Ferrozine Method Modification

Sample and reagent volumes were scaled down from Stookey (1970) based on the sample volume available. Standards were prepared from a 1000ppm Iron AA Standard stock solution in 3% HCl. A 1 M sodium acetate solution was used as the buffer, a 1.5 M hydroxlyamine hydrochloride solution was used as the reductant, and a 0.01 M FerroZine (ACROS Organics) solution was used as the iron reagent. For all samples and standards, 15 ml aliquots of samples or ultra-pure water were analyzed with 0.5 ml of each reagent to result in a 16.5 ml solution for analysis. Samples and reagents were individually and carefully pipetted into a 10 cm glass cylindrical cell, which was then capped and gently tilted back and forth to ensure mixing. A minimum of five minutes was allowed before analyzing each sample in order to allow for full color development. The cell was then placed in a Shimadzu UVmini-1240 UV-Vis Spectrophotometer set to 562 nm and absorbance was measured manually. This method reduces all the Fe in solution to Fe^{2+} with the hydroxylamine hydrochloride solution; the Ferrozine binds with the Fe^{2+}; and the buffer solution buffers the pH (Stookey, 1970). The cell was thoroughly rinsed with deionized water and dried between each sample measurement. Prior to sample analysis, an eight-point calibration curve was created using standards that had been treated to develop color as described above.

Filterable Fe Data

Table DR1 description: Data from TV were grouped first by lake basin and then by associated stream. The 'µM Fe' value for each group in Appendix I is the statistical mean of 'n' samples shown, while the sample standard deviation is presented as '+/-µM Fe' relative to each group's mean concentration. The number of samples included in the 'n' of each group that were at or below the detection limit of 0.03 µM are shown in the 'n @/BDL' column. These samples had measurements ≤ 0.03 µM but still had a value higher than the mean blank value and were included as measured in the mean calculations at their specific locations. Some samples had measured absorbance values equal to or below the mean blank value and were not included in Figure 1, Table DR1, or the mean calculations as they are considered to have undetectable iron concentrations. A TV sample (Von Guerard Stream) was an outlier amongst other samples from the same stream and was also excluded. The 'Mean of Identifier Means' reported value of 0.21 for TV represents the mean of all 'µM Fe' values at the study area. Filterable Fe concentrations of samples ranged from < DL to 3.4 µM.

Table DR1. Filterable Fe data for locations in Taylor Valley (TV), Antarctica.

TV	n @/BDL	n		Stream/Identifier	µg L^{-1} Fe	+/- µg L^{-1} Fe
Fryxell	2	14		Crescent	9.1	8.4
	2	7	*	Aiken	6.4	7.5
		3		Harnish	5.7	2.8
	1	10		Green	6.7	6.4
	1	4		Von Guerard	5.8	5.3
	2	6	*	Huey	5.3	5.9
	1	9		Lost Seal	14	11
	3	6	*	Delta	3.2	3.2
	3	7	*	Canada	7.7	15
	2	4	*	McKnight	57	90
		5	*	Bowles	13	20
	2	5	*	Mariah	6.5	7.2
		2		Adam's	56	46
		5		Commonwealth	7.4	4.0
		1		Wales	3.6	
Hoare		5	*	Wharton	23	40
		6		Andersen	10	7.0
		4	*	McKay	6.5	7.6
	3	5	*	House	2.4	2.4
Bonney	1	3	*	Priscu	40	65
	1	2		Lawson	2.3	1.8
		2		Sharp	4.3	0.5
	3	5		Bohner	< DL	0.8
		4		Wormherder	8.7	3.1
	1	4		Santa Fe	9.0	8.8
		1		Lyons	23	
		2		Red River	10	6.2
Etc.	1	8		Onyx River	4.2	3.3
	2	2		Miers	< DL	0.6
		1		Garwood	4.0	
		1		Suess	5.2	
				Mean of Identifier Means	12	
				Mean of Individual TV Samples (n=143)	11	

* Coefficient of Variation is ≥1

Detection limit = ~2 µg L^{-1} Fe

Table DR2.
Suspended sediment data from Taylor Valley, Antarctica.
Samples taken near stream gauge during December 1998.

Stream	n	TSS (mg/L) average
Andersen	10	48.2
Canada	3	0.65
Delta	1	5.56
Lawson	2	361.7
Lost Seal	2	18.3
Priscu	2	13.6
Santa Fe	3	277.8