



Estimation of evapotranspiration rate in irrigated lands using stable isotopes

Gulomjon Umirzakov (1,2), David Windhorst (2), Irina Forkutsa (1,2), Lutz Brauer (1), Hans-Georg Frede (1,2)
(1) Justus-Liebig Universität Giessen, Center for international Development and Environmental Research, Giessen, Germany
(gulomjon.umirzakov@agrar.uni-giessen.de, 0641 9937384), (2) Justus-Liebig Universität Giessen. Institute Landshaft
ecology and Resoerces managment. Giessen, Germany

Agriculture in the Aral Sea basin is the main consumer of water resources and due to the current agricultural management practices inefficient water usage causes huge losses of freshwater resources. There is huge potential to save water resources in order to reach a more efficient water use in irrigated areas. Therefore, research is required to reveal the mechanisms of hydrological fluxes in irrigated areas. This paper focuses on estimation of evapotranspiration which is one of the crucial components in the water balance of irrigated lands. Our main objective is to estimate the rate of evapotranspiration on irrigated lands and partitioning of evaporation into transpiration using stable isotopes measurements. Experiments has done in 2 different soil types (sandy and sandy loam) irrigated areas in Ferghana Valley (Uzbekistan). Soil samples were collected during the vegetation period. The soil water from these samples was extracted via a cryogenic extraction method and analyzed for the isotopic ratio of the water isotopes (2H and 18O) based on a laser spectroscopy method (DLT 100, Los Gatos USA). Evapotranspiration rates were estimated with Isotope Mass Balance method. The results of evapotranspiration obtained using isotope mass balance method is compared with the results of Catchment Modeling Framework -1D model results which has done in the same area and the same time.