

Accessory publication

Ionic regulation in an alpine peatland in the Bogong High Plains, Victoria, Australia

Ewen Silvester

Research Centre for Applied Alpine Ecology, Department of Environmental Management and Ecology (DEME), La Trobe University, Albury-Wodonga Campus, Vic. 3690, Australia.

Email: e.silvester@latrobe.edu.au

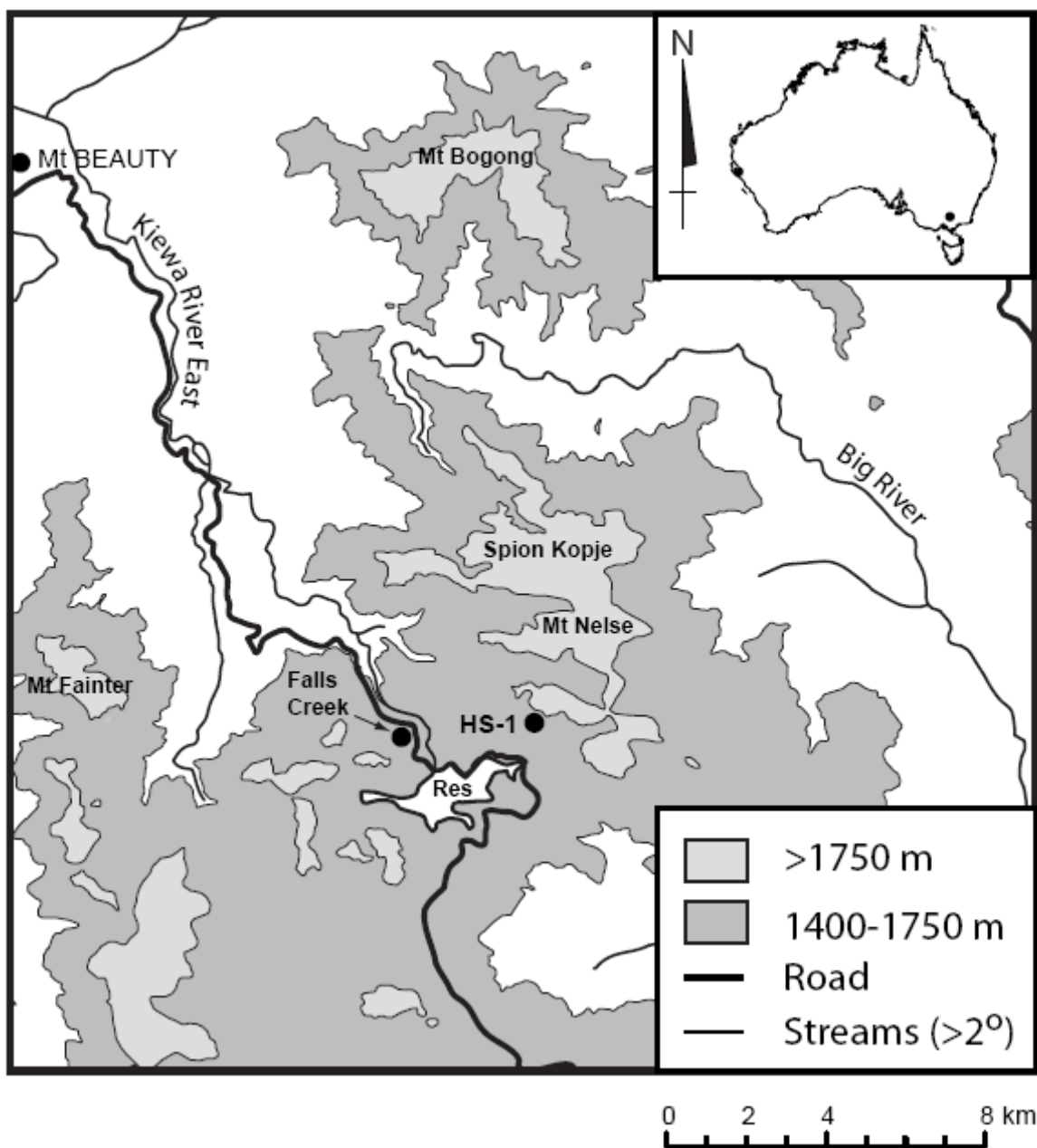


Fig. A1. Map of the Northern section of the Bogong High Plains, Victoria, Australia. Shown are land areas classified as sub-alpine (1400–1750 m) and alpine (>1750 m), streams greater than 2nd order, and the nearby township of Mt Beauty. (Res, Rocky Valley Storage).

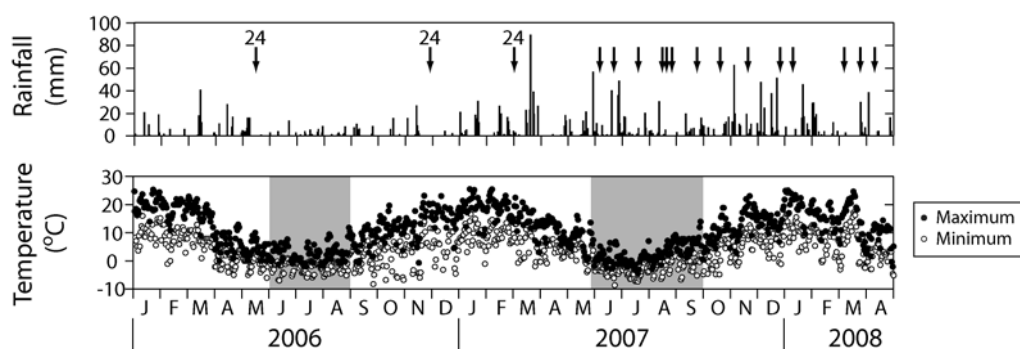


Fig. A2. Rainfall and temperature (maximum and minimum) recorded at the Falls Creek Bureau of Meteorology monitoring station for the study period. Shown on the rainfall record are the sampling occasions. Sampling occasions marked '24' are 24-h sampling runs.

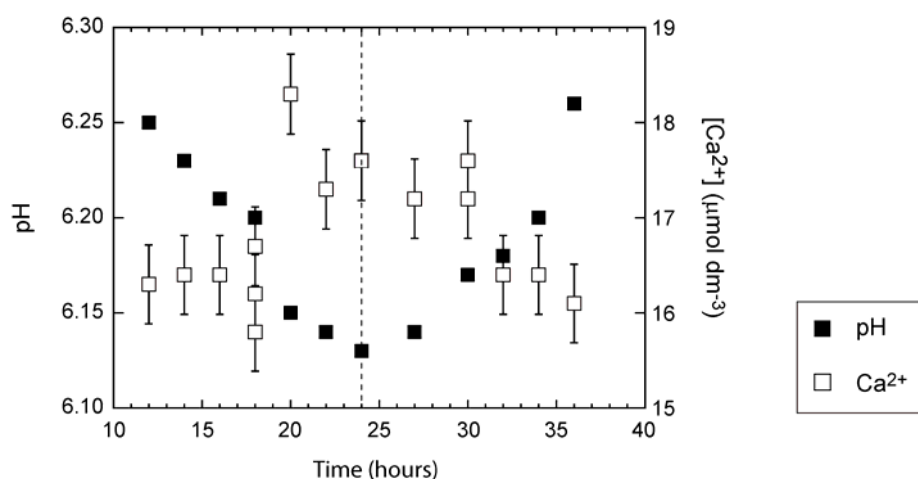


Fig. A3. pH and calcium concentrations in stream exit water at Heathy Spur 1 over a 24-h period during Run 3 (March 2007). The time scale is referenced to the first day of the two-day monitoring period. Midnight (marked by the dashed line) corresponds to 24 hours. Error bars ($\pm 2\sigma$) are based on uncertainties in analytical determinations.

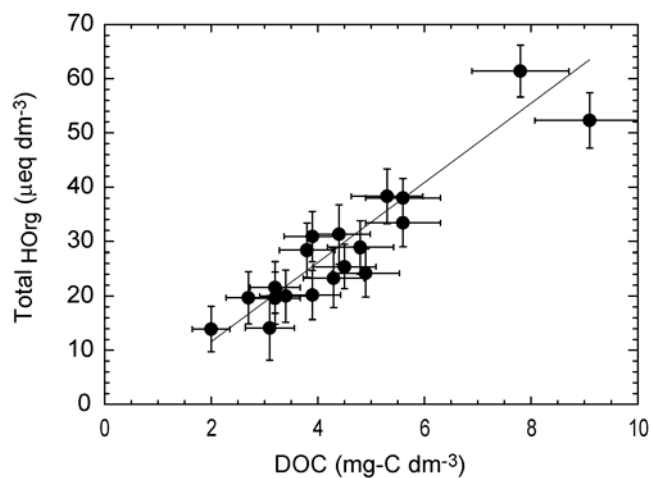


Fig. A4. Relationship between Total_{HOrg} and dissolved organic carbon (mg-C dm⁻³) for stream exit water at Heathy Spur 1. Total_{HOrg} is calculated from [Org⁻] using the Oliver et al. model (ref. [23] in article) for DOC charging, yielding a site density value of 7.3 µeq mg (C)⁻¹. Error bars ($\pm 2\sigma$) are based on propagation of uncertainties in analytical determinations.

Table A1. Range of physical and chemical parameters recorded for groundwater, snow and stream exit water at HS-1 over the study period

Feed water, 36 samples over 17 sampling occasions; snow, 8 samples over 6 sampling occasions; stream exit water, 87 samples over 17 sampling occasions. Percentages in parentheses for groundwater feed refer to the average contributions of each ionic component to cationic or anionic charge. CA, carbonate alkalinity

Parameter	Groundwater	Snow	Stream exit
Flow (dm ³ s ⁻¹)	–	–	0.6–24.5
pH (field)	5.24–5.40	5.4–5.7	5.57–6.26
pH (CO ₂ = 418 ppm)	6.30–6.47	Not measured	5.97–6.61
Dissolved oxygen (mg dm ⁻³)	9–10	Not measured	7.3–11.1
Temperature (°C)	5.0–5.5	Not measured	1–16.5
Sodium (μmol dm ⁻³)	18.5–21.7 (40.3%)	1.0–7.7	9.0–30.4
Potassium (μmol dm ⁻³)	2.8–4.1 (6.8%)	0.8–3.0	0.5–4.7
Calcium (μmol dm ⁻³)	5.2–6.7 (24.3%)	0.8–2.9	4.1–18.3
Magnesium (μmol dm ⁻³)	4.2–5.3 (18.5%)	<1.2	3.9–13.7
Chloride (μmol dm ⁻³)	14.9–16.7 (29.6%)	0.6–8.4	2.1–21.5
Nitrate (μmol dm ⁻³)	7.3–10.1 (15.8%)	0.3–7.7	0.16–1.03
Sulfate (μmol dm ⁻³)	1.91–2.19 (7.7%)	0.2–5.05	0.12–1.5
CA (μeq dm ⁻³)	22.5–27.1 (47.0%)	~3	6.1–26.6
Organic anions (μeq dm ⁻³)	<2	Not measured	12.4 - 62
DOC (mg C dm ⁻³)	0.2–0.3	Not measured	2.0–9.1
Aluminium (μmol dm ⁻³)	<2	Not measured	<2.5
Iron (μmol dm ⁻³)	<0.1	Not measured	<1.5
Manganese (μmol dm ⁻³)	<0.1	Not measured	< 0.05
Silicon (μmol dm ⁻³)	20–25	Not measured	25–35
Charge balance (%)	0.4–7.0 (average 3.2, cation deficient)	Not determined	Assumed zero