Assessment of water/rock interaction to safeguarding drinking water quality

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Water storage, transfer and deliver to end users for drinking and sanitary purposes have been a challenge over the years in IRAN. IWRM strategies were focused to ease the Scio-economical aspects of the water shortage that vulnerability of the resources and the Environmental flow simply was ignored. Geological characteristics of artificial lakes and their natural or manmade transfer routs, exclusively studied from geotechnical prospects. Water/Rock interaction of bed rocks or reservoir body was neglected.

Chamgardalan dam located in IYLAM province, which water/rock interaction made an odor and taste problem in reservoir water is the best example [1]. Reservoir rocks consist of interbeded coal layers highly rich in sulfur and iron changed the quality of the dam lake water over years. The costly remediation study is ongoing (2009 till now). Contamination changes the quality of the water as effective as intensive interaction of water with bed rocks. In small projects in local or regional scale considering such studies will be costly and developers may not include it in their action plans. National or international fundamental research should provide such information.

In the new approach a methodology established to consider the effect of geological formation on the quality of surface water in the basin scale. Faults, intrusives, salt domes & massive evaporation sediments, closed & operating mines, progressive alteration, and etc. were assessed. Defined guideline played a major role in IWRM study of Caspian and Uromieh lake basins in north of Iran which has been carried out in 2010 [2]. The result concluded in generating a 1:250000 scale geological map on potential effect of geological formations on surface water quality regarding the heavy metals & trace elements, salinity and sediment production. The integrated map will give a glimpse of possible potential which has to be assessed meticultly.

[1] Khajehzadeh (2011) '*Clean Water*' Work shop, Iran
[2] Chehrehnegar (2010) Iran water Resource management Conf. Proc.

The variation of magnetic susceptibility with grain size: Its implication on forensic studies

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Detectable quantities of magnetic and paramagnetic minerals are almost always found in soils, being the magnetic susceptibility the sum of all contributions from the forming minerals, and varying due to concentration and composition those minerals. The magnetic susceptibility (MS) measurements of soils at room temperature are non-destructive. Additionally, does not require sample preparation, and can be used as a simple and fast method which may be operable in small samples. So, MS is an excellent tool for studies of soils being used as trace evidence in forensic investigations.

During this study, twenty four soil samples were collected on two different coastal sites from North Portugal, Mindelo and Cabedelo. At each site twelve samples were collected with a plastic spade from the surface soil. The samples were subjected to dry sieving using a column of sieves, resulting in different size classes: >2mm; [2mm-1mm]; [1mm-0.5mm]; [0.5mm-0.25mm]; [0.25mm-0.125mm]; [0.125mm-0.063mm] and <0.063mm. The MS analyses were performed directly on 1g of each size fraction after homogenisation, applying an external magnetic field of 300 A/m to the sample, and a Kappabridge, model KLY-4S of Agico balance equipped with the Sumean software used. The MS was calculated in m^3/kg. It was observed that in all samples the MS increases from coarse to fine grain size. The coarser fractions >2mm and [2mm-1mm] generally show negative values of MS and this is generally followed by low positive values of MS that increase ten times on the next fine fraction. These data show that fine fractions are the mostly enhanced in terms of MS. Finally, higher reproducibility was observed on the lower size fractions.

We conclude that although the magnetic susceptibility analysis is suitable to be used in a forensic soil investigation, it is important to adopt the same protocol during the analysis.

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