

Corrections to “Predominance of Aqueous Tl(I) Species in the River System Downstream from the Abandoned Carnoulès Mine (Southern France)”

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The authors regret that in our article,¹ the Eh–pH diagram in Figure 2 (page 2058) exhibits an abnormal stability field for Thallium minerals. This error comes from the numerical method used to calculate the diagram. The mosaic diagrams method, included in the software Chess² is fast but imprecise; in particular, (1) it does not take into account any activity correction, and (2) aqueous complexation between elements is not always taken into account. Although this method is useful to give a rapid idea of geochemical behavior of simple systems, it is not precise enough for systems containing more than two or three components.

The correct Eh–pH diagram presented below has been calculated using the full speciation method which is more precise than the mosaic diagrams method. It consists in calculating a complete geochemical speciation in every significant point of the Eh–pH domain in order to detect the predominant species. With such a method, sodium hydroxide, hydrochloric acid, and dioxygen concentrations are used to modify pH and Eh just like a natural reaction path. This method is implemented in Phreeplot³ that uses Phreeqc.⁴ Here, the Eh–pH diagram of Tl in Amous DC solution (Figure A1) has been calculated with

were, in the diagram presented in Figure 2 of our paper.¹ This corroborates redox speciation measurements presented in our paper¹ and still tends to confirm the general conclusion which is that aqueous Tl(I) species seems to be dominating in most freshwaters.

REFERENCES

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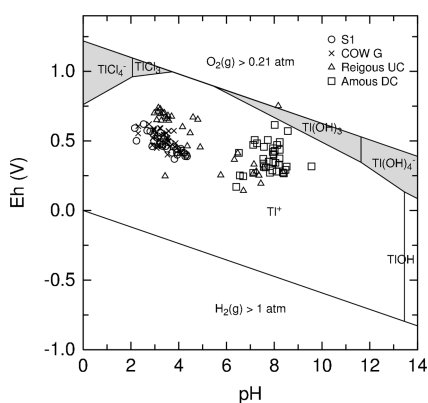


Figure A1. Eh–pH diagram of Thallium: concentrations used in the PHREEQC simulation are detailed in the text.

the same database converted into Phreeqc-format and with mean concentrations (mol kg^{−1}) at station Amous DC (ref 24 of ref 1): 5.33e-3 for C, 2.45e-3 for Ca, 1.00e-3 for Mg, 26e-6 for K, 0.17e-3 for Na, 0.17e-3 for Cl, 4.4e-9 for Tl, 7.9e-4 for S, 1e-6 for Fe, 4e-7 for As, 2.6e-6 for Al, Eh = 0.4 V, pH = 8.0.

In this new Eh–pH diagram, field Eh and pH data are located in the stability domain of Tl⁺, as most of the field data points

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