

Sub-Surface Water Oozing at Kalayat Village, Jind District, Haryana in December, 2005: Possible Connection with Saraswati Palaeochannel

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Abstract: Sudden spurt of sub-surface water oozing at Kalayat village in Jind district of Haryana has been reported in December, 2005. Oozing water has high temperature, high fluoride content but low in TDS, nitrate and total hardness indicative of palaeochannel source. This incidence coupled with the occurrence of a major earthquake in the Hindukush region on 13th December, 2005 indicate source of the oozing water at Kalayat could possibly be from a palaeochannel of lost Saraswati.

Keywords: Groundwater, Palaeochannel, Kalayat, Saraswati, Haryana.

INTRODUCTION

The Vedic Saraswati, a mighty river of northwest India, is believed to have flown from Har-ki-dum glacier of Garhwal Himalaya to Gulf of Khambhat in Gujarat coast during 6000-3000 B.C. (Bharadwaj, 1999; Radhakrishna, 1999). Different workers have suggested a number of

palaeochannels of River Saraswati. Several remnants of this river exist as palaeo/abandoned channels.

During the renovation/excavation of Kapil Muni Sarovar (Longitude 76°15'16.53" and Latitude 29°40'18.86") at Kalayat village, Jind district, Haryana (Fig.1), sudden spurt of water oozing from tank bed was reported on

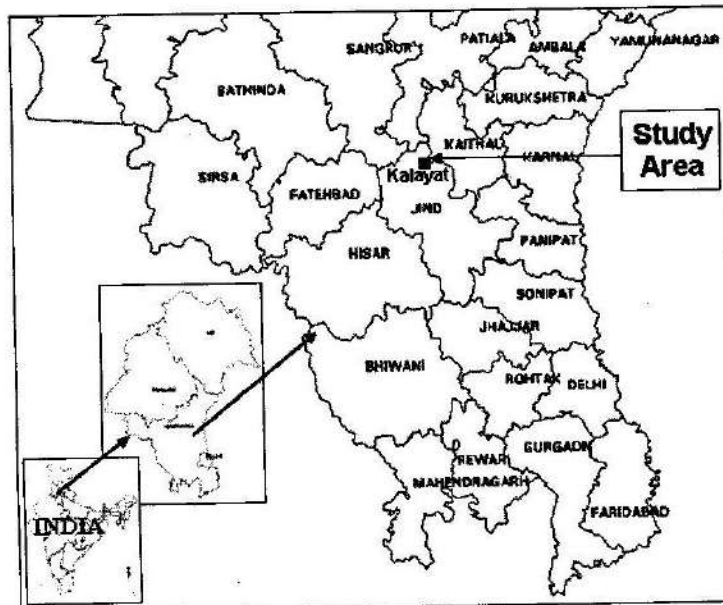


Fig.1. Location map of the study area and the water oozing site at Kalayat village, Jind District, Haryana.

4th December, 2005. According to eyewitnesses, water was emerging at a high pressure with water jet up to 0.5 meters high. The water jet pressure slowly died. Water started oozing after December 13, 2005 earthquake in the Hindukush area also affected Delhi and surrounding region.

Water samples were collected for water quality analysis

and temperature measurements. Results of the chemical analysis of water samples, collected from oozing water site are presented along with other scientific data.

Observations

Palaeochannel Mapping: Satellite images (IRS P6 LISS-III) of 2004 show the existence of distinct palaeochannels



Fig.2. Field photographs showing the incidences of sub-surface water oozing at Kapil Muni Ashram Sarovar at Kalayat village. (a) Location of two adjacent ponds and collected water sample locations (W_1 , W_2 and W_3 with star marks) from Pond-I and Pond-II. (b) Water oozing site (red dots) in Pond-II only. (c) and (d) Main water oozing site and gaseous bubbles (black circles) on 18.12.2005. (e) Continuous emergence of gaseous bubbles and oozing water on 28.1.2006. (f) Temperature measured on 18.12.2005 at the oozing site.

Table 1. Chemical analysis of water samples from Kapil Muni Saraovar, Kalayat Village, District Jind, Haryana (Water samples collected on 18.12.2005)

Water Sample	Temp (°C)	EC	TDS (mg/l)	pH	Na (mg/l)	K (mg/l)	Ca (mg/l)	Mg (mg/l)	Cl (mg/l)	SO ₄ (mg/l)	HCO ₃ (mg/l)	NO ₃ (mg/l)	F (mg/l)	Total Hardness	Na%	SAR	Remarks
W ₁ : Water from Pond-I	21	5000	3363	8.10	299	98	525	139	652	759	549	616	0.20	1880	24.48	3.00	Lower Temp., Higher TDS, K, NO ₃ and Low F indicate contaminated sewerage (polluted) water
W ₂ : Oozing water from Pond-II	26	4000	2552	7.80	205	94	385	126	425	644	500	423	0.88	1480	21.76	2.31	Higher Temp., Lower TDS, K, NO ₃ and High F indicate fresh groundwater source
W ₃ : Water from Pond-II	21	4500	2914	7.90	265	98	409	151	603	552	488	593	0.72	1640	24.57	2.84	Lower Temp., Higher TDS, K, NO ₃ and Lower F (compared to W ₂) indicate mixing of pond water with oozing water

of considerable dimension in this area. Kalayat village and the place of water oozing fall on one of the palaeochannels. The site is also very close to the main palaeochannel passing through the Kaithal town.

There are two adjacent ponds of nearly equal dimension (Fig.2a) near Kapil Muni Ashram. The western pond (Pond-I) is filled with stagnant, dirty water. But the eastern pond (Pond-II, Kapil Muni Saraovar) has clean water with gaseous bubbles oozing out at 3-4 sites (Figs.2c and d). The same place was revisited after a month (28.1.2006) and found that water was continuously oozing with low pressure (Fig.2e).

Temperature and water Quality Analysis: The temperature of stagnated water was found to be 21°C while the temperature of the oozing water was 26°C.

Water samples were collected from three places: (a) Stagnated water sample (W₁) from Pond-I on the west of Kapil Muni Saraovar, (b) Oozing water sample (W₂) from Pond-II and (c) Turbid water sample (W₃) from Pond-II few meters away from the oozing site (Figs.2a and b) were analysed and details are furnished in Table 1. Comparison of analytical results indicate that (a) Water (W₁) in Pond-I is polluted and contaminated and (b) Oozing water (W₂) from the eastern pond (Pond-II) is cleaner. It shows exceptionally high content of F. Higher values of F in

oozing water are indicative of deep groundwater conditions.

Aquifer Material of the Palaeochannel: The lithological data of key wells were collected for the Kaithal district from Ground Water Cell, Govt. of Haryana. A large number wells at Padla, Kaithal, Barot and Pabnawa villages are falling on the palaeochannels. Litholog data of these wells show riverine coarse sand/gravel.

Oozing water also carries sub-surface sediments, which are different from that of the adjacent soil/sediment in the pond water. Textural and heavy mineral analysis of the sub-surface and surface sediments shows distinct sedimentological variation. Oozing sediments contain sub-angular fragments of quartz, mica and heavy minerals like topaz, corundum, tourmaline etc. which has an affinity with basement rocks of Higher Himalaya (Analytical results of Dr. A. R. Choudhury, Geology Department, Kurukshetra University – Personal Comm.), while the surface sediments are well sorted, sub-rounded and devoid of heavy minerals.

Possible Tectonic Affinity: The sudden spurt of water in the area might be the effect of earthquakes. Rigorous shaking of saturated soil by tectonic disturbance could result in oozing of water. Such phenomena have earlier been reported in the Kachchh region during Bhuj earthquake of 26th January, 2001.

References

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(Received: 11 May 2006; Revised form accepted: 17 May 2006)