Supplement of Hydrol. Earth Syst. Sci., 20, 3831–3842, 2016
http://www.hydrol-earth-syst-sci.net/20/3831/2016/
doi:10.5194/hess-20-3831-2016-supplement

Hydrology and Earth System Sciences
Open Access

Supplement of

The influence of riparian evapotranspiration on stream hydrology and nitrogen retention in a subhumid Mediterranean catchment

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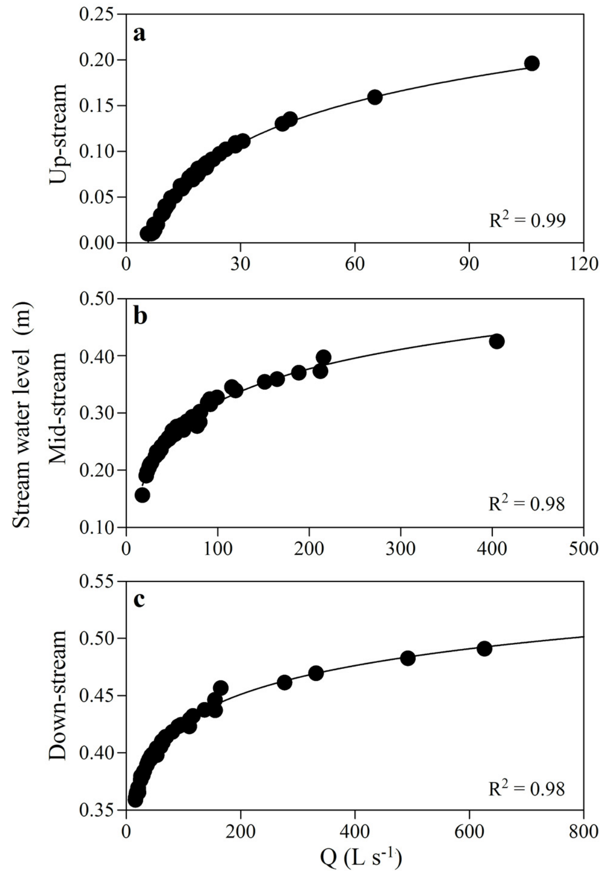

Figure S1. Regressions between discharge (Q) and stream water level for the (a) up-stream, (b) mid-stream and (c) down-stream sites during the period 2010-2012. Circles are data from slug additions and lines are the regression models. The R^2 values are also shown for each case. n = 57, 60 and 61 for the up-, mid- and down-stream sites, respectively. These regressions were used to infer stream discharge at 15 min intervals.

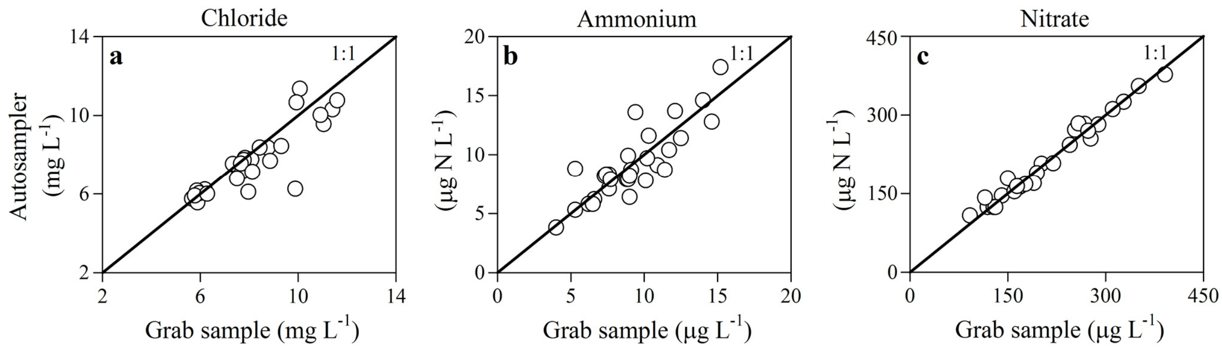

Figure S2. Comparison of stream water chemistry measured by grab samples vs auto-samplers. The samples collected with auto-samplers were taken in the same day than the manual ones, but the formers were then kept in the auto-sampler between 1-10 days. Data is shown for (a) chloride, (b) ammonium and (c) nitrate. The line 1:1 is also shown. The relative root-mean-square error was 3.1, 2.7 and 1.1% for chloride, ammonium and nitrate concentrations, respectively. The good match between the two types of samples suggest that biogeochemical transformation was minimal within the auto-sampler bottles.

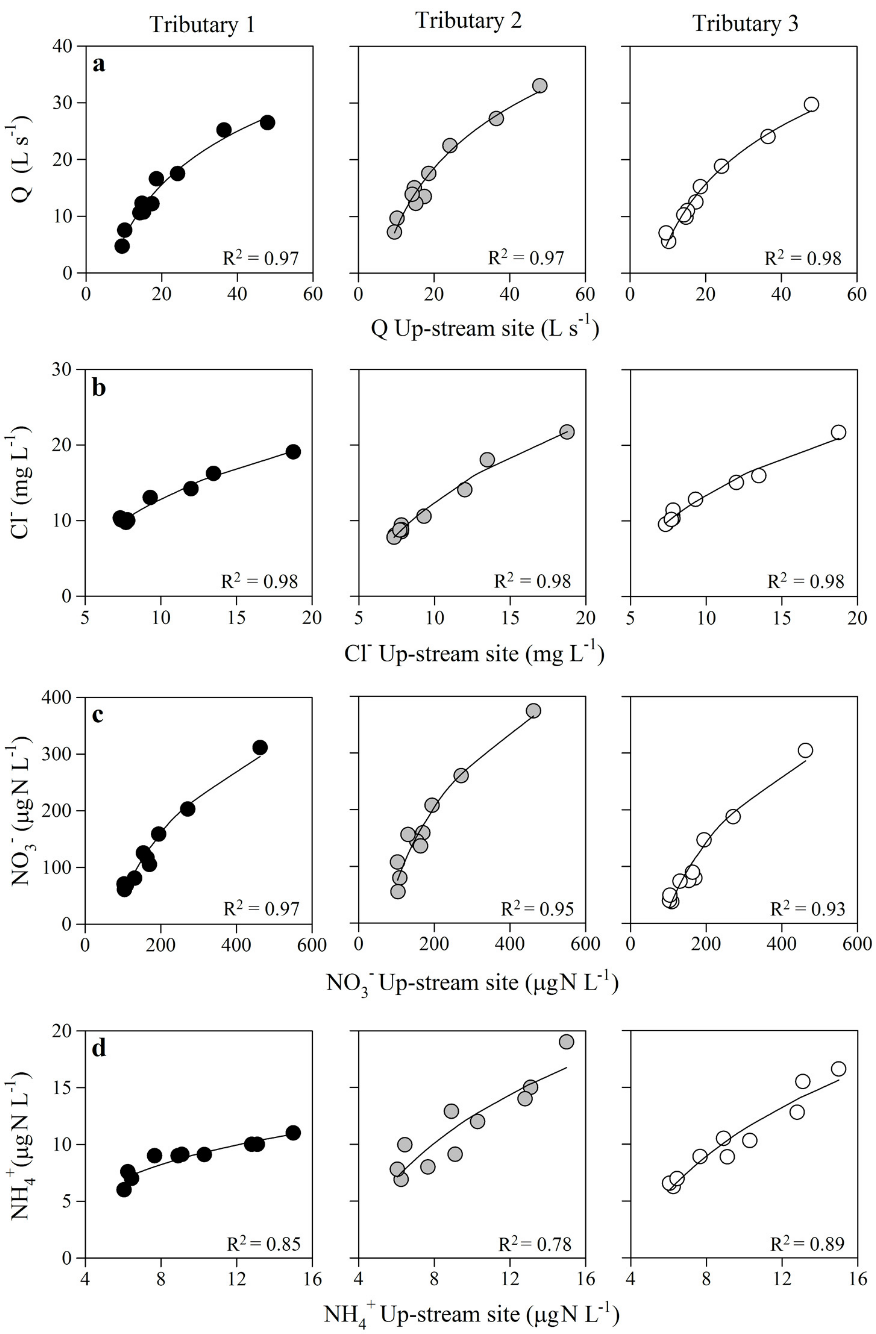

Figure S3. Relationship between values measured at the three main tributaries of the main steam and those measured at the up-stream site for (a) discharge and concentrations of (b) chloride, (c) nitrate, and (d) ammonium. Data was collected on the same day for a set of 11 synoptic field campaigns during the period 2010-2012 (Bernal et al., 2015). The line indicates the best fit (logarithmic model) and R^2 values are shown for each case. The regressions models were used to infer mean daily discharge and daily solute concentrations at each tributary from values measured at the upstream site, which were then used for mass balance calculations.

Table S1. Measured and predicted concentrations of riparian groundwater concentrations for chloride (Cl^-), nitrate (NO_3^-) and ammonium (NH_4^+) at the headwater reach during the study period. The relative difference between measured and concentrations predicted from mass balance are also shown. Groundwater concentrations were measured during a parallel study conducted in the catchment, and are shown as the median value for the 7 wells installed along the headwater reach (< 2 m from the stream) (Bernal et al., 2015). The concentrations predicted from the mass balance approach showed a good match with measured concentrations, differing < 5%, 7%, and 10% for Cl^-, NO_3^-, and NH_4^+, respectively. This relative difference between measured and predicted groundwater concentrations at the headwater reach was used as a threshold to determine when observed and predicted concentrations at the down-stream site differed significantly from each other.

	Cl^- (mg L^{-1})			NO_3^- (µg N L^{-1})			NH_4^+ (µg N L^{-1})		
Day	Measured	Predicted	Diff (%)	Measured	Predicted	Diff (%)	Measured	Predicted	Diff (%)
24/08/2010	6.8	6.5	4	246	230	7	21	20	5
27/10/2010	6.3	5.7	5	428	404	6	43	39	9
22/11/2010	7.3	7	4	99	92	7	27	28	-4
19/01/2011	6.9	6.9	0	229	218	5	13	11	10
1/3/2011	6.9	6.6	4	360	351	3	28	27	4
12/4/2011	7	6.8	3	129	131	-2	31	30	3
26/05/2011	6.2	6.1	2	80	78	3	16	17	-6
9/8/2011	9.1	8.6	5	97	102	-5	26	25	4
13/09/2011	8.7	8.5	2	111	110	1	20	20	0
26/10/2011	6.2	5.9	5	223	212	5	24	25	-4
14/12/2011	7.2	7.4	-3	166	175	-5	18	16	10

Table S2. Annual precipitation (P), annual potential evapotranspiration (PET), P/PET ratio, percentage of riparian area within the catchment (Rip Area) and riparian water depletion (RWD) for different catchments across climatic regions. This data set was used to build Figure 6 of the main manuscript.

Climate	P (mm yr^{-1})	PET (mm yr^{-1})	P/PET	Rip Area (%)	RWD (%)	Source
Arid	250	2280	0.11	8.4	33	Dahm et al., 2002
Arid	300	1800	0.17	11.7	36	Doble et al., 2006
Arid	400	1400	0.29	3-11	22	Contreras et al., 2011
Arid	255	693	0.37	---	20	Goodrich et al., 2000
Arid	570	900	0.63	---	13	Springer et al., 2006
Mediterranean	1296	1911	0.68	8.2	9	Scott, 1999
Mediterranean	780	1055	0.72	3.0	12	Folch and Ferrer, 2015
Mediterranean	850	1170	0.73	15.0	7	Wine and Zou, 2012
Mediterranean	750	990	0.77	2.1	5	Sabater and Bernal, 2011
Mediterranean	925	1100	0.84	6.0	3.6	Present Study
Temperate	1780	1400	1.27	8.4	4	Dunford and Fletcher, 1947
Temperate	858	590	1.45	8.0	3	Petrone et al., 2007
Temperate	1523	1011	1.51	---	2.5	Salemi et al., 2012
Temperate	1800	900	2.00	11.0	1.2	Dunford and Fletcher, 1947
Tropical	4370	1825	2.39	2.5-6.6	1.4	Cadol et al., 2012

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