Marine and Freshwater Research, 2019, **70**, 1585–1602
https://doi.org/10.1071/MF19017

Supplementary material

Discharge-driven seasonal pattern of ionic solutes, suspended sediment and water clarity for a tropical savanna river in northern Australia

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Table S1. List of candidate sets of models for run-off event volume-weighted average dependent water quality variables and covariates

Dependent variables were: electrical conductivity, pH, turbidity, total suspended sediment and volatile suspended sediment for the dry-season to wet-season transition and the wet season. The covariates were: maximum event discharge (Q), event duration (D), event volume (V), average rate of discharge increase over the rising limb of the event hydrograph (R), time since the start of the season and event maximum discharge (S) and time since the last run-off event (L, set to zero for the first event of each season). The models were run for each water quality parameter (WQ) and for each season, giving a total of 10 individual analyses. Model 1 is the null hypothesis model

Model	Model
1	WQ ~1
2	WQ ~Q
3	WQ ~D
4	WQ ~V
5	WQ ~R
6	WQ ~S
7	WQ ~L
8	WQ ~Q+S
9	WQ ~Q+L
10	WQ ~Q+S+L
11	WQ ~V+S+L
12	WQ ~D+S+L

Table S2. Candidate models for Akaike Information Criterion (AIC) analyses for single dependent variables: electrical conductivity (EC), turbidity, total suspended sediment and volatile suspended sediment abbreviated as WQ and euphotic depth (Z_{eu}) with independent variable discharge (Q)

Candidate models are also presented for turbidity *v*. EC and euphotic depth (Z_{eu}) *v*. EC. Models 1, 4, 7 and 10 are null hypotheses

Model	Model
1	$\log_{10}(WQ) \sim 1$
2	$\log_{10}(WQ) \sim \log_{10}(Q)$
3	$\log_{10}(WQ) \sim \log_{10}(Q) + (\log_{10}(Q))^2$
4	$pH \sim 1$
5	$pH \sim \log_{10}(Q)$
6	$pH \sim \log_{10}(Q) + (\log_{10}(Q))^2$
7	$\log_{10}(Turbidity) \sim 1$
8	$\log_{10}(Turbidity) \sim \log_{10}(EC)$
9	$\log_{10}(Turbidity) \sim \log_{10}(EC) + (\log_{10}(EC)^2$
10	$\log_{10}(Z_{eu}) \sim 1$
11	$\log_{10}(Z_{eu}) \sim EC$
12	$\log_{10}(Z_{eu}) \sim \log_{10}(EC)$

Table S3. Estimated coefficients of covariates selected by Akaike Information Criterion (AIC) analyses to best explain run-off event volume-weighted average values of electrical conductivity (EC), pH, turbidity, total suspended sediment (TSS) and volatile suspended sediment (VSS) during the dry-season to wet-season transition (*n* = 14) and the wet season (*n* = 17)

The selected covariates were: event maximum discharge (Q), event duration (D), event volume (V), time since the start of the season (S) and time since the last run-off event (set to zero for the first event of each season). The covariate average rate of discharge increase between the start of the event and its maximum discharge was not selected for any of the models. All data were normalised. Bold values represent coefficients that were significant at the 5% level (i.e. slopes were significantly different from zero)

Analysis set	Dependent variable	Intercept	Q	D	V	S	L
Dry-season to wet-season transition	EC	**348**	**–75.9**				
	pH	**7.86**	**–0.139**				
	Turbidity	**57.8**	**21.1**				
	TSS	**31.3**	**20.6**				
	VSS	**9.42**	**3.48**				
Wet season	EC	**106**	**–27.2**				
	pH	**6.98**		**0.178**		–0.0398	**–0.177**
	Turbidity	**97.8**			**–20.2**	**–26.1**	**5.57**
	TSS	**59.7**	**–10.5**			**–15.1**	
	VSS	**7.49**	**–0.918**			**–1.56**	

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Table S4. Preferred models shown in Fig. 5 and selected by AIC analyses

w_i is the relative strength of the selected model with values between 1 and 0, where the highest value equals the most parsimonious model selected from candidate models. Percentage deviation is the proportion of deviance explained by the model compared with the null model. *n*, number of data. Variable abbreviations: Q, discharge (m^3 s^{-1}); TSS, total suspended sediment (mg L^{-1}); VSS, volatile suspended sediment (mg L^{-1}); turbidity (NTU); EC, electrical conductivity (µS cm^{-1}); Z_{eu}, euphotic depth (m)

AIC selected model	w_i	Percentage deviation	*n*
pH ~9.2 – 0.66 $\log_{10}$(Q)	0.53	85	502
$\log_{10}$(EC) ~3.5 – 0.51 $\log_{10}$(Q)	0.66	89	716
$\log_{10}$(TSS) ~4.0 $\log_{10}$(Q) – 0.71 $(\log_{10}(Q))^2$ – 3.9	1.00	69	716
$\log_{10}$(VSS) ~2.8 $\log_{10}$(Q) – 0.51 $(\log_{10}(Q))^2$ – 3.0	1.00	52	230
$\log_{10}(Z_{eu})$ ~1.6 – 0.57 $\log_{10}$(Q)	0.71	76	79
$\log_{10}$(turbidity) ~1.1 – 0.21 $\log_{10}$(EC)	1.00	97	622
$\log_{10}(Z_{eu})$ ~0.0021(EC) – 0.33	1.00	78	80