

**Supplementary information**

**Release of arsenite, arsenate and methyl-arsenic species from streambed sediment affected by acid mine drainage: a microcosm study**

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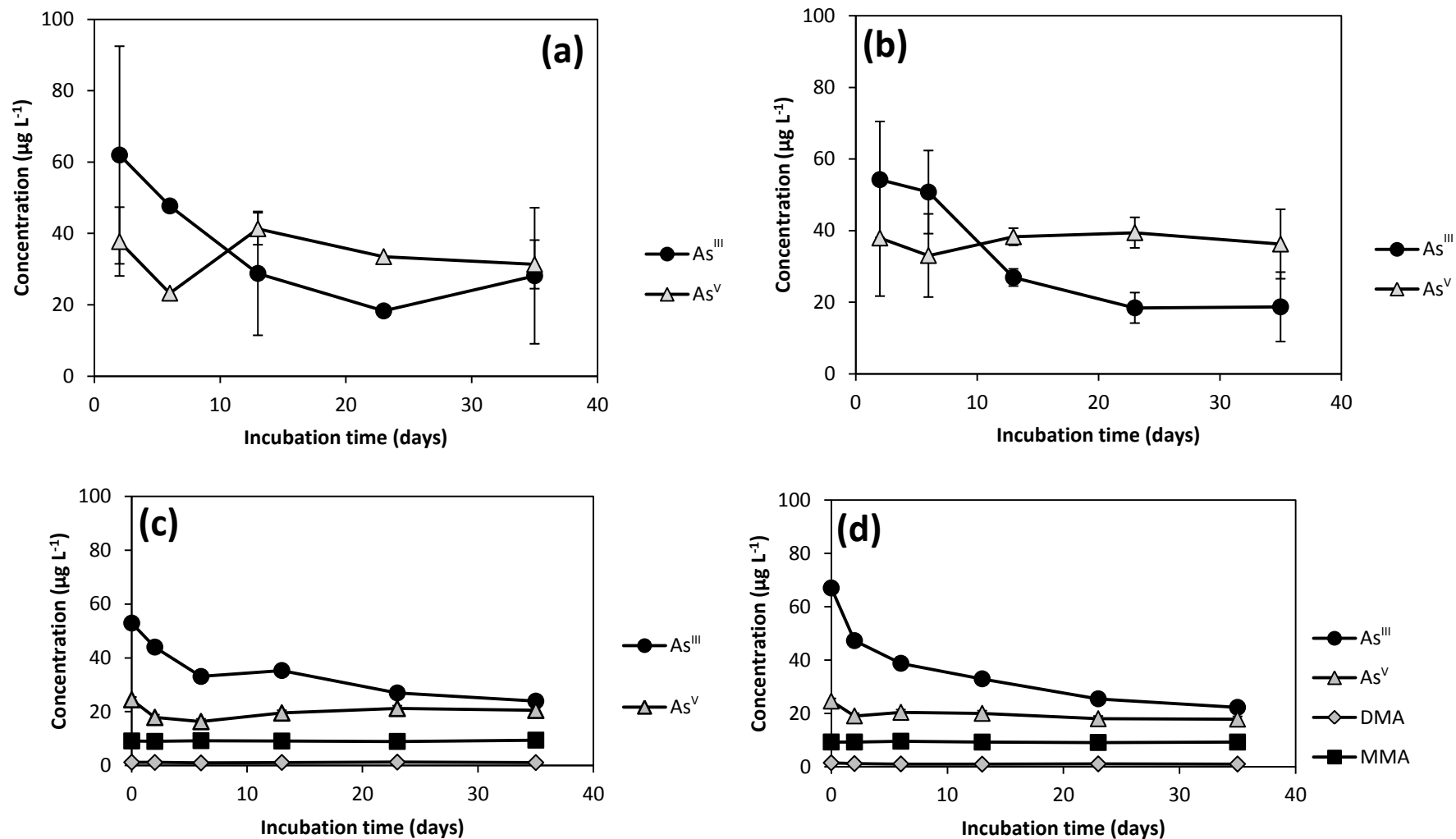
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<sup>1</sup> Both authors contributed equally to this work.

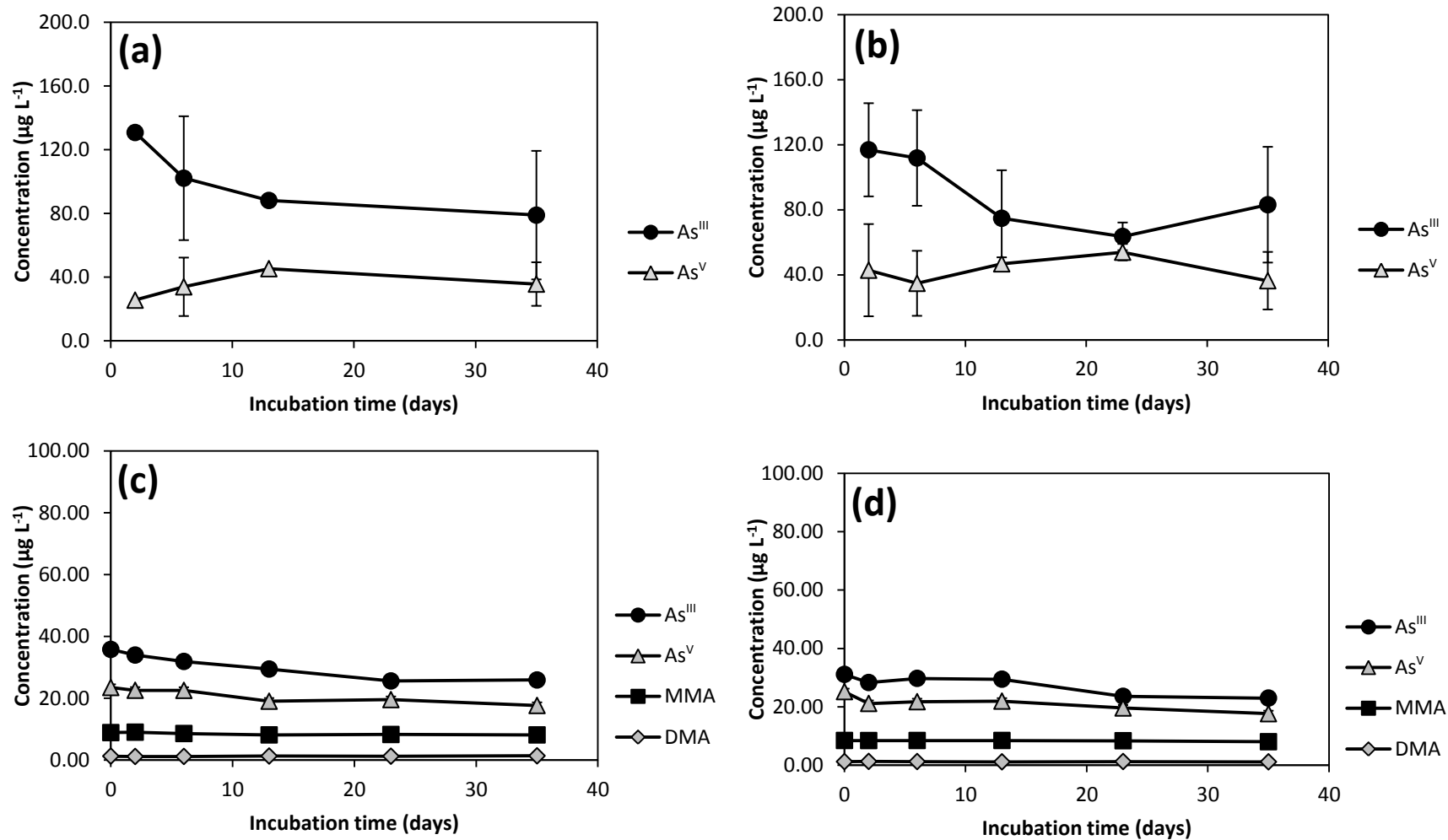
**Table S1. Physico-chemical characteristics of Amous River water at the reference unpolluted site, upstream the confluence with the Reigous (Amous UC, used for microcosm experiments), and at the sediment sampling location, downstream the confluence with the Reigous (Amous DC)**

DL, detection limit

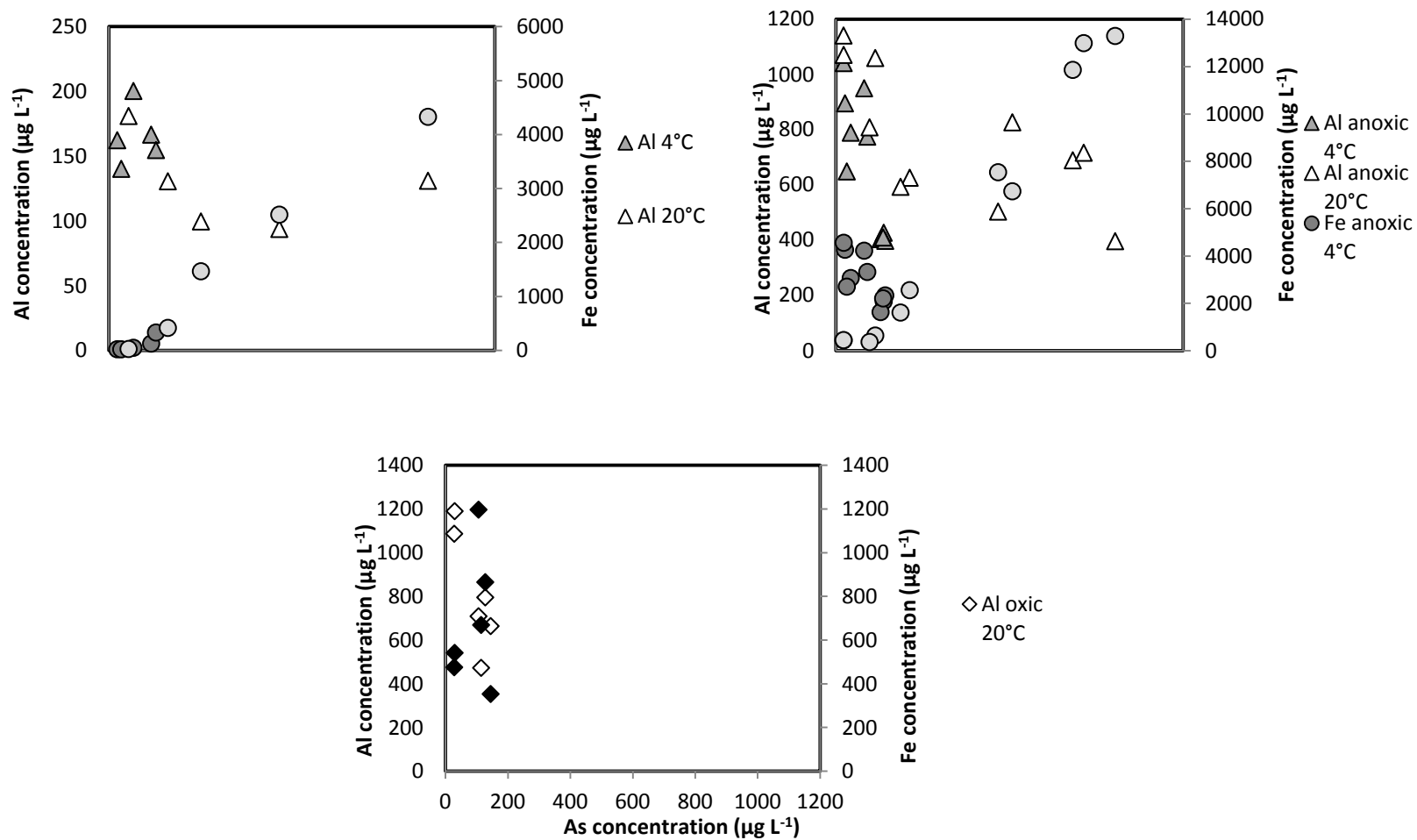
Parameter	Unit	Amous UC		Amous DC	
		November 2011	March 2012	November 2011	March 2012
Temperature	°C	11.3	15.6	9.1	9.0
pH		8.2	8.4	8.1	8.1
Redox potential	mV	366	210	458	292
Conductivity	µS cm <sup>-1</sup>	388	455	413	444
Dissolved oxygen	mg L <sup>-1</sup>	11.2	10.9	11.4	10.8
Cl <sup>-</sup>	mg L <sup>-1</sup>	3.7	5.4	4.7	7.4
NO <sub>3</sub> <sup>-</sup>	mg L <sup>-1</sup>	19.9	0.3	20.4	1.3
SO <sub>4</sub> <sup>2-</sup>	mg L <sup>-1</sup>	12.4	25.4	79.0	78.6
Ca <sup>2+</sup>	mg L <sup>-1</sup>	80.9	68.6	89.5	90.8
Mg <sup>2+</sup>	mg L <sup>-1</sup>	21.4	28.2	20.9	22.8
Na <sup>+</sup>	mg L <sup>-1</sup>	2.6	3.0	3.1	4.4
K <sup>+</sup>	mg L <sup>-1</sup>	<DL	0.4	<DL	1.2
As <sup>III</sup>	µg L <sup>-1</sup>	0.4	1.6	46.7	1.4
As <sup>V</sup>	µg L <sup>-1</sup>	0.9	<DL	7.3	9.6
DMA	µg L <sup>-1</sup>	<DL	<DL	<DL	<DL
MMA	µg L <sup>-1</sup>	<DL	<DL	<DL	<DL
Al	µg L <sup>-1</sup>	4.1	1.6	65.8	28.7
Mn	µg L <sup>-1</sup>	1.2	2.5	233.7	44.8
Fe	µg L <sup>-1</sup>	7.9	10.6	<DL	4.6
Zn	µg L <sup>-1</sup>	37.5	50.1	167.2	77.8
Pb	µg L <sup>-1</sup>	0.2	0.8	0.1	0.8



**Fig. S1.** Mobilisation of arsenic species in abiotic (sterilised) microcosms set up with November (a, b) and March (c, d) sediments incubated under oxic conditions at 4 °C (a, c) and 20 °C (b, d). In microcosms set up with November sediments, mobilisation of monomethyl- (MMA) and dimethyl-arsenic (DMA) species was not observed.



**Fig. S2.** Mobilisation of arsenic species in abiotic (sterilised) microcosms set up with November (a, b) and March (c, d) sediments incubated under anoxic conditions at 4 °C (a, c) and 20 °C (b, d). In microcosms set up with November sediments, mobilisation of monomethyl- (MMA) and dimethyl-arsenic (DMA) species was not observed.



**Fig. S3.** Correlation between Al, Fe and As release into water in anoxic microcosms set up with November sediments (a), anoxic microcosms set up with March sediments (b) and oxic microcosms set up with March sediments (c). The vertical dotted line separates out the early stage of incubation ( $\text{As} < 200 \mu\text{g L}^{-1}$ ) from the latest stage of incubation ( $\text{As} > 200 \mu\text{g L}^{-1}$ ).