Relationship between incidence of esophageal cancer in Maravehtapeh region (Northeast of Iran - Golestan province) and concentration of trace elements in sediments

NEDA SHARIFI SOLTANI[1] AND FARID MOORE[2]

[1]Department of Geoscience, Shiraz University, Shiraz-Iran (*correspondence: N.sharifi09@gmail.com)
[2]Department of Geoscience, Shiraz University, Shiraz-Iran (*correspondence: Moore@susc.ac.ir)

Esophageal cancer is one of the ten most common cancer and the eighth cause of death in the world. In Iran annually about 51,000 new cases of cancer occur. Most organs of men and women involved in is gastrointestinal tract which about 6500 cases are esophageal cancer. Since the distribution of Esophageal squamous cell cancer (esophageal cancer belt) matches loess deposits of the world which is extended from north of China to north east of Iran, Therefore , likely there is a close relationship between loess deposits and this endemic disease.

Sediment samples of study area were taken from 50 stations in 'atrak' river basin. Trace elements results from ICP-MS analysis in the 'ACME' laboratory-Canada were studied.To obtain extent of external factors (Anthrapogenic impacts), 'Enrichment factor' and 'Muller's geoaccumulation index' was calculated which the amount of enrichment factor was mainly between 0.5-2.5 that shows concentration of elements not affected by anthrapogenic factors and the amount of geoacuumulation index was between -0.5-0.5 which also shows no significant pollution. Results of Analysis of varience 'Anova' test which is investigated the statistical relation of formation 'five formations in study area' with concentration of trace elements, shows concentration of Selenium is directly related with the type of formation since with 95 percent confidence level, there is a signicant difference in amount of Se in different formations especially loess deposits which have the least Se concentration. Considering that Se deficiency in body can enhance esophageal cancer risk, recommneded in future studies measuring of Se concentration in water samples and blood serum of residents of this area.

Mobilization of multi-walled carbon nanotubes in consecutive imbibition and drainage events

PRABHAKAR SHARMA[1] AND DENIS M. O'CARROLL[2]

[1]Department of Earth Science, Uppsala University, Villavägen 16, Uppsala, 75236 Sweden (prabhakar.sharma@geo.uu.se)
[2]Department of Civil and Environmental Engineering, The University of Western Ontario, London, ON, Canada (docarroll@eng.uwo.ca)

Carbon nanotubes (CNTs) are important engineered nanoparticles with unique and beneficial properties. As a result CNTs has been used in a wide range of commercial products including electronics, optical devices and drug delivery leading to their disposal in the natural environment. Literature studies have investigated the mobility of CNTs in saturated porous media under differing physical and chemical conditions. However CNT transport in temporally changing porous media water content has not been investigated thus far (a common scenario with rainfall/infiltration events in the vadose zone). This study investigated the mobilization of multi-walled CNTs (MCNTs) in repeated wetting and drying cycles with varying flow rates and ionic strength of the inflow solution. Imbibition-drainage-imbibition cycle experiments suggest that MCNTs mobilization increased with increase in flow rates. MCNTs mobilization occurred only with first imbibition events at low ionic strengths however less mobilization happened for higher ionic strength inflow solution in the first imbibition cycle and additional MCNTs were found in the outflow solution in second imbibition cycle, using low ionic strength solution. This observation was likely due to the attachment forces between MCNTs and sand surface. Most of the MCNT mobilization occurred during liquid-gas interface movement with less chance of MCNTs to jump the energy barrier at higher ionic strength solution experiments. As a result less detachment of MCNTs occurred from the sand surface.