

APPLICABLE ALS LOCATION

ULTRA TRACE ANALYSES

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NOTES

GENERAL

This guide provides prompts and tips for exploration geologists using hydrogeochemistry.

PREVENTING CONTAMINATION

The very low levels of analytes make clean sampling practices imperative. It is important that all jewellery be removed at least one full day before sampling. All sample bottles should be washed a minimum of 3 times with sample water before sample collection.

IN FIELD STORAGE

Samples should be kept cool and away from direct sunlight after sampling. It is recommended that bottles are transported in cooler boxes with cold blocks or ice in the field.

STORAGE FOR TRANSPORTATION

Samples will need to be shipped to the lab in cooler boxes with fresh cold blocks. It is worth cooling samples in a fridge prior to transportation but ensure they do not freeze in contact with the walls of the fridge.

METER

Calibration of the water meter is essential for good quality measurements. It is recommended that meters are calibrated daily for pH, and conductivity. Measurement of a ORP solution (such as Zobell) should also be carried out daily for correction of measured Eh to true values.

TIP

A photograph at each sample location is a good way of recording information that may not be clear from meta-data information.



HYDROGEOCHEMISTRY FOR EXPLORATION

POCKET GUIDE MAY 2019

IN-FIELD MEASUREMENT	ALS PREP-CODES	WATER ANALYSES					
		MINIMUM ANALYSES FOR EXPLORATION HYDROGEOCHEMISTRY			ADD-ON ANALYSES AVAILABLE		
<p>pH</p> <p>Record pH until stable (to within 0.1 units)</p>	<p>WAT-PREP02</p> <p>filter water to <0.45µm and acidify with ultra pure nitric acid before analyses</p>	<p>ULTRA-TRACE</p>	<p>ANION</p>	<p>ALKALINITY</p>	<p>TRACE REE</p>	<p>Pb ISOTOPES</p>	<p>ISOTOPES: S, C, O, Cu</p>
		<p>CODE</p> <p>ME-MS14L™</p>	<p>CODE</p> <p>MS14L-ANPH™</p>	<p>CODE</p> <p>MS14L-ANPH™</p>	<p>CODE</p> <p>MS-14L-REE™</p>	<p>CODE</p> <p>MS14L-PbIS™</p>	<p>CODE</p> <p>on request</p>
<p>Eh (ORP)</p> <p>record until stable (within 10 units)</p>	<p>WAT-PREP03</p> <p>filter water to <0.45µm before analyses</p>	<p>SAMPLE CONTAINER</p>	<p>SAMPLE CONTAINER</p>	<p>SAMPLE CONTAINER</p>	<p>SAMPLE CONTAINER</p>	<p>SAMPLE CONTAINER</p>	<p>SAMPLE CONTAINER</p>
		<p>150ml HDPE bottle</p>	<p>150ml HDPE bottle</p>	<p>150ml HDPE bottle</p>	<p>150ml HDPE bottle</p>	<p>150ml HDPE bottle</p>	<p>150ml HDPE bottle</p>
<p>Temperature</p> <p>record at time of removal from source</p>	<p>WAT-PREP04</p> <p>acidify samples with nitric acid before analyses</p>	<p>MINIMUM SAMPLE VOLUME</p>	<p>MINIMUM SAMPLE VOLUME</p>	<p>MINIMUM SAMPLE VOLUME</p>	<p>MINIMUM SAMPLE VOLUME</p>	<p>MINIMUM SAMPLE VOLUME</p>	<p>MINIMUM SAMPLE VOLUME</p>
		<p>50ml (100ml suggested for repeats and an extra 50ml for REE)</p>	<p>50ml (same bottle as alkalinity sample)</p>	<p>50ml (same bottle as anion sample)</p>	<p>ME-MS14L sample used</p>	<p>50ml</p>	<p>dependant on concentration of element of interest (150ml recommended)</p>
<p>Total Dissolved Solids</p> <p>be sure to record units (ppm or ppt)</p>		<p>PRESERVATION</p>	<p>PRESERVATION</p>	<p>PRESERVATION</p>	<p>PRESERVATION</p>	<p>PRESERVATION</p>	<p>PRESERVATION</p>
		<p>ultra pure HNO₃ (1ml/145ml), chill but do not freeze</p>	<p>chill but do not freeze</p>	<p>chill but do not freeze</p>	<p>ultra pure HNO₃ (1ml/145ml), chill but do not freeze</p>	<p>ultra pure HNO₃ (1ml/145ml), chill but do not freeze</p>	<p>chill but do not freeze</p>
<p>Conductivity</p> <p>be sure to record the units (mS or µS)</p>		<p>ANALYTES</p>	<p>ANALYTES</p>	<p>ANALYTES</p>	<p>ANALYTES</p>	<p>ANALYTES</p>	<p>ANALYTES</p>
		<p>all ultra trace metals in fresh or saline water</p>	<p>anions by ion chromatography</p>	<p>alkalinity by titration</p>	<p>trace REE by ICP-MS</p>	<p>²⁰⁴Pb, ²⁰⁶Pb, ²⁰⁷Pb, ²⁰⁸Pb</p>	
		<p>NOTES</p>	<p>NOTES</p>	<p>NOTES</p>	<p>NOTES</p>	<p>NOTES</p>	<p>NOTES</p>
		<p>filtration (<0.45µm) is essential to obtain the metals in solution and not those associated with particles suspended in the water</p>	<p>filter in field (<0.45µm) to remove suspended particles. Fill to positive meniscus if using one bottle for anion and alkalinity</p>	<p>fill to positive meniscus to prevent air interaction. If using sperate bottle than for anion no filtration is required</p>	<p>sample for ultra-trace metals used for trace REE. Filtration is essential (<0.45µm).</p>	<p>filtration (<0.45µm) is essential to determine Pb isotopes in solution and not those associated with particles suspended in water</p>	<p>filtration (<0.45µm) is essential to determine isotopes in solution and not those associated with particles suspended in water</p>
		<p>HOLDING TIME</p>	<p>HOLDING TIME</p>	<p>HOLDING TIME</p>	<p>HOLDING TIME</p>	<p>HOLDING TIME</p>	<p>HOLDING TIME</p>
		<p>6 months</p>	<p>Remote field locaitons that result in delay of upto 1 month can still be effecively tested</p>	<p>Remote field locations that result in delay of upto 1 month can still be effectively tested</p>	<p>6 months</p>	<p>6 months</p>	<p>dependant on isotope and preservation</p>