Determination of fluid inclusion characteristics and mineral exploration using them in the zones of porphyry-type alteration in the locality of Erzurum-Oltu-İnanmış by means of fluid inclusion petrography

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The study area, located in the eastern part of E Pontides, covers an area of about 20 km^2. It comprises various Jurassic-Cretaceous units, some of which bears a continuous succession lasting until Upper Paleocene, bordered by about NE-SW trending structural lineaments. Exhibiting distinct litho-stratigraphical characteristics, these units are categorized by Konak *et al.* (2001) as four groups, Hopa-Borçka zone, Artvin-Yusufeli zone, Olur-Tortum zone and Erzurum-Kars ophiolite zone, respectively from north to south, taking into consideration similarities between them. Of these belts, the southernmost Olur-Tortum zone is distinguished as 'Olur, Aksu and Çardaklı Units' from north to south, and these units are chaotically overthrusted between İnanmış and Balkaya, constituting 'Oltu Overthrusted Zone' (OOZ) (Konak *et al.* 2001). Enclosing this zone in the south, Tertiary successions are composed of Eocene marine clastic and volcanic rocks at the bottom and Oligo-Miocene continental evaporitic and clastic rocks with andesitic-basaltic volcanic rocks. The youngest units in the region are various Late Miocene volcanic rocks and Plio-Quaternary deposits. İnanmış locality, situated within Oltu Overthrusted Zone, is 25 km W distant from Erzurum-Oltu district, between Çamlıbel and İnanmış villages. In the locality, there are observed outcrops of Jurassic-Cretaceous basic-character volcanics (Konak *et al.* 2001), coeval with Meydantepe limestone, clastic rocks of Eocene together with acidic and basic rocks, intruding all these rocks. Basic volcanic rocks of Jurassic-Cretaceous often show porphyritic texture, intruded by acidic, intermediate and basic rocks and so subjected to a widespread alteration. Alterations, which are observed in the field, are argillitization, limonitization, hematitization, pyritization, chloritization and epidotization. Besides these, it is observed that basic volcanic and acidic intrusive rocks contain quartz, calciTRUNCATED

Arsenic sorption in aquatic sediments: Equilibrium, kinetic and mixed modeling approaches

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Arsenic sorption is included in a reactive transport model that accounts for the major biogeochemical processes regulating the coupled biogeochemical cycling of C, O, N, Fe, S and As in aquatic sediments. Predicted As distributions and fluxes are compared for different formulations of the sorption reactions. In particular, we compare the results generated with equilibrium (K_d and surface complexation models), fully kinetic (absorption, co-precipitation and dissolution) and mixed equilibrium-kinetic approaches, under steady state and non-steady state conditions. The work builds on our earlier modeling study of non-steady state As distributions in sediments of an oxic lake [1].

A purely equilibrium description of the partitioning of As between pore water and solids fails to reproduce the depth profiles of As measured in the lake sediments. Both the kinetic and mixed equilibrium-kinetic descriptions capture the observed features of the pore water and solid-bound As profiles. However, the mixed equilibrium-kinetic approach, which includes fast, reversible adsorption, followed by slow As coprecipitation plus stoichiometric dissolution of the sorbent phases (ferric iron oxyhydroxides and iron sulfides), allows us to compare fitted adsorption parameters with values obtained in controlled laboratory experiments, and to estimate *in situ* As adsorption site densities under variable environmental boundary conditions. By describing fast As adsorption with the surface complexation model, the effects on As partitioning of variations in the nature of the sorbents and variations in pore water pH and ionic strength are explicitly accounted for. Results obtained with the mixed equilibrium-kinetic model indicate that in the studied lake sediments ~6% of solid-phase As is reversibly adsorbed at the surface of iron minerals, while the remaining As is coprecipitated with the mineral sorbents.

[1] Couture *et al.* (2010) *Environ. Sci. Technol.* **44,** 197–203.