5 – P187

Session 5 – Poster – young researcher

^{18}O, ^{2}H AND ^{13}C ISOTOPIC COMPOSITIONS OF WATER IN TOROGH AND KARDEH DAMS, MASHHAD (NE IRAN)

Hossein MOHAMMADZADEH (1, 2)

(1) Department of Geology, Ferdowsi University of Mashhad, Mashhad, Iran
(2) Department of Earth Sciences, University of Ottawa, Ottawa, Canada
(mohammadzadeh@alumni.uottawa.ca)

Mashhad, the second biggest city in Iran with populations of more than 2.5 million, depends on both surface water and groundwater resources. There are two large dams around Mashhad, so called Torogh and Kardeh, which are supplying irrigation and potable water for the city. The recharge area of the Kardeh dam is higher than that of the Torogh dam which resulted in slightly negative isotopic values of $\delta^{18}O$ and $\delta^{2}H$ (-8.3 ‰, -55.4 ‰ and -7.6 ‰, -52.2 ‰ for Kardeh and Torogh dams, respectively). In both dams, the $\delta^{18}O$ and $\delta^{2}H$ isotopic compositions within the lake water are more enriched relative to the recharge spring water which can be attributed to evaporation. For example in Torogh dam, the values of $\delta^{18}O$ and $\delta^{2}H$ are -6.8 ‰ and -43.7 ‰, respectively, in lake water, whereas in upstream river they are -7.5 ‰ and -48.2 ‰, respectively. The oxygen and hydrogen isotopic compositions of the latter are similar to those in recharge spring water ($\delta^{18}O$ = -7.6 ‰, $\delta^{2}H$ = -52.2 ‰). The dissolved inorganic content (DIC) concentration in recharge area of the Kardeh (38.6 to 42.7 mg/l) is slightly higher than that of Torogh (35.5 to 42.4 mg/l). This is due to the existence of karstic outcrop in catchment area of the Kardeh dam which can be confirmed by slightly enriched $\delta^{13}C$ isotope of DIC (-9.5 ‰ and -10.8 ‰ for Kardeh and Torogh, respectively). Although DIC concentration within the Kardeh lake is high (30.3 and 42.7 mg/l for Torogh and Kardeh, respectively) and $\delta^{13}C_{DIC}$ values are more enriched, there is not much difference in $\delta^{13}C_{DIC}$ values for Torogh and Kardeh (-8.0 ‰ and -8.5 ‰, respectively). This could be due to enriched CO_2 generation through DOC degradation within the lake water (-29.5 ‰ and -28.0 ‰ for DOC of Torogh and Kardeh, respectively).