154 – INVESTIGATING RECHARGE AND DISCHARGE OF YOUNG GROUNDWATER BASED ON MULTI-TRACERS APPROACH: A CASE STUDY OF SEBOU BASIN – MOROCCO

Hamid Marah[1] – Fatima Raibi[1] – Fouad Taous[1] – Redouan Saadi[1]

[1]Water and Climate Unit – CNESTEN, BP 1382 Rabat Morocco;
e-mail: marah@cnesten.org.ma

Tritium-helium and stables isotopes has been used to date young ground water (1–50 years old) and to determine the relations between surface water and groundwater of the Sebou basin. The comparison between the results of T/He investigations and classical hydrological methods shows a good agreement. The exponential correlation between depth and T/3He age and/or the age and flow path showed the potential of using T/He for the estimation of the recharge rate and GW velocity, those results will help to develop an improved version of the hydrologic flow model, which can be used for management purposes. The T/He approach is very applicable to determine groundwater flow path and recharge rate and he has advantages in that they do not require special field instrumentation and can be used to provide estimates of groundwater age, transit time and/or horizontal and vertical groundwater velocity that are difficult to be derived with other methods.

155 – THE GEOCHEMISTRY AND ISOTOPEIC COMPOSITION OF THE AYUB-PEIGHAMBAR HOT SPRING, BOJNURD, NE OF IRAN

Hossein Mohammadzadeh – Ali Keivan Zeraatkar

Groundwater Research Center (GRC), Faculty of Science, Ferdowsi University of Mashhad,
P.O. Box: 91775-1436, Iran;
e-mails: mohammadzadeh@um.ac.ir; mohammadzadeh@alumni.uottawa.ca

Ayub-Peighambar hot spring is located about 95 km northeast of Bojnurd city, NE of Iran The field observation, field measurements of T, pH, Eh, EC (38.4ºC, 7.5, 418 mv, and 935 µmohs/cm, respectively), and the measured laboratory geochemical data, indicates that the type of water is calcium-sulphate. Base on saturation index of gypsum (SIgypsum = –0.25 < 0) and calcite (SIcalcite = 0.75 > 0), the calcium-sulphate composition of water is due to existence of karstic aquifer in core of Asiazow anticline and also the dissolution of halite and sulphate minerals such as gypsum available in shale and marl formations. This can be confirmed by H2S out gassing from spring and high concentration of $SO4^{=}$ and dissolved inorganic carbon (DIC) in springs water (248 and 91 mg/l, respectively) and the fairly enriched ^{13}C value of DIC in springs water (–1.3‰ VPDB). The high temperature of water in Ayub-Peighambar hot spring is probably is due to geothermal gradient and also chemical reactions that happen at the flow path in Ayub fault zone. The aim of this paper is investigation on the origin and

the source of thermal energy of Ayub-Peighambar hot spring using geochemistry and isotopic composition approach.

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156 – USE OF RADIOACTIVE FALLOUT CESIUM-137 AND GEOCHEMICAL ELEMENTS TO TRACE SEDIMENT SOURCE IN A SUB-CATCHMENT SCALE

Hossein Asadi[1] *– Elham Alidoost*[2]

[1]Department of Soil Science, University of Guilan, Rasht-Tehran Highway- km 5, Rasht 41889-58643, Iran; e-mail: asadi@guilan.ac.ir
[2]Department of Soil Science, College of Agriculture, Isfahan University of Technology, Isfahan 84156-83111, Iran; e-mail: e.alidoust@ag.iut.ac.ir

Soil erosion and sediment-related environmental problems pose a serious threat to land management sustainability and water resources utilization in many countries. Traditional methods used to study soil erosion are time consuming and the results obtained for an experimental plot are usually incomparable with one another (Poreba, 2006). The use of radionuclides to measure soil erosion overcomes some of the limitations of the traditional methods. The fallout radionuclide cesium-137 ((137)Cs) has been successfully used in soil erosion studies worldwide (Li et al., 2009). Caesium-137 measurements can be used as a basis for studying both the spatial variability of soil loss and its magnitude. This method can be used also for identifying sediment sources (Walling and Quine, 1991; Wallbrink et al., 1999). The fallout radionuclides (FRNs) (137)Cs, (210)Pb(ex) and (7)Be are increasingly used as a means of obtaining quantitative information on soil erosion and sediment redistribution rates within agricultural landscapes (Mabit et al., 2008). They have been also used for assessing the effectiveness of soil conservation measures for sustainable watershed management and crop production (Dercon et al., 2012).

The determination of relative contributions of potential sediment sources is an important step in the development of management strategies to combat soil erosion. In this case also, because of many problems associated with traditional procedures for identifying sediment sources, fingerprinting techniques, based on geochemical, radionuclides and organic properties of sediment and source materials, are increasingly being used as valuable and effective approach to assemble such information (Collins and Walling, 2002).