Saraswati, that is to say, did not connect to glacial area during mature Harappan period because sand dunes on either side of the Ghaggar river had been formed before that. We can say that there would be two answers concerning the "Lost Saraswati" hypothesis, i.e. 1) did not occur during mature Harappan period, or 2) must have been slow and slight change.