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data for the the 1 and 2 hazard class elements content for all SAEL LLS tests by seasons (16 elements * 11 points * 4 seasons = 704) and the following results were obtained.



The graph shows that the content of hazardous trace elements in the waters of the Upper Naryn river basin drastically increases in the summer. Moreover, the relative content of the elements under the 1 and 2 hazard classes in the BN-N river system in the summer is higher tan the content of those elements in the Other river system by 63.22%. Samples were taken from the Kumtor river on August 28, 2010 and from the Sary-Tor river (a tributary of the Kumtor river) on April 24, 2011 and were analyzed in the SAEL LLS laboratory.The results showed that the sum of the content ratios to their MAC for the elements under the 1 and 2 hazard classes in the Kumtor river at the control point was equal to 11.2, and in the Sary-Tor river - to 112.06. This data also supports the assumption that the intensively developed gold deposit Kumtor can play an important part in the elevated levels of a number of trace elements in the Big Naryn - Naryn river system.

Keywords: Abstract, EWG-DSS, ecogeochemistry, MAC, microelements, Naryn river.

Evaluation of physicochemical and microbiological quality in tap and spring waters in Bünyan, Kayseri

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ABSTRACT
Clean water is not only necessary for survival, but also a basic right of human beings and all living things. Yet, importance of water quality monitoring, sharing the results with public and evaluating public opinion have not been fully percieved or implemented locally which sometimes leads people choosing untreated, unsafe water sources for consumption. This study aims to define the drinking water quality of Bünyan, Kayseri, to understand the problems and the underlying reasons, and to reflect the local people's opinion about the water sources they consume from. Water samples were collected from sixteen different sources including tap water and spring water sources at three different seasons in 2010 and 2011. The analyses including total mesophilic bacteria (colony number/1 ml), total coliform bacteria (MPN (colony number/100 ml)) and *Eschericia coli* colony numbers (VRBA plate count (colony number/1 ml)) were for defining microbial quality. For determining physicochemical quality, colour, odour, turbidity (NTU), pH, conductivity (µs/cm), total phosphorus, alkalinity (mg/L $CaCO_3$), chloride, hardness levels and dissolved Oxygen levels (mg/l) were conducted following standard methods. The results showed that physical and chemical parameters were within the limits stated in "TS 266 Drinking Water Standards" and the legislation of "The Quality of Water for Human Consumption". Yet, microbiological analyses showed that some tap water and spring water sources included coliform bacteria, some of which were *E. coli* specifically. To be able to understand the underlying reasons behind the observed contamination problems, Bünyan's water supply system was also evaluated and the problems of the system were listed within this study. Finally, surveys with the local people were carried out to understand the preferences on water consumption. The results emphasize that, most people chose to consume untreated spring water, some of which contained coliform bacteria. This study documents that although physicochemical properties of drinking water system in Bünyan meets the

standards, the microbiological quality of some sources indicate contamination and that local people are consuming the unsafe, untreated water sources as drinking water supply.
Keywords: water quality, coliform, mesophilic bacteria, Bünyan, public perception. **Acknowledgment:** We would like to express appreciation for the support of the Erciyes University Scientific Research Projects Coordination Unit [FBA-08-545].

Multivariate analysis of monitoring fluorescence spectra

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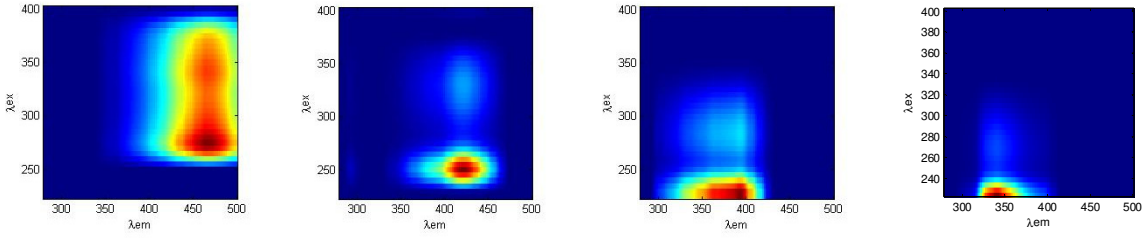
ABSTRACT
Dissolved organic matter (DOM) is ubiquitous in all types of aquatic systems and, due to the influence that it has on their ecological health, can be used as a useful water quality indicator. Fluorescence spectroscopy has been intensely used in recent decades for the analysis of DOM in water. The fluorescent DOM fractions, which are typically observed in freshwaters and which provide water quality information are protein-like - indicator of microbial activity and humic-like – indicator of terrestrial activity. Many studies have shown that this technique can characterize DOM and detect different types of aquatic pollutants, like sewage, oil or pesticides. Furthermore, DOM fluorescence data correlate with water quality parameters such as: total organic carbon, aquatic plankton and biological oxygen demand. Considering that natural water is a complex multi-component mixture which cannot be resolved satisfactorily by conventional fluorescence methods, like fluorescence excitation or emission spectra, most researchers use excitation – emission matrices (EEMs). EEMs represent fluorescence contour maps, in which repeated emission scans are collected at numerous excitation wavelengths providing highly detailed information. The EEMs are very simple to analyze because the fluorescence intensity maxima are identified as $\lambda_{excitation}$ / $\lambda_{emission}$ pairs. A single EEM can generate thousands of data points and interpretation of large datasets is challenging. Methods applied in the interpretation of fluorescence EEMs vary from the simple, like "peak-picking" method, but oftentimes effective approach of analyzing single wavelength pairs at predetermined locations, to more complex methods (multivariate methods) whereby whole regions are considered, for example principal component analysis (PCA), parallel factor analysis (Parafac) and self organizing maps (SOM). However, some researchers suggested such multivariate techniques might provide little advantage over "peak-picking". Consequently, there is a need to identify the method that provides most useful information, especially in the case of on-line fluorescence monitoring. The aim of this study has been to determine the effectiveness of Parafac on data processing, in order to facilitate pattern recognition and to identify the most relevant spectral properties in surface water systems. Temporal data sets, consisting of fluorescence EEMs, acquired automatically every 3 minutes, during a 10 days monitoring campaign, for water extracted from an urban river, have been used in this study. The dataset contained, apart from the natural organic components, a contamination with diesel oil, which appeared 7 days after the beginning of the experiment. Diesel oil has the same fluorescence emission domain as the protein – like component, minimizing the possibility to separate the two components, in case of unattended monitoring system. Parafac decomposes the fluorescence signal into underlying individual fluorescent components. It represents a valuable tool for characterizing and quantifying changes in DOM fluorescence enabling the tracing of different fractions in the natural environment. Parafac identified four components belonging to: the first and second peak of the humic – like components, the protein – like component and the diesel – like component. The method has been able to separate between microbial and diesel contamination, as can be seen in figure 1.



a) first humic – like b) second humic – like c) protein – like d) diesel – like