The Salda Lake wetland basin is located in the southwestern part of Turkey and an important water reservoir. For this reason, it is important to know the origin and recharge process of groundwater and lake water. In this paper, we focus on the Salda Lake wetland in order to assess the capability of water stable isotope analysis ($\delta^2$D, $\delta^3$H and $\delta^{18}$O) and to the understanding on recharge process of the aquifer system and lake water. For this, water samples were collected for dry (November-2015) and wet (June 2015) periods and the stable isotope ($\delta^2$D, $\delta^3$H and $\delta^{18}$O) and radiogenic isotope (14C) analysis were made in the basin. The $\delta^{18}$O contents of groundwater and lake water are from -9.94 to 1.18 ‰ in dry period and from -10.24 to 0.30 ‰ in wet period, and $\delta^2$D contents of groundwater and lake water are from -67.42 to 1.20 ‰ in dry period and from -64.51 to -2.80 ‰ in wet period. The stable isotope data of samples lie generally above and under the Global Meteoric Water Line (GMWL) and also under the Lakes District Meteoric Water Line (LDMWL) indicate its meteoric origin. As a rule, if the elevation increases, more negative values arise due to isotopic dilution. Groundwater is recharged from high elevations in the basin. Lake water is recharged from low elevations. The tritium ($\delta^3$H) content of the water samples ranges from 1.04 to 4.49 TU in the dry period and from 1.91 to 4.18 TU in the wet period. The $\delta^3$H values of waters could be represented that this waters recharged shallow and medium circulating waters with mixing and transitional water characteristics. Also in this study carried out age determination by radiogenic isotope (14C) analysis. The 14C values varied between 90-110 year for Salda Lake waters and 530-5990 year for groundwater. According to the 14C values Salda Lake waters are quite young water. The groundwaters represent the older waters in the basin. Acknowledgements This study have been supported by The Scientific and Technological Research Council of Turkey (TUBITAK) with project No: 114Y084.