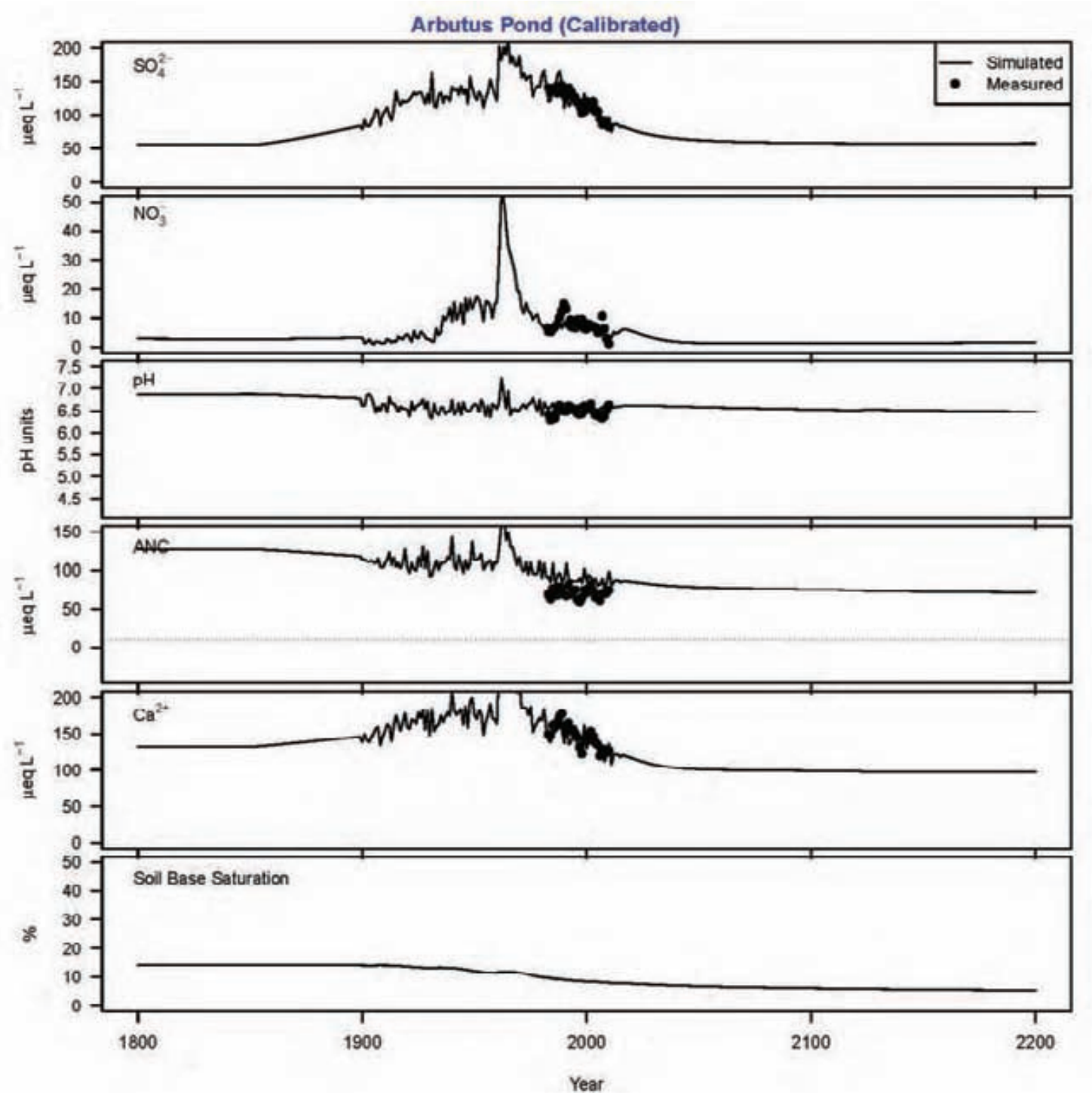
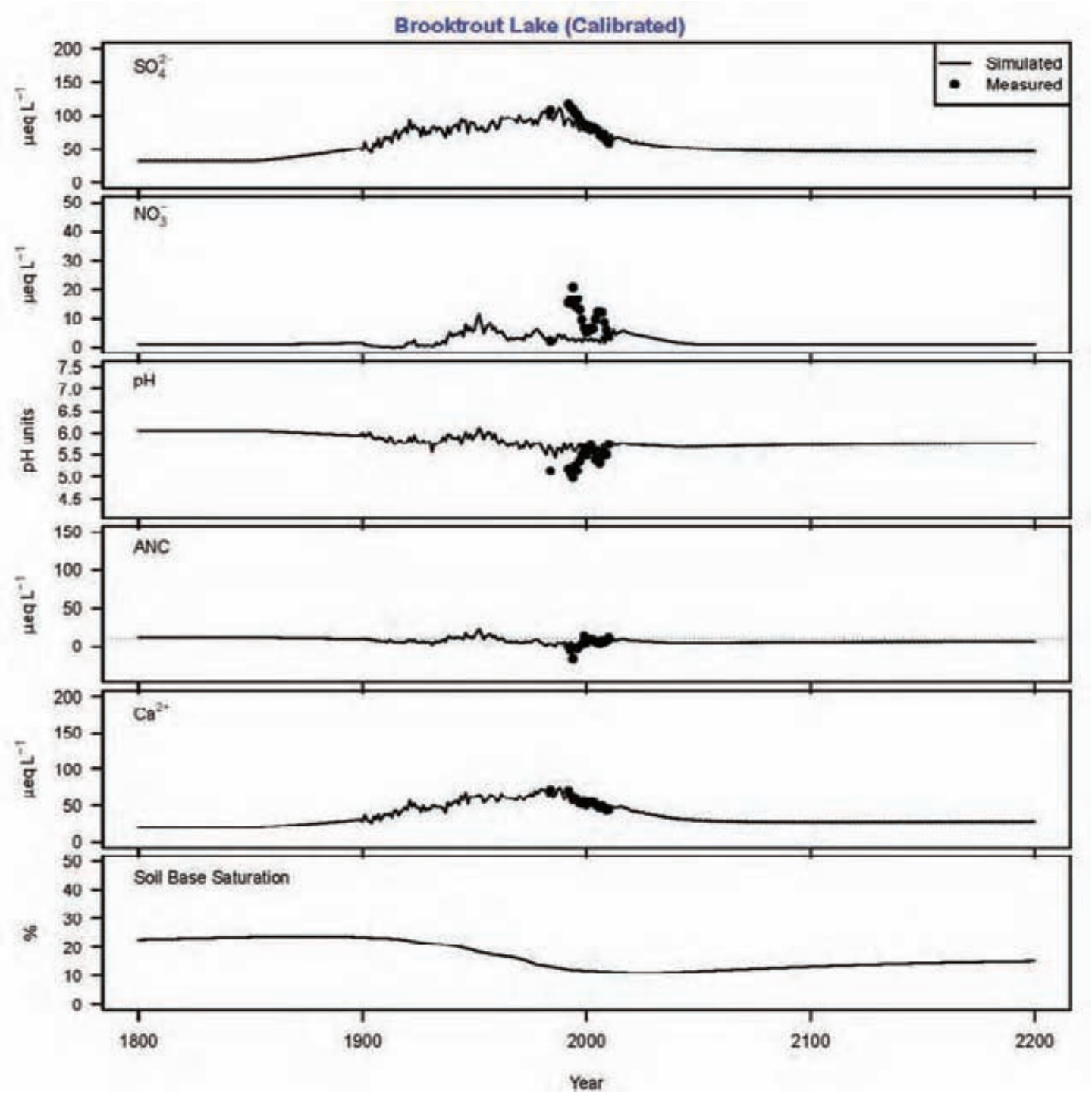
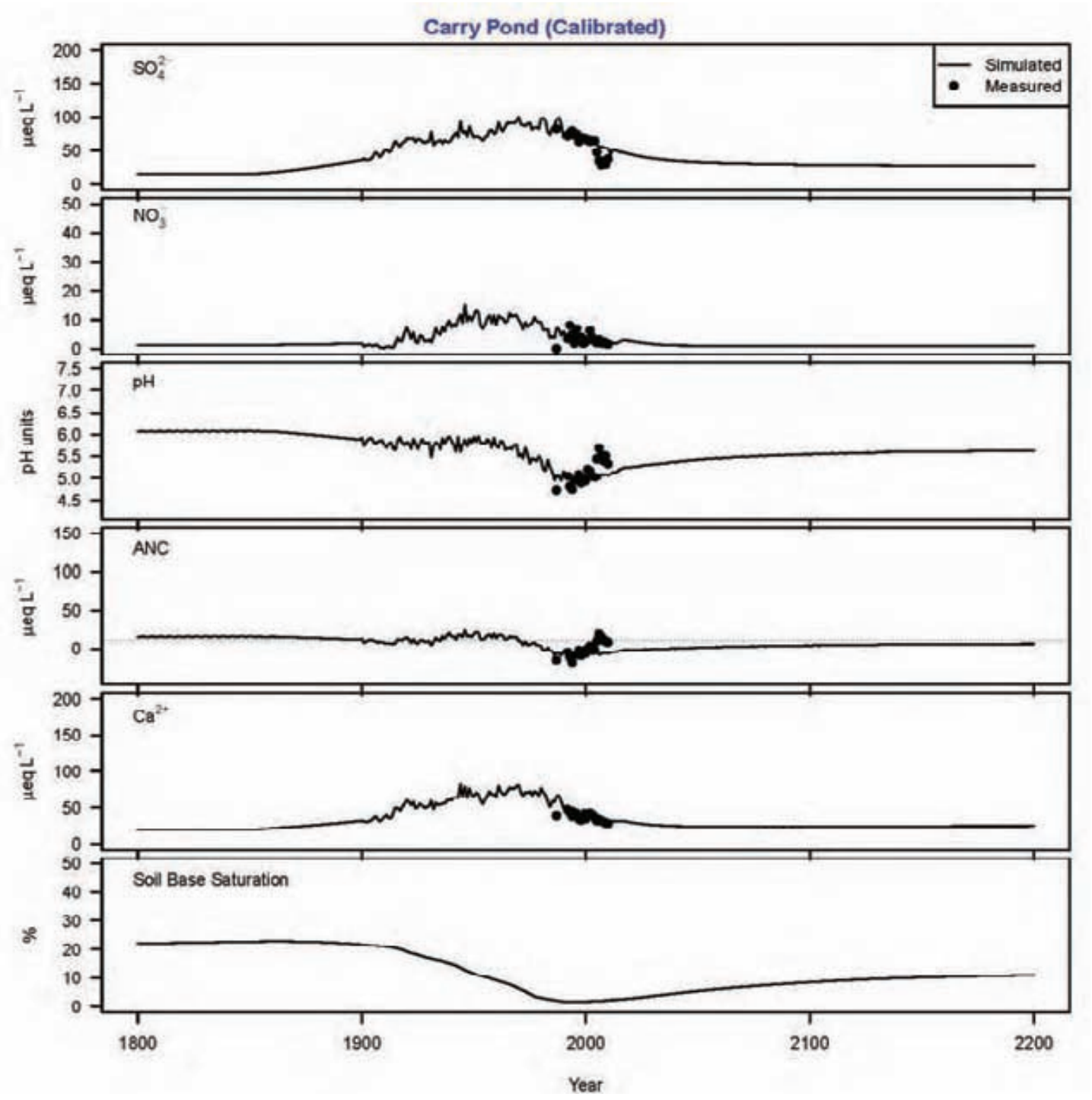
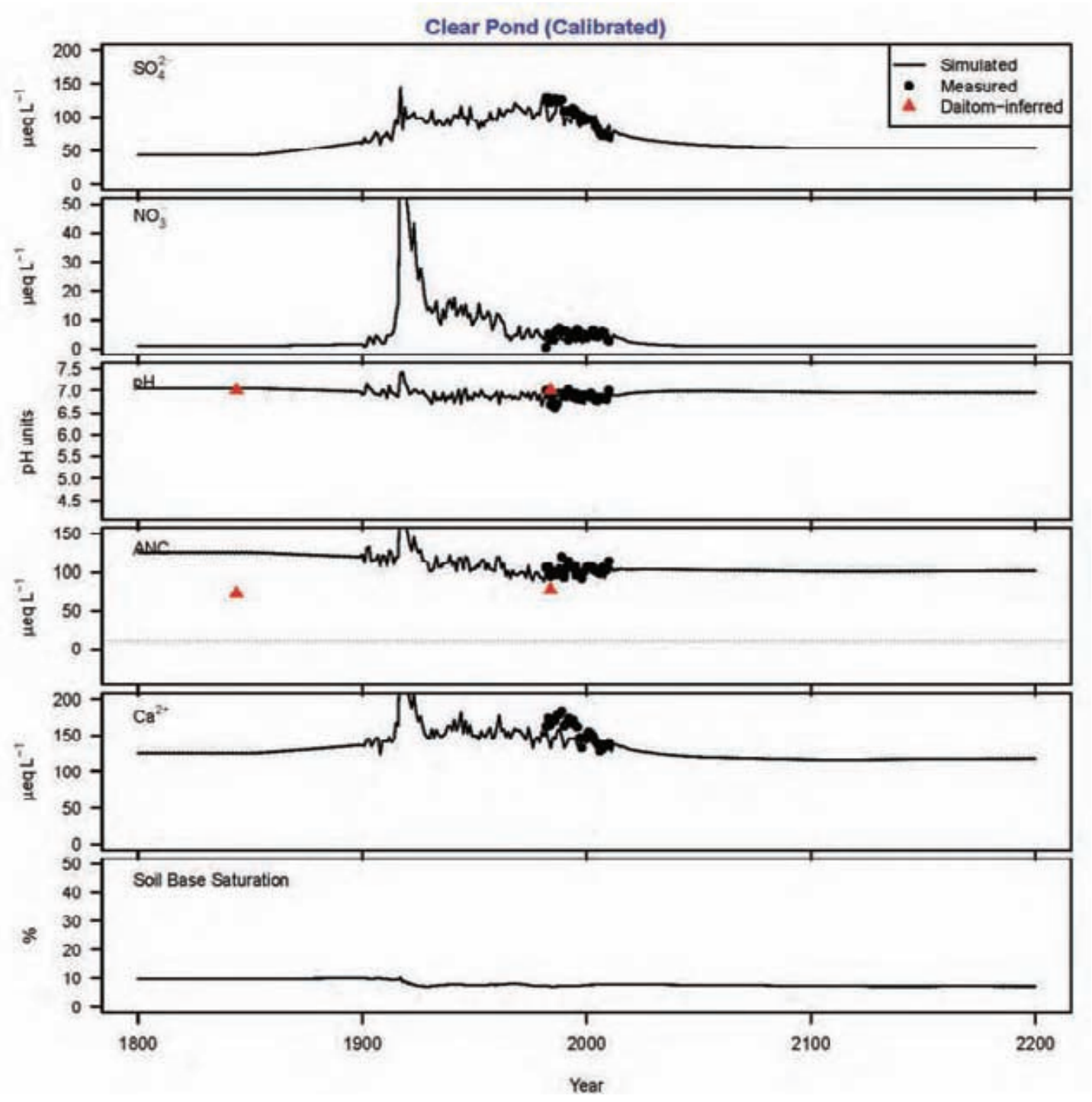
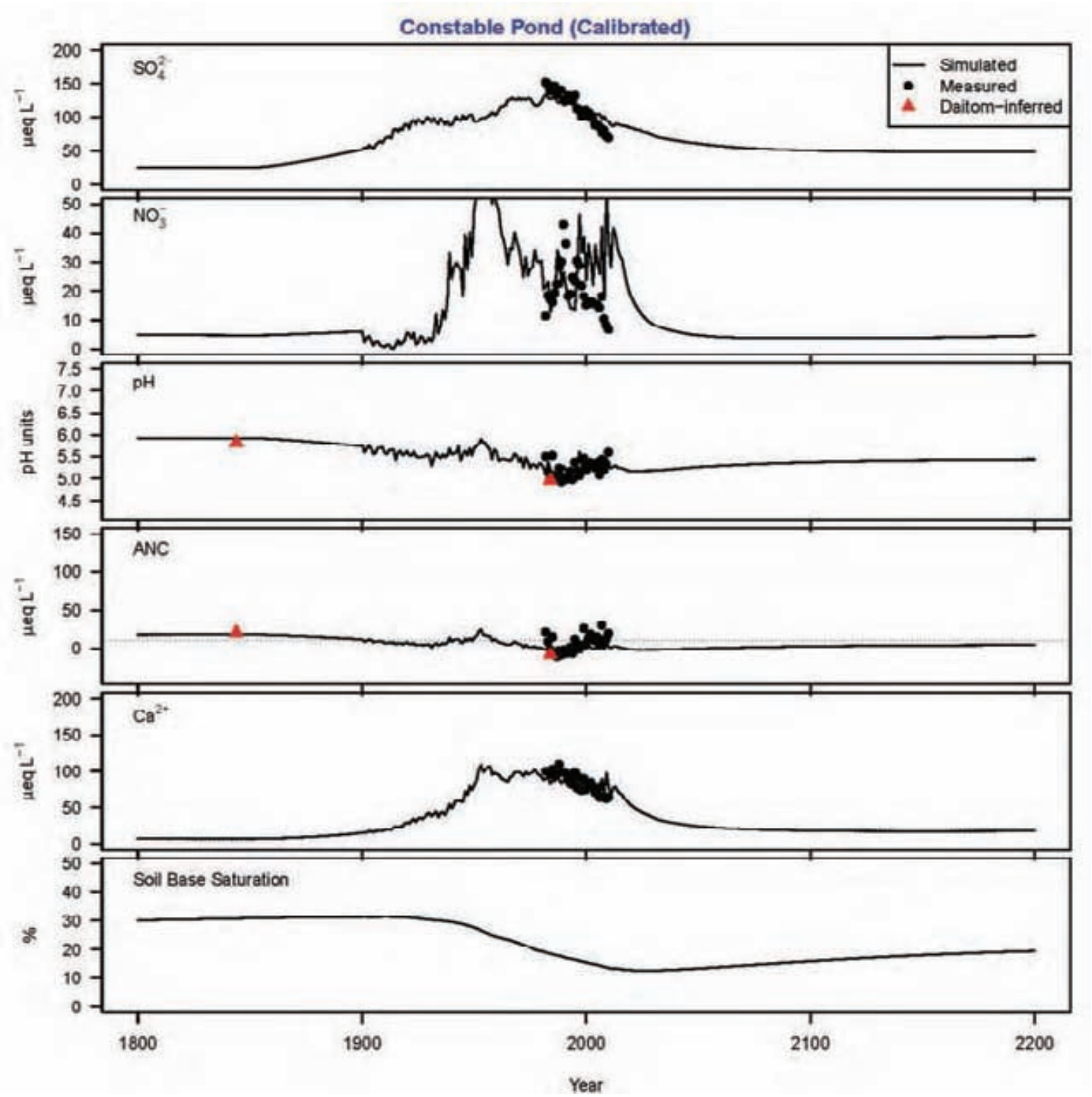
Appendix 1
Time-series results of model simulated concentrations of SO_4^{2-}, NO_3^-, pH, ANC, Ca^{2+} and soil percent base saturation for the 12 calibration and 14 confirmation lakes

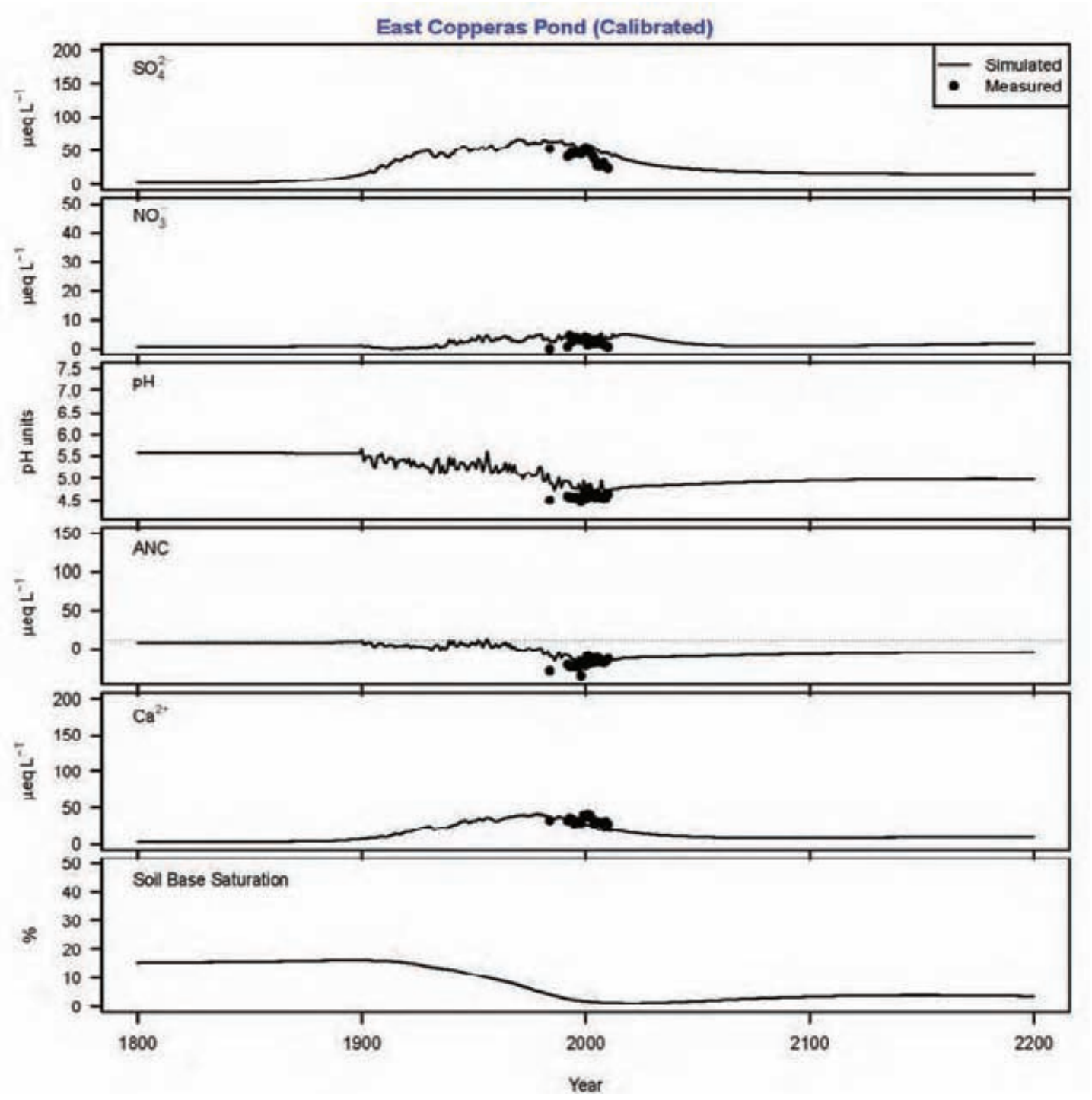

Arbutus Pond (Calibrated)
Simulated
Measured
SO_4^{2-}
NO_3^-
pH
ANC
Ca^{2+}
Soil Base Saturation
μeq L⁻¹
pH units
%
Year

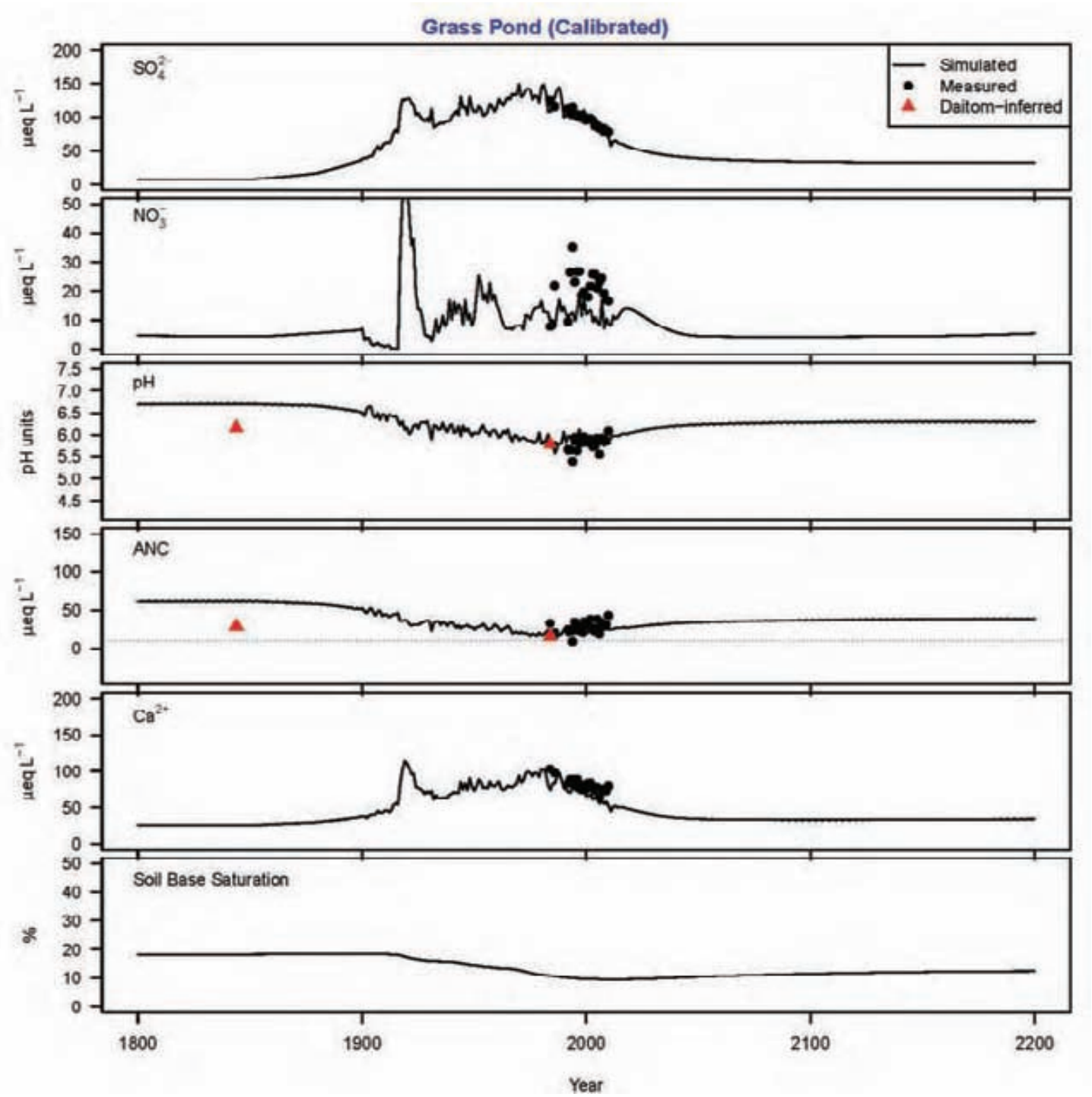

Brooktrout Lake (Calibrated)
Simulated
Measured
SO_4^{2-}
NO_3^-
pH
ANC
Ca^{2+}
Soil Base Saturation
μeq L⁻¹
pH units
%
Year
1800
1900
2000
2100
2200

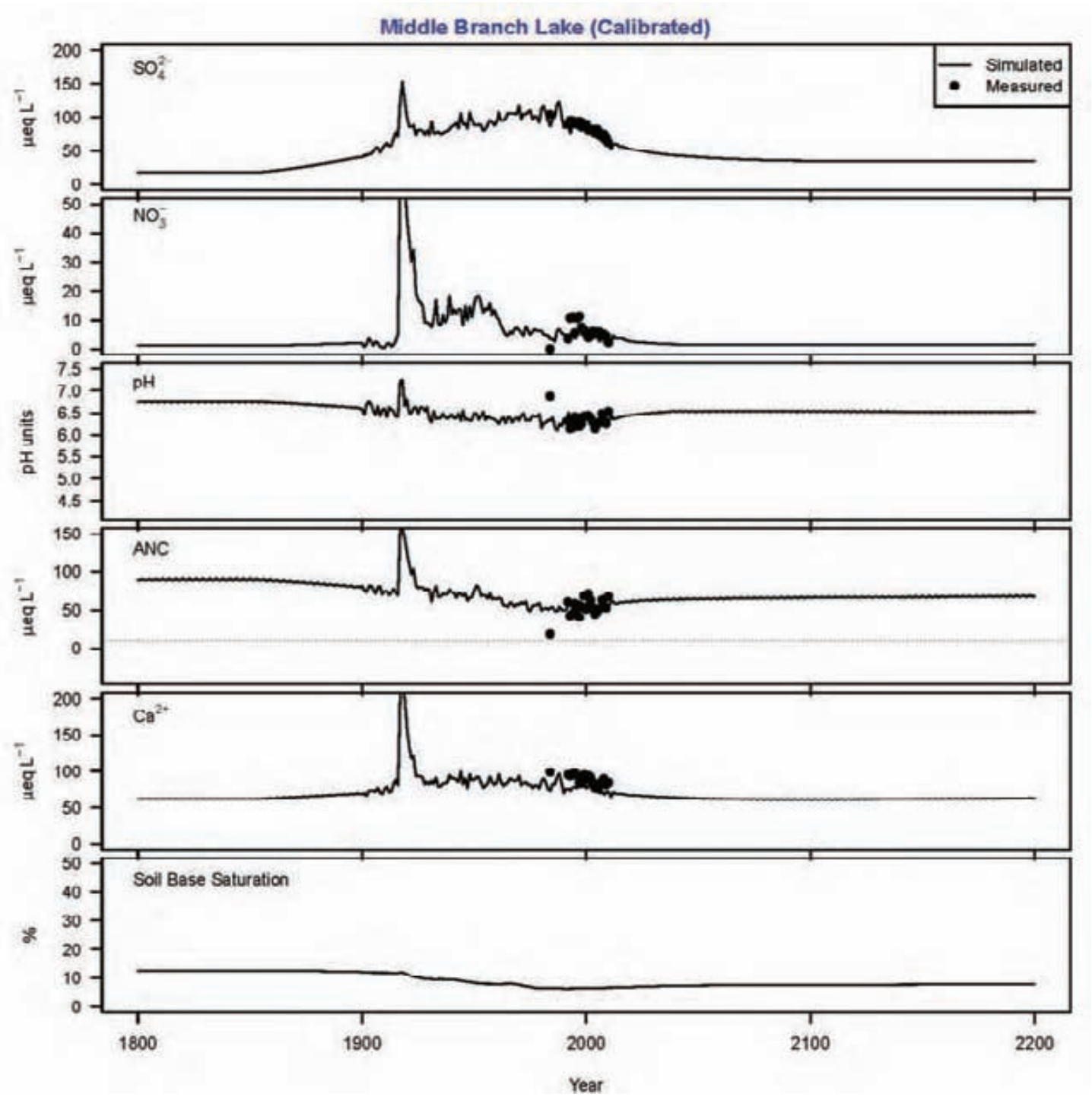

Carry Pond (Calibrated)
Simulated
Measured
SO_4^{2-}
NO_3^-
pH
ANC
Ca^{2+}
Soil Base Saturation
μeq L⁻¹
pH units
%
Year
1800
1900
2000
2100
2200

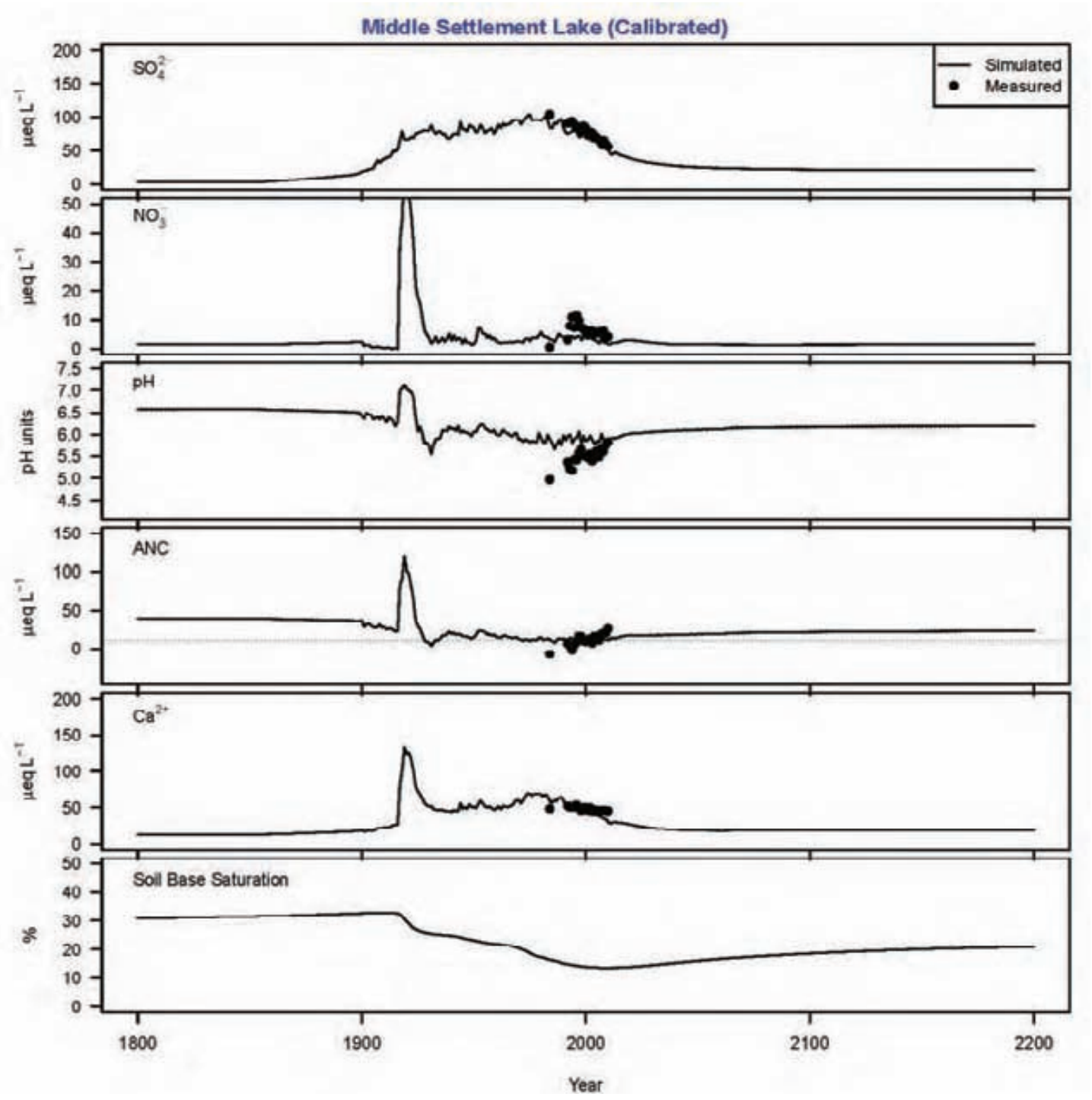

Clear Pond (Calibrated)
Simulated
Measured
Daitom-inferred
SO_4^{2-}
NO_3^-
pH
ANC
Ca^{2+}
Soil Base Saturation
μeq L⁻¹
pH units
%
Year
1800
1900
2000
2100
2200

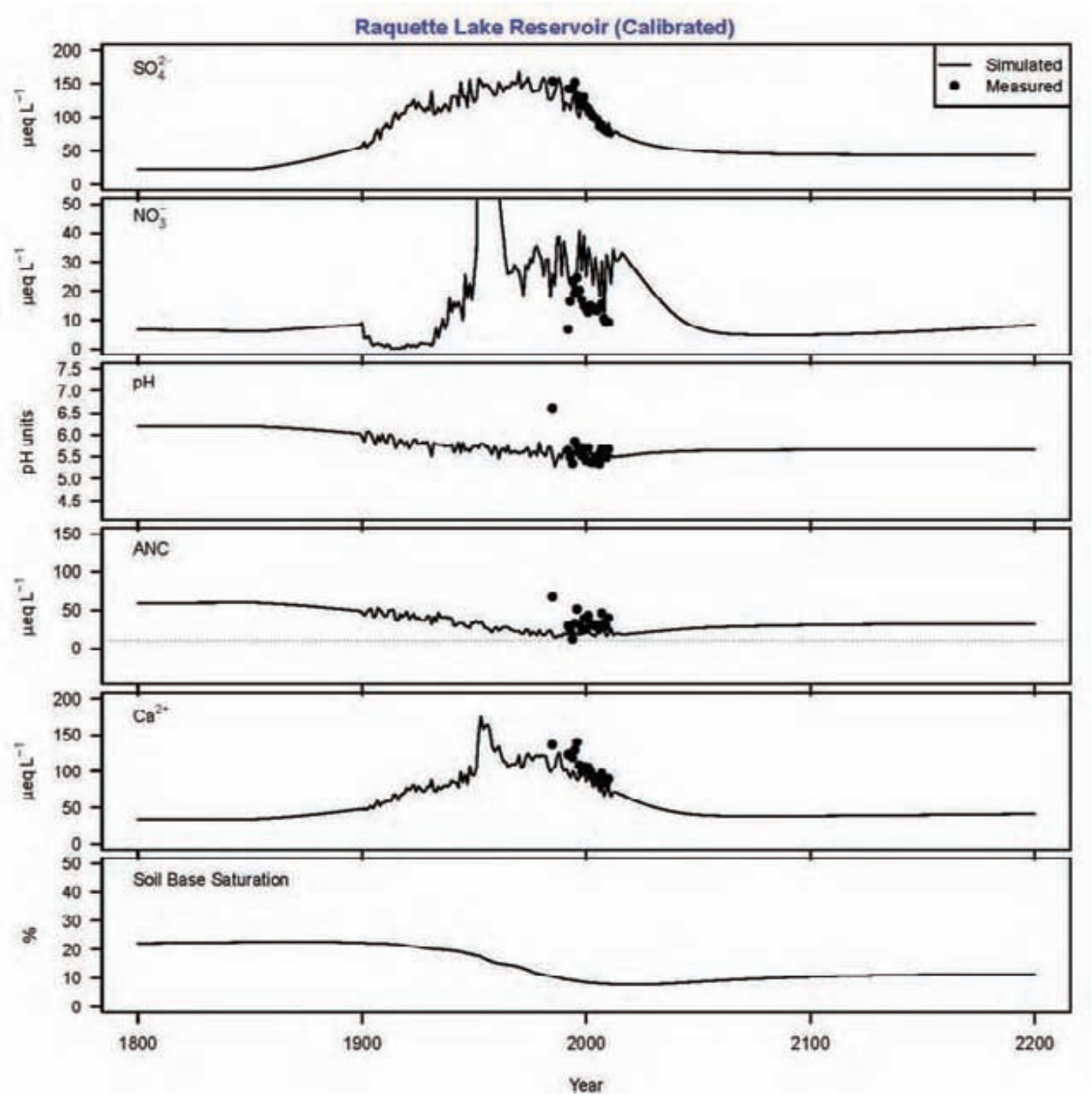

Constable Pond (Calibrated)
Simulated
Measured
Daitom-inferred
SO_4^{2-}
NO_3^-
pH
ANC
Ca^{2+}
Soil Base Saturation
μeq L⁻¹
pH units
%
Year
1800
1900
2000
2100
2200

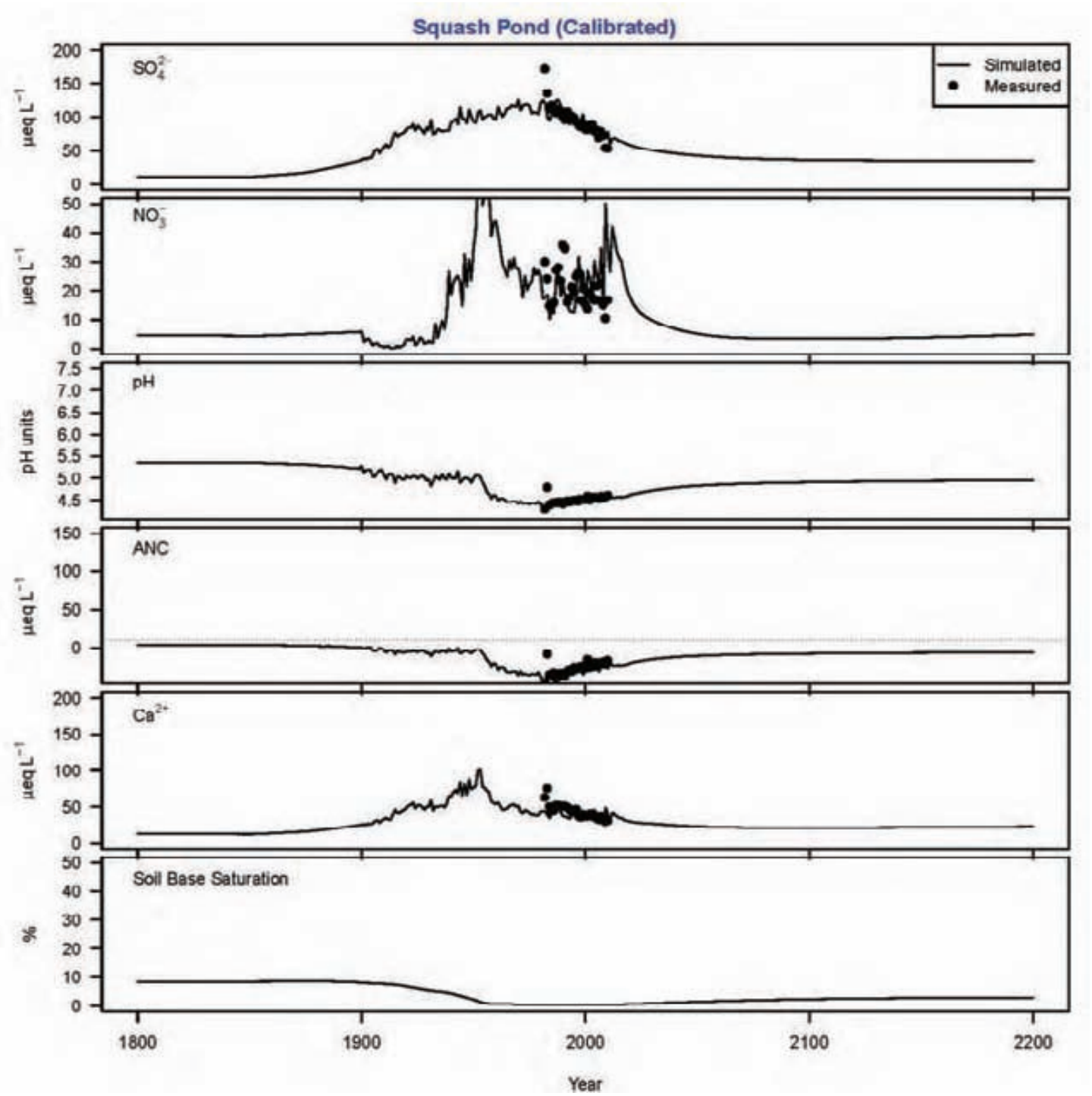

East Copperas Pond (Calibrated)
Simulated
Measured
SO_4^{2-}
NO_3^-
pH
ANC
Ca^{2+}
Soil Base Saturation
μeq L⁻¹
pH units
%
Year
1800
1900
2000
2100
2200

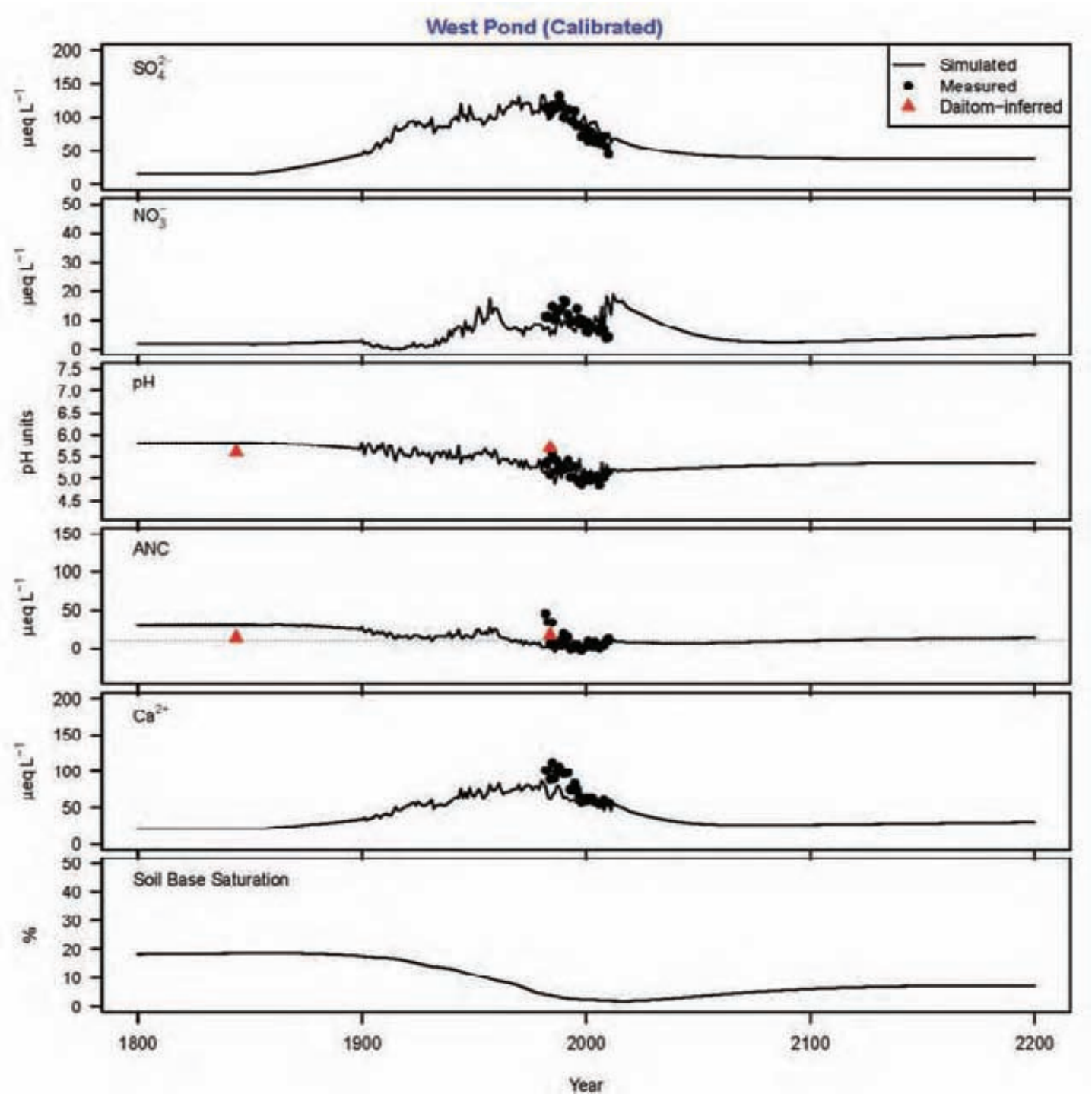

Grass Pond (Calibrated)
Simulated
Measured
Daitom-inferred
SO_4^{2-}
NO_3^-
pH
ANC
Ca^{2+}
Soil Base Saturation
μeq L⁻¹
pH units
%
Year
1800
1900
2000
2100
2200

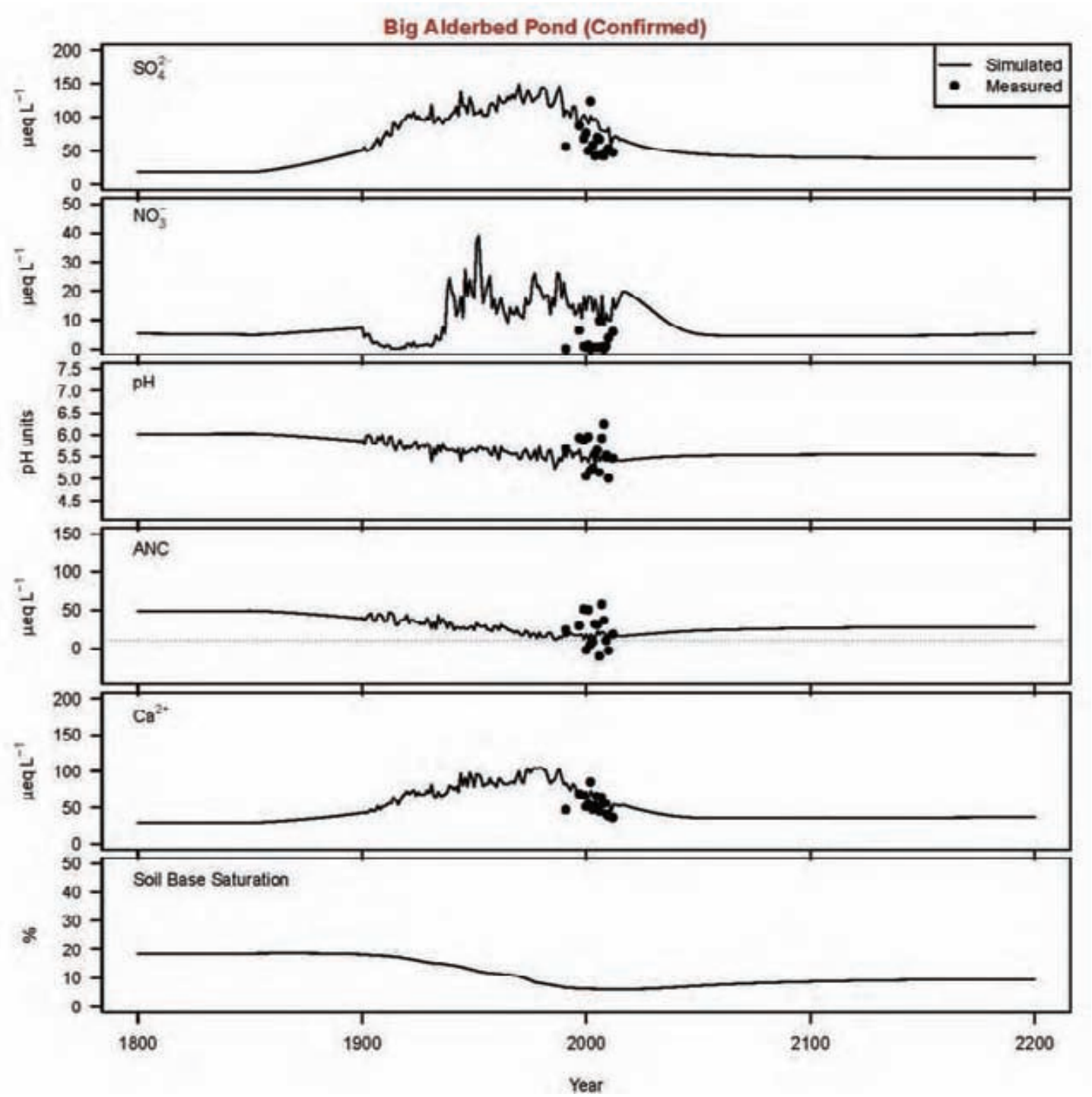

Middle Branch Lake (Calibrated)
Simulated
Measured
SO_4^{2-}
NO_3^-
pH
ANC
Ca^{2+}
Soil Base Saturation
μeqL⁻¹
pH units
%
Year

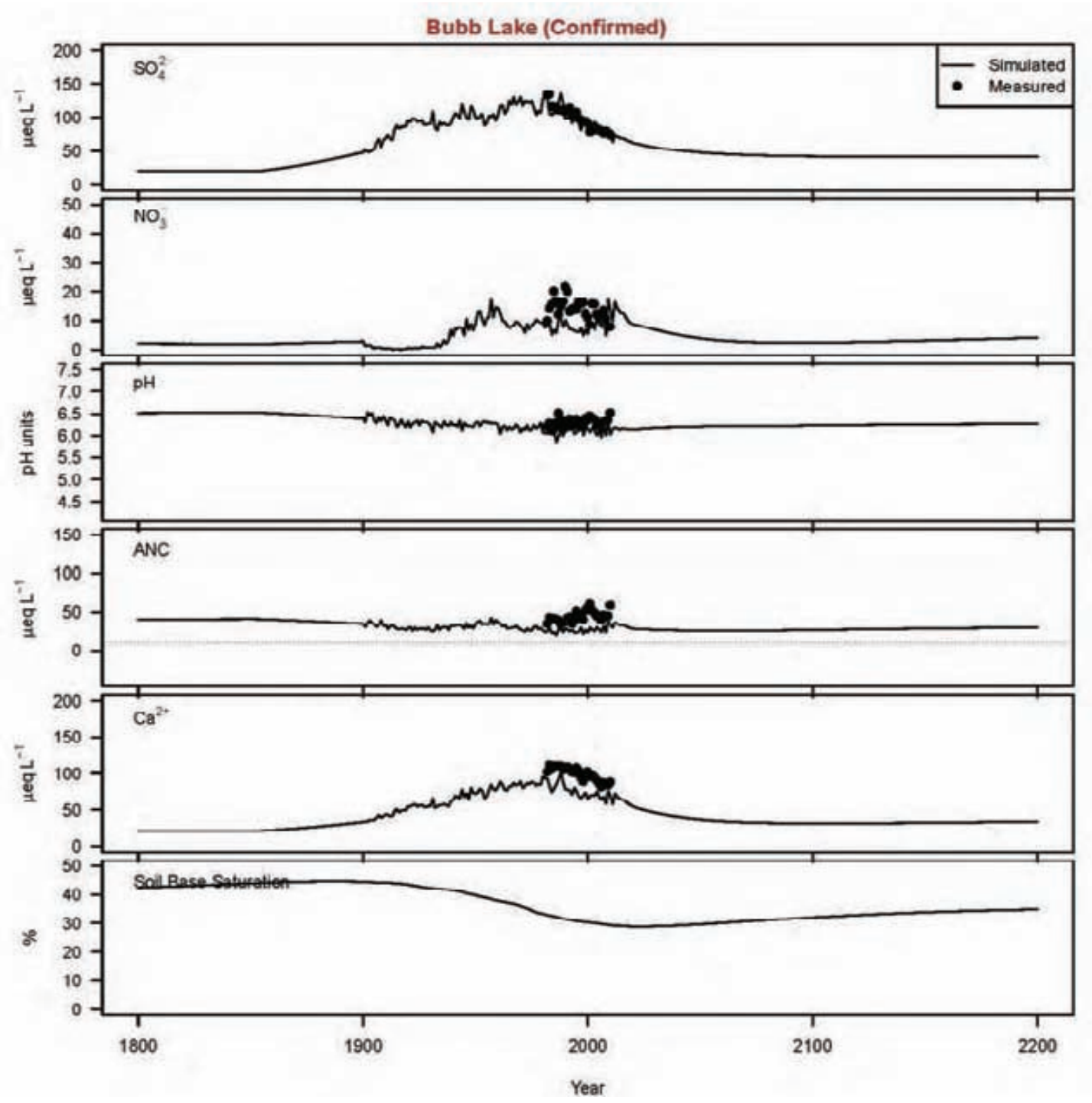

Middle Settlement Lake (Calibrated)
Simulated
Measured
SO_4^{2-}
NO_3^-
pH
ANC
Ca^{2+}
Soil Base Saturation
μeq L⁻¹
pH units
%
Year

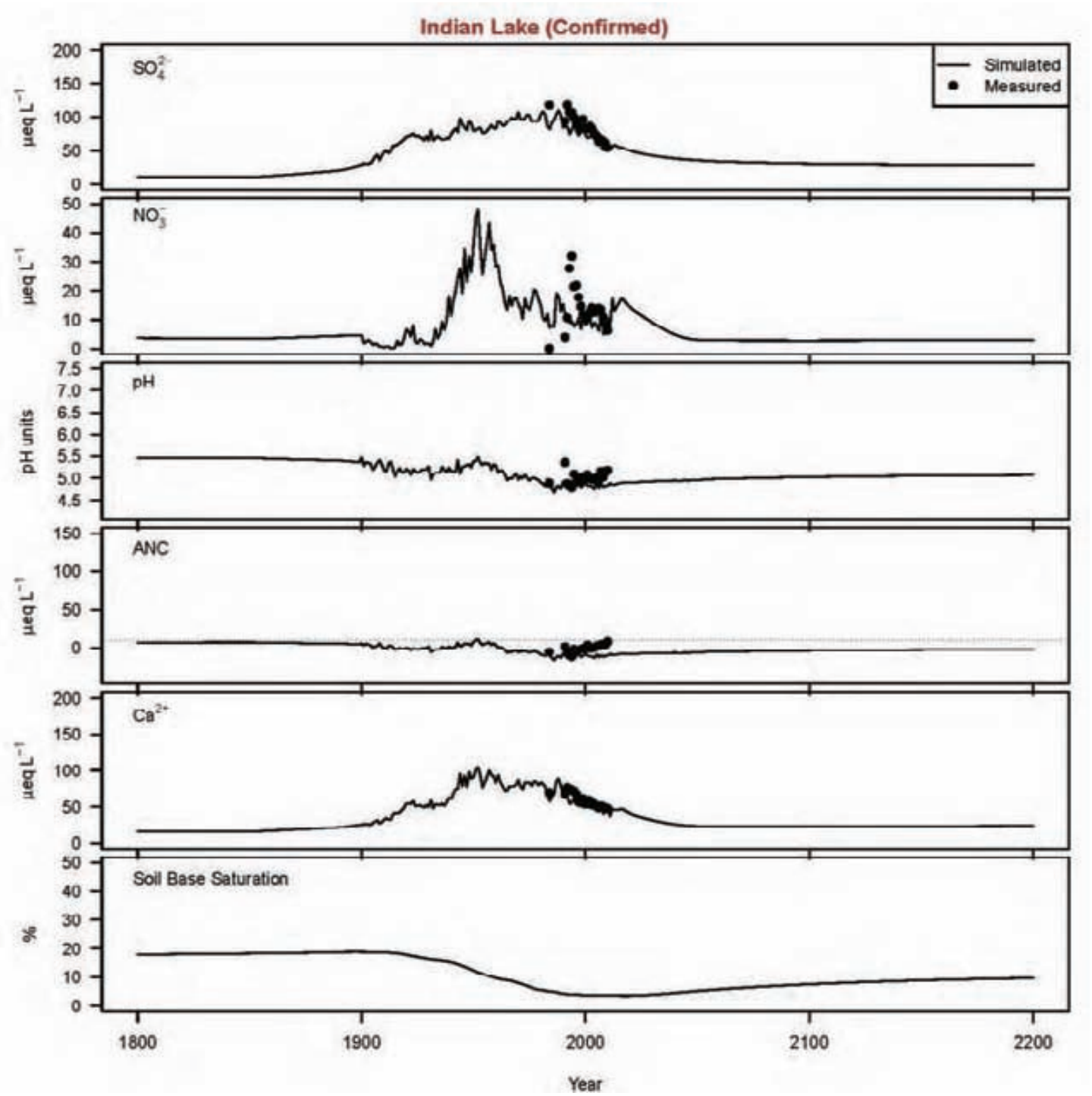

Raquette Lake Reservoir (Calibrated)
Simulated
Measured
SO_4^{2-}
NO_3^-
pH
ANC
Ca^{2+}
Soil Base Saturation
μeq L⁻¹
pH units
%
Year
1800
1900
2000
2100
2200

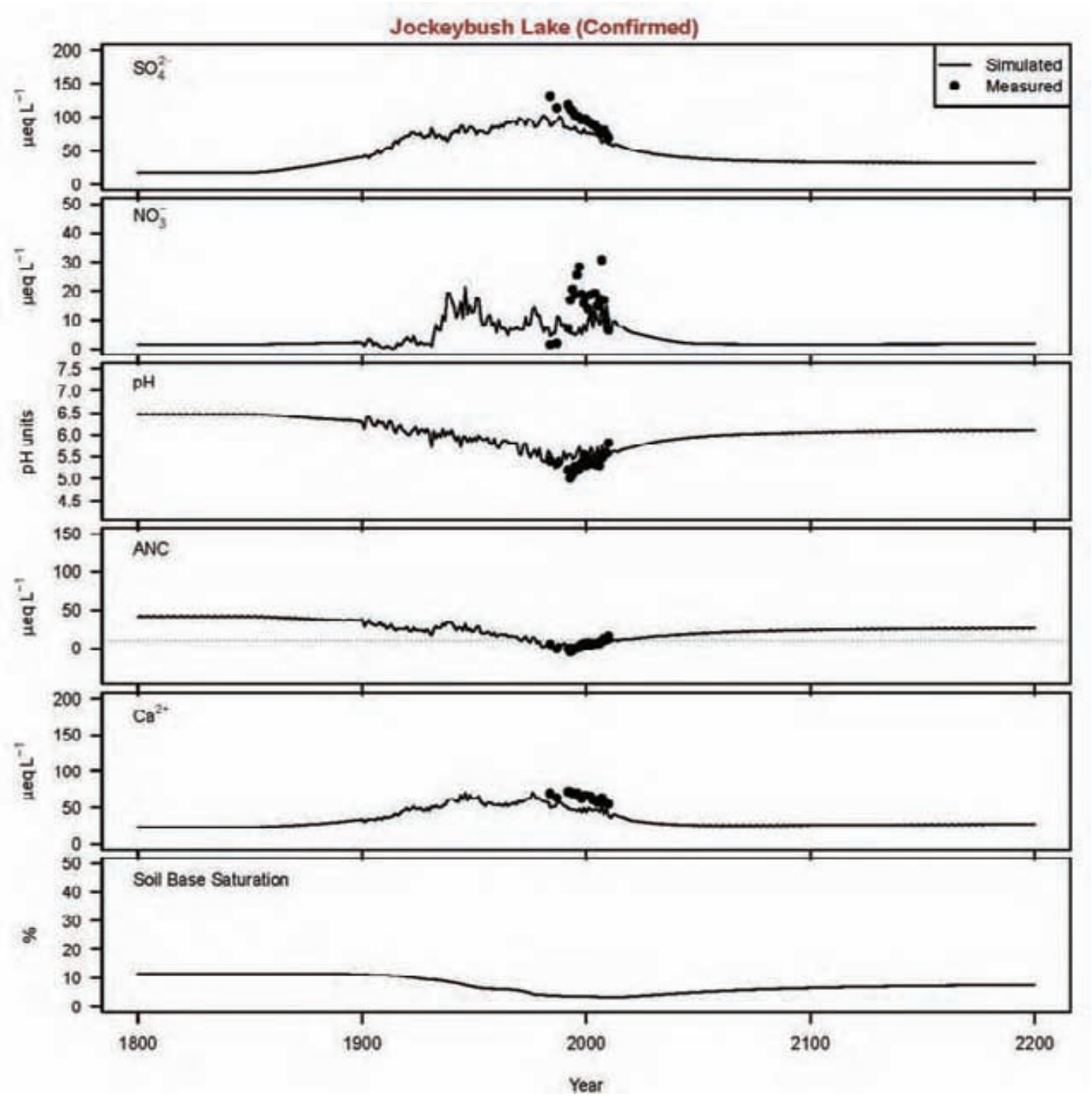

Squash Pond (Calibrated)
Simulated
Measured
SO_4^{2-}
NO_3^-
pH
ANC
Ca^{2+}
Soil Base Saturation
μeq L⁻¹
pH units
%
Year
1800
1900
2000
2100
2200

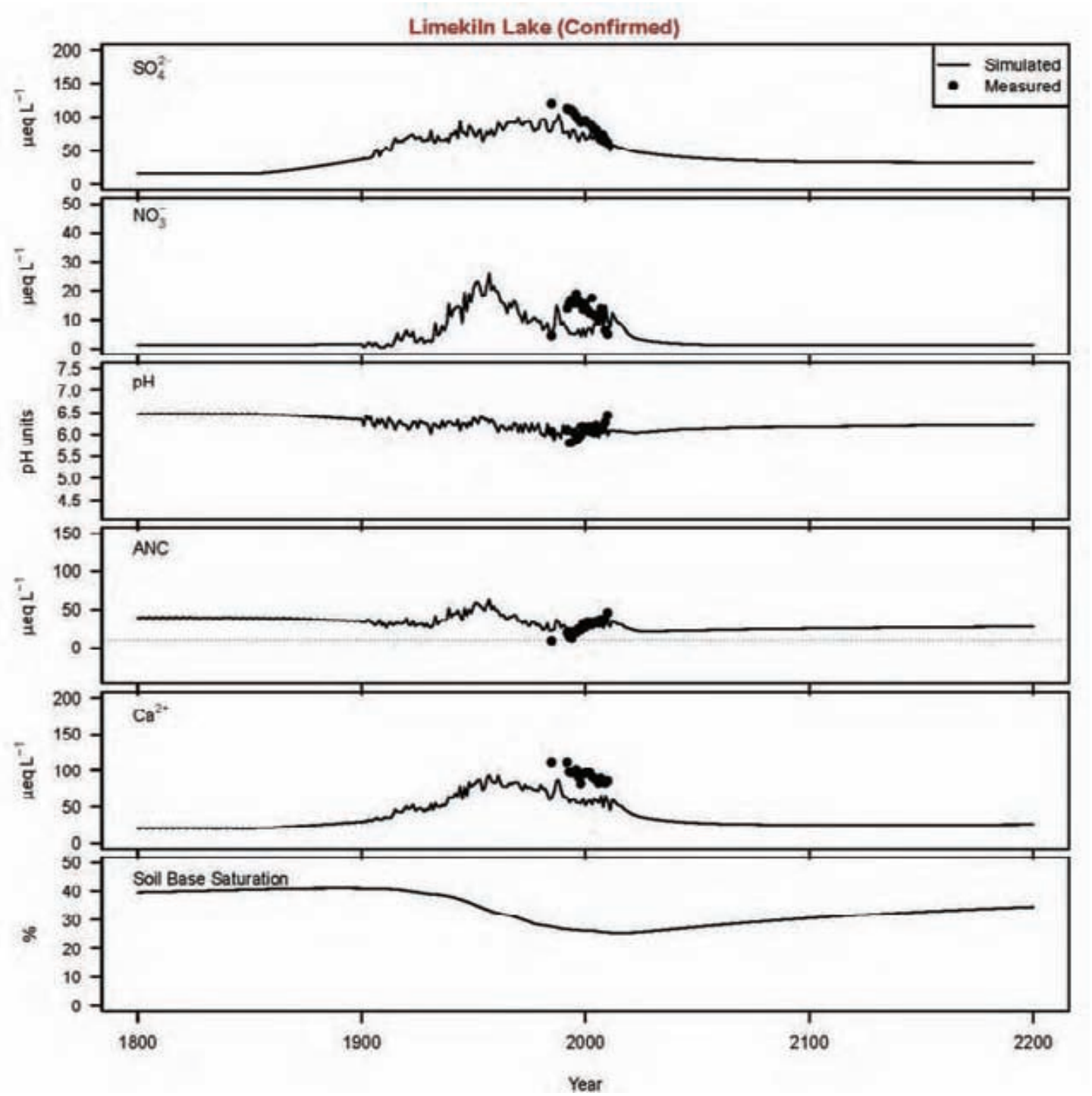

West Pond (Calibrated)
Simulated
Measured
Daitom-inferred
SO_4^{2-}
NO_3^-
pH
ANC
Ca^{2+}
Soil Base Saturation
μeq L⁻¹
pH units
%
Year
1800
1900
2000
2100
2200

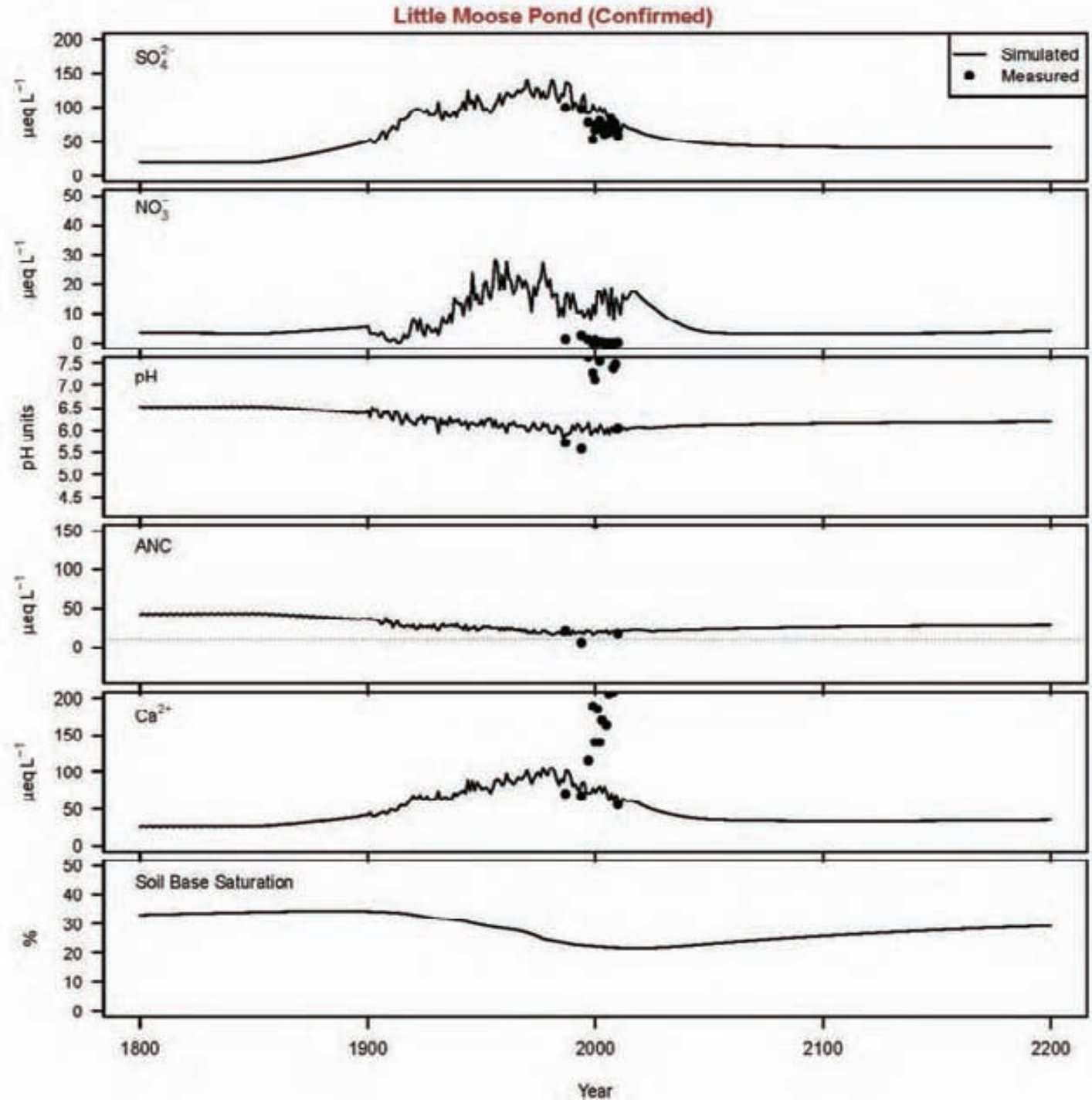

Big Alderbed Pond (Confirmed)
Simulated
Measured
SO_4^{2-}
NO_3^-
pH
ANC
Ca^{2+}
Soil Base Saturation
μeq L⁻¹
pH units
%
Year
1800
1900
2000
2100
2200

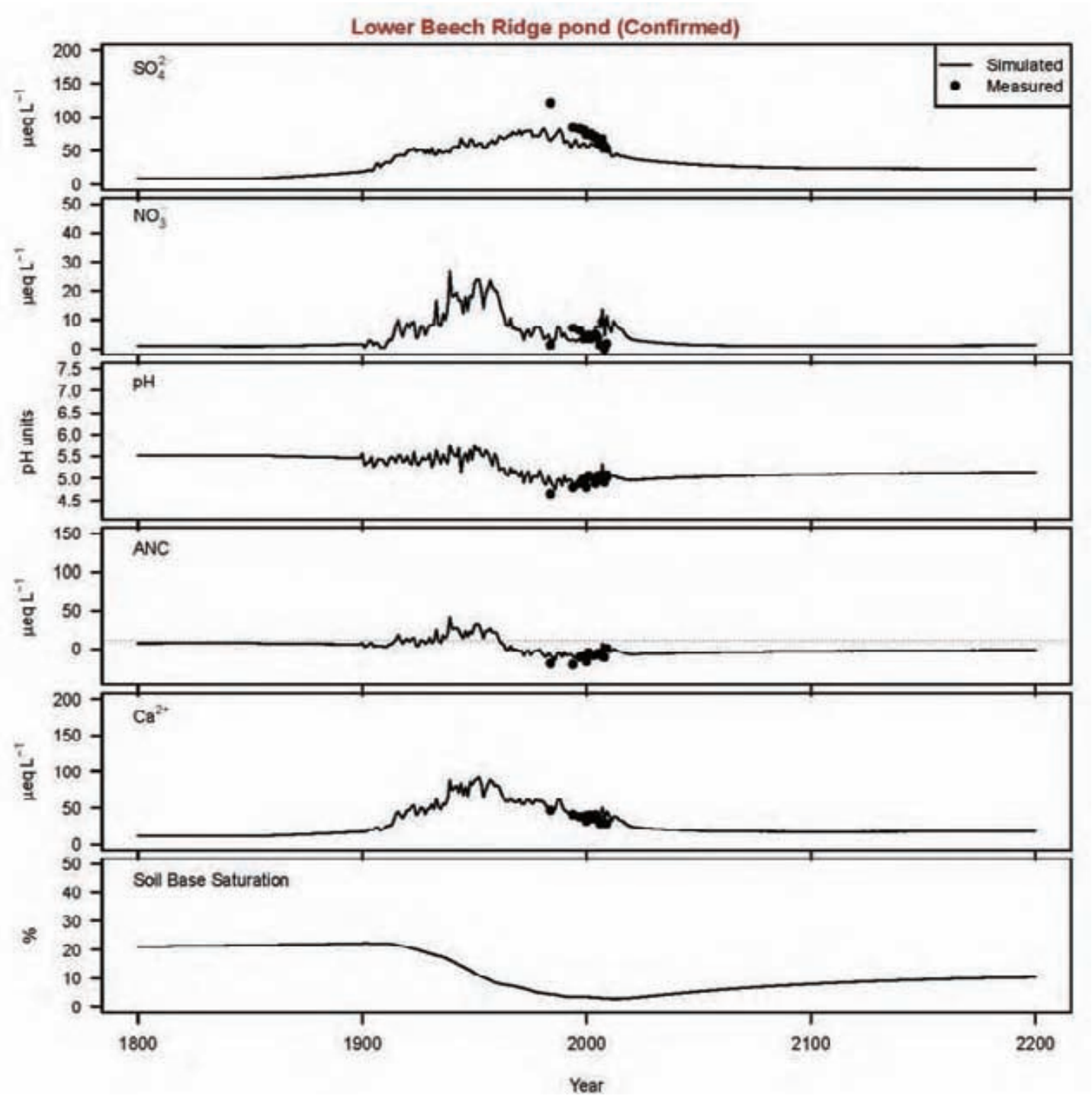

Bubb Lake (Confirmed)
Simulated
Measured
SO_4^{2-}
NO_3
pH
ANC
Ca^{2+}
Soil Base Saturation
μeq L⁻¹
pH units
%
Year
1800
1900
2000
2100
2200

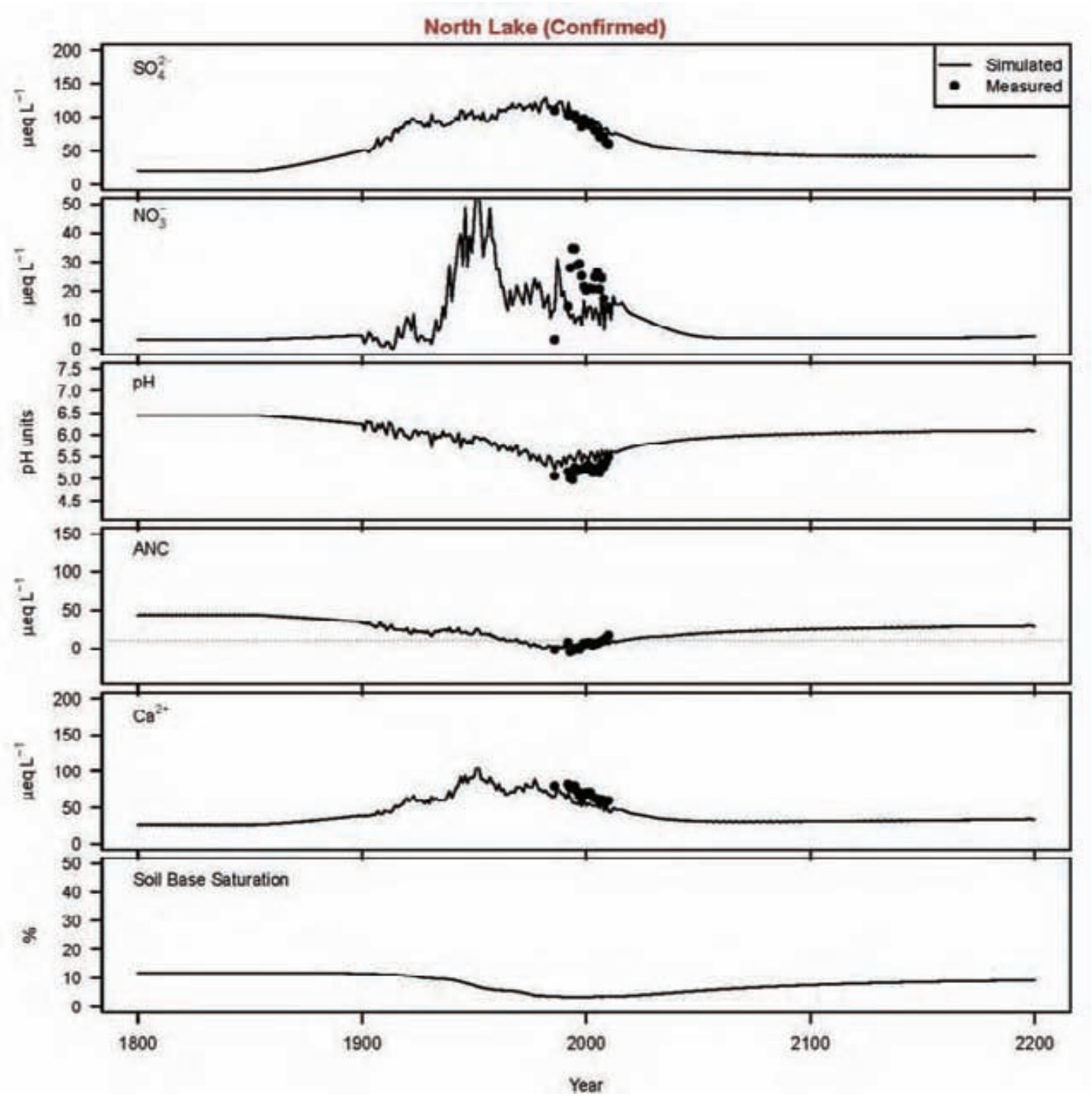

Indian Lake (Confirmed)
Simulated
Measured
SO_4^{2-}
NO_3^-
pH
ANC
Ca^{2+}
Soil Base Saturation
μeq L⁻¹
pH units
%
Year
1800
1900
2000
2100
2200

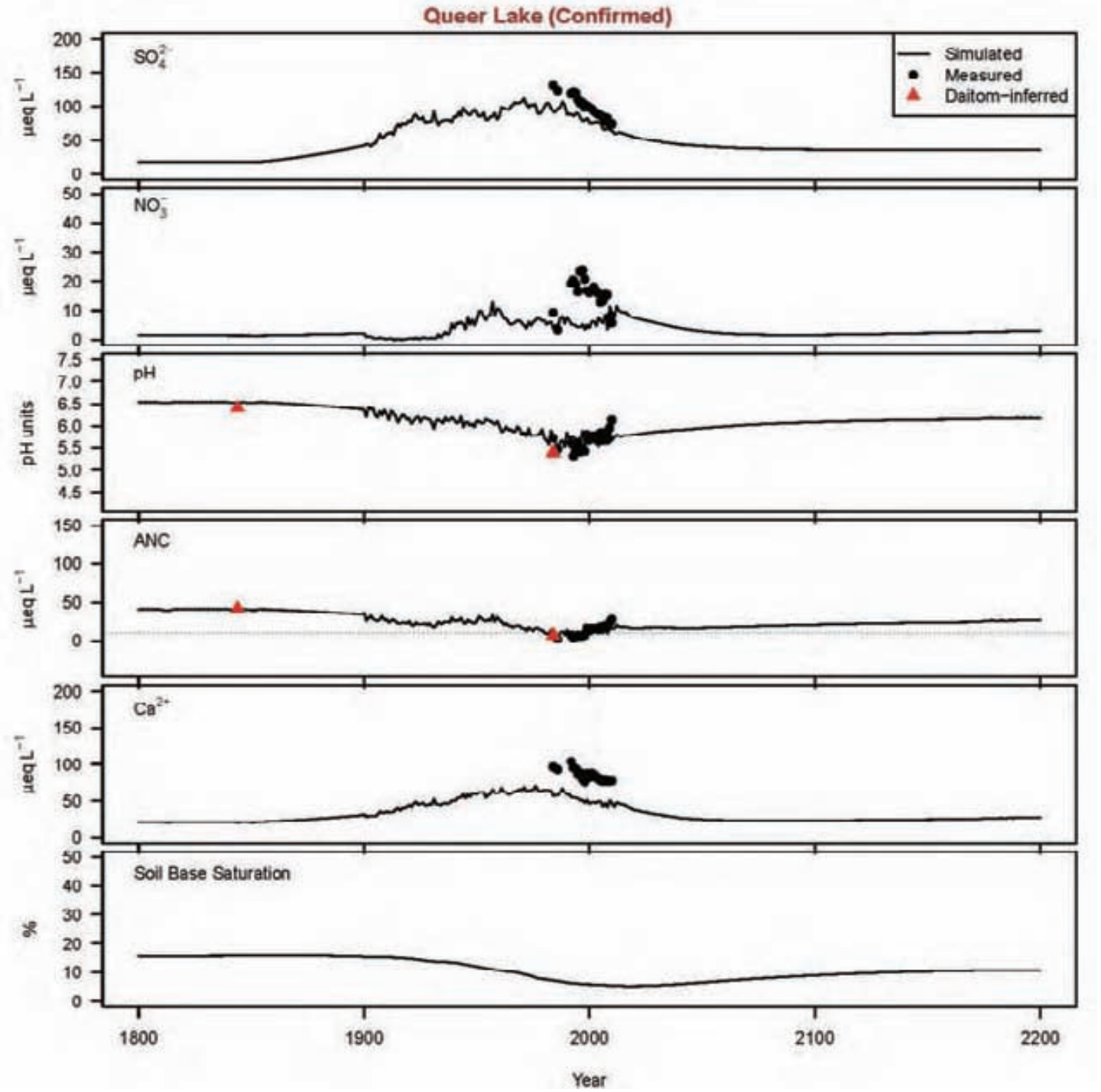

Jockeybush Lake (Confirmed)
Simulated
Measured
SO_4^{2-}
NO_3^-
pH
ANC
Ca^{2+}
Soil Base Saturation
μeqL⁻¹
pH units
%
Year
1800
1900
2000
2100
2200

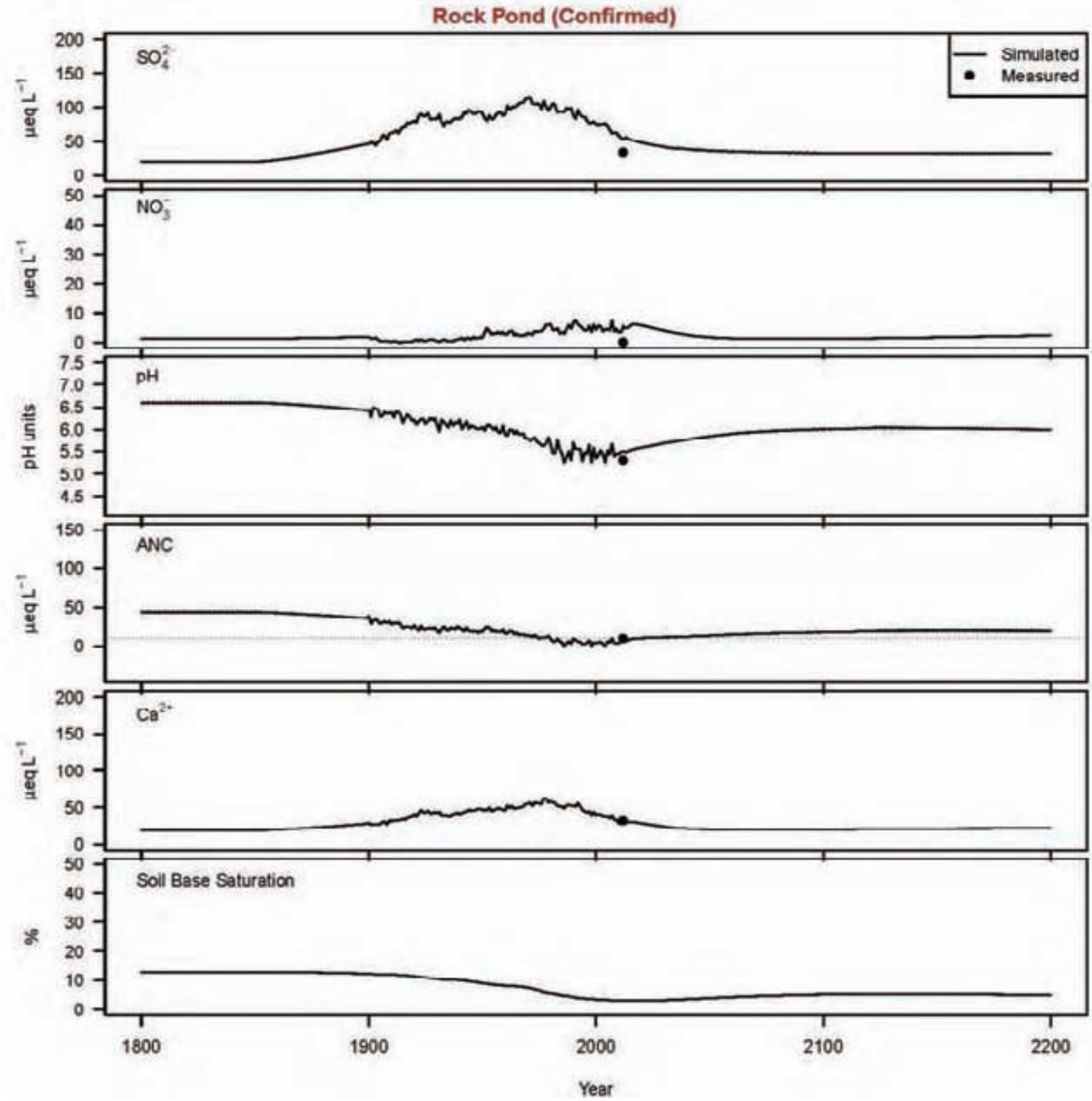

Limekiln Lake (Confirmed)
Simulated
Measured
SO_4^{2-}
NO_3^-
pH
ANC
Ca^{2+}
Soil Base Saturation
μeq L⁻¹
pH units
%
Year
1800
1900
2000
2100
2200

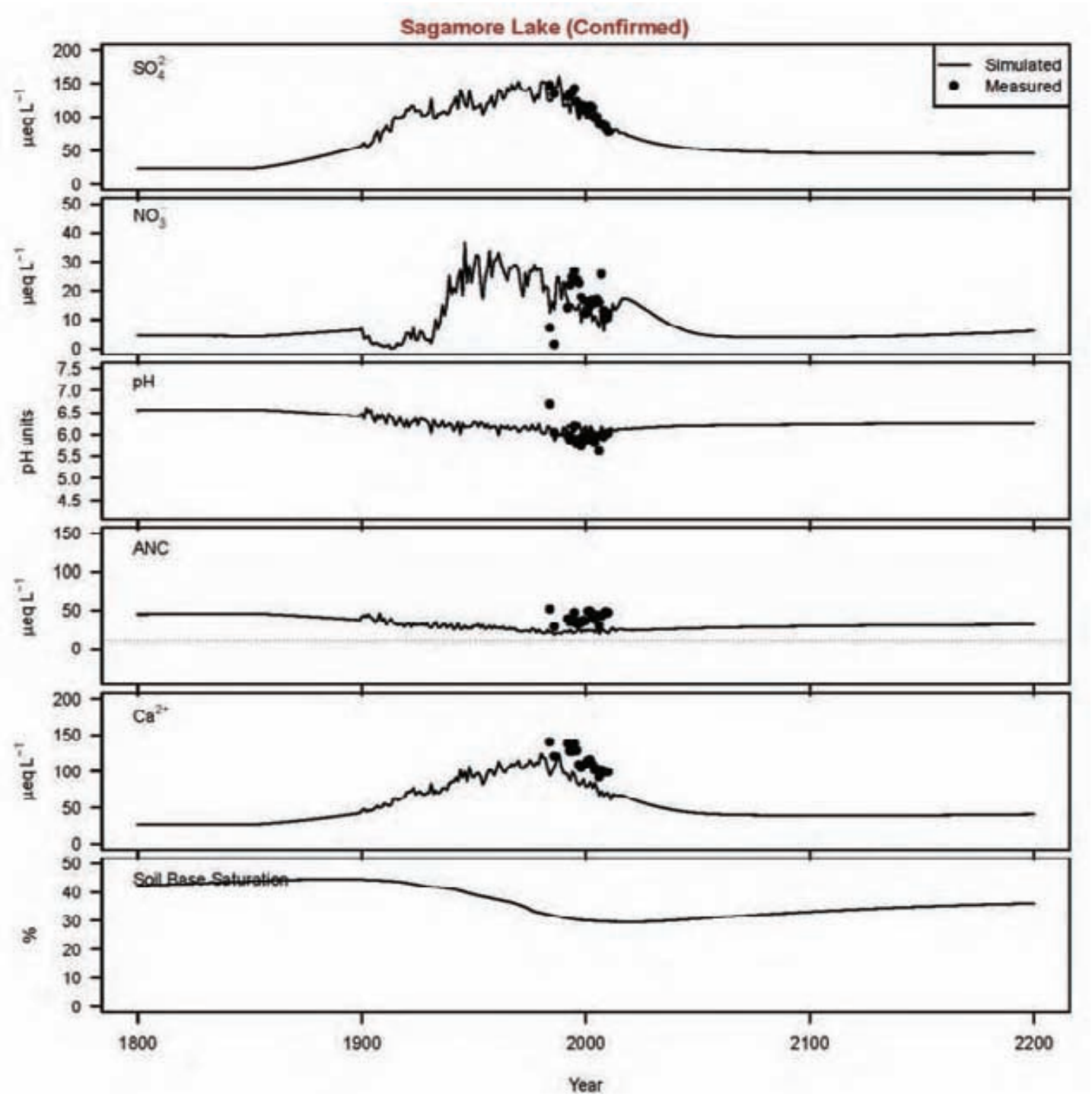

Little Moose Pond (Confirmed)
Simulated
Measured
SO_4^{2-}
NO_3^-
pH
ANC
Ca^{2+}
Soil Base Saturation
μeq L⁻¹
pH units
%
Year
1800
1900
2000
2100
2200

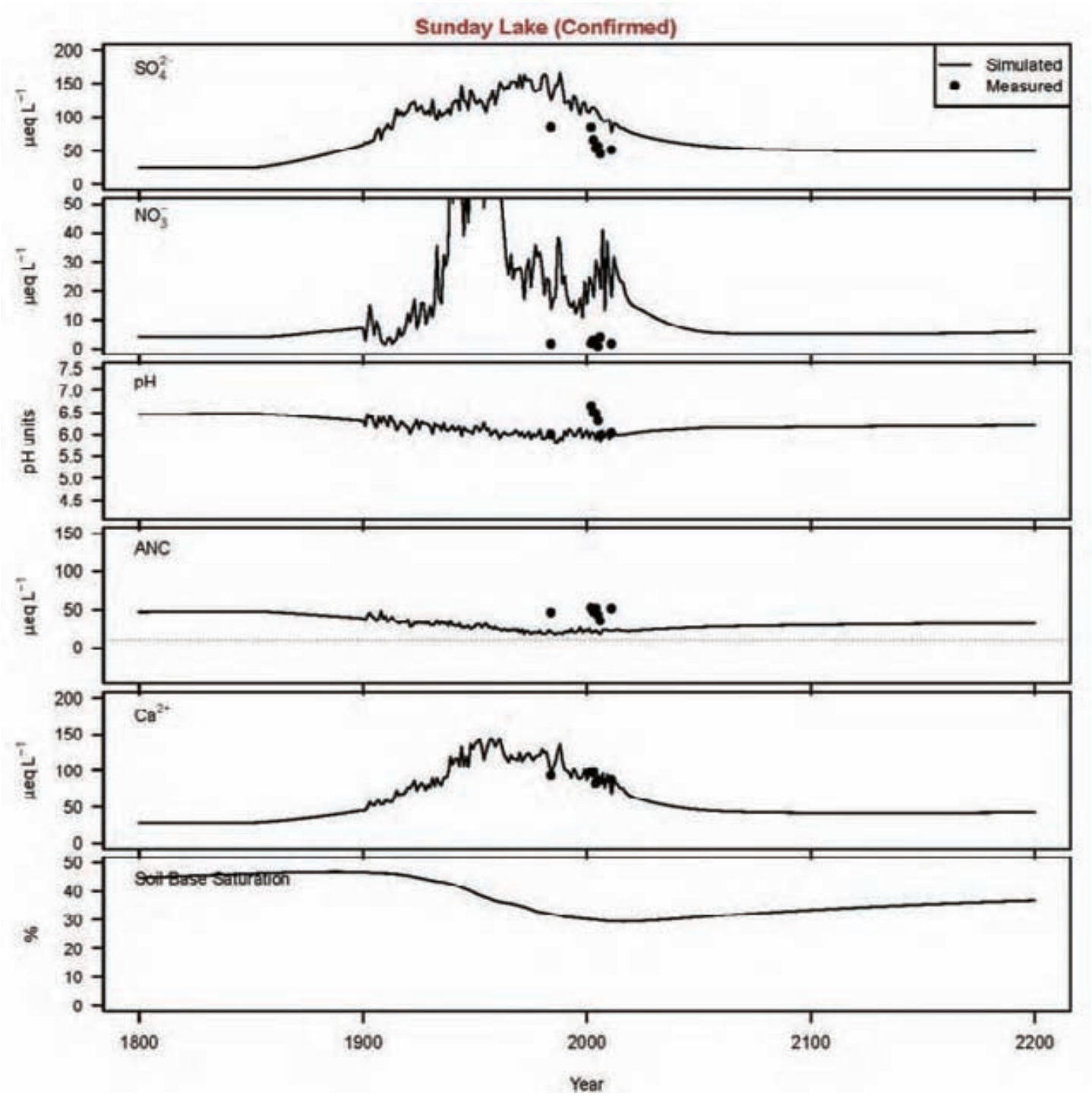

Lower Beech Ridge pond (Confirmed)
Simulated
Measured
SO_4^{2-}
NO_3^-
pH
ANC
Ca^{2+}
Soil Base Saturation
μeq L⁻¹
pH units
%
Year
1800
1900
2000
2100
2200

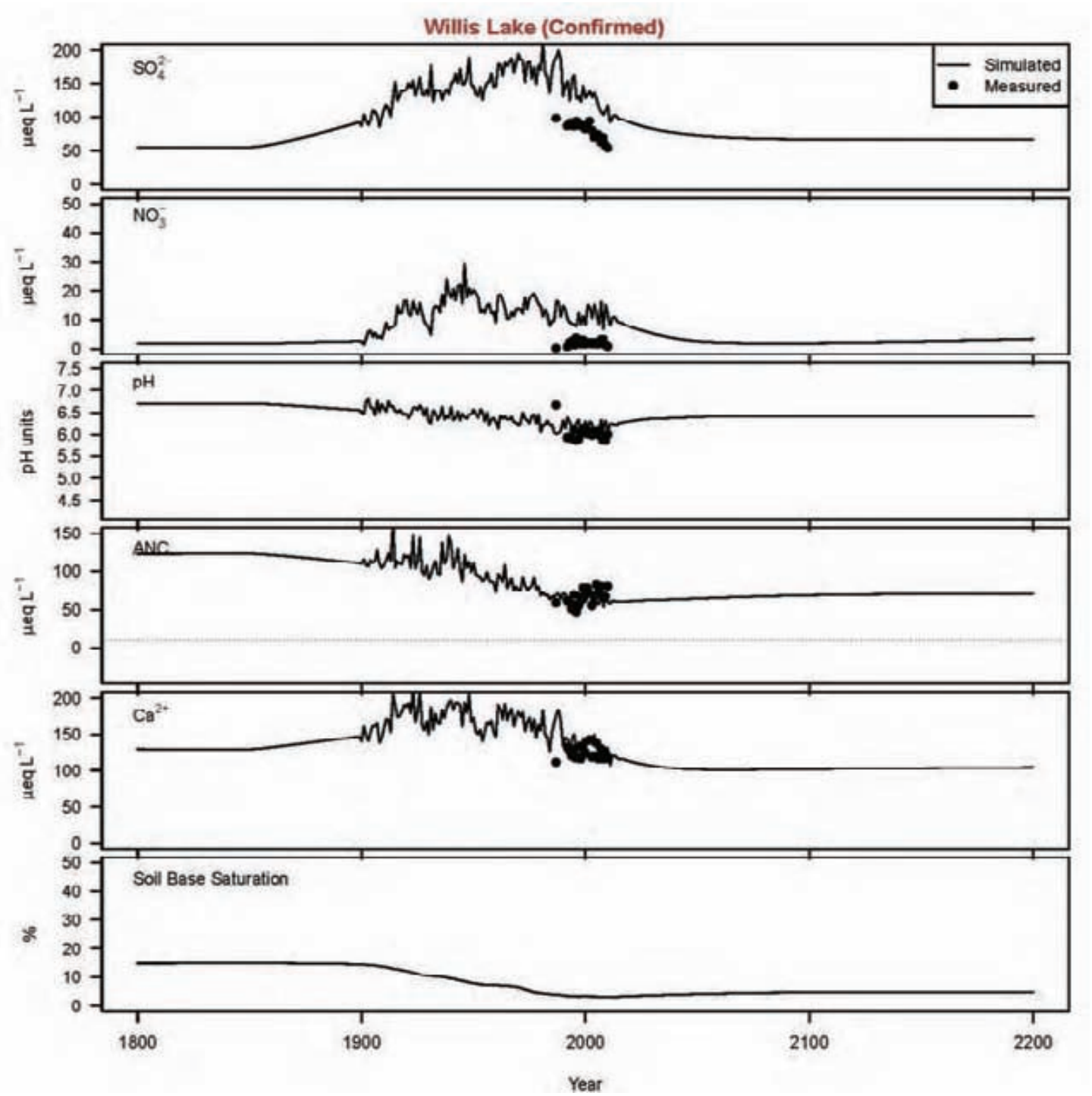

North Lake (Confirmed)
Simulated
Measured
SO_4^{2-}
NO_3^-
pH
ANC
Ca^{2+}
Soil Base Saturation
μeq L⁻¹
pH units
%
Year
1800
1900
2000
2100
2200

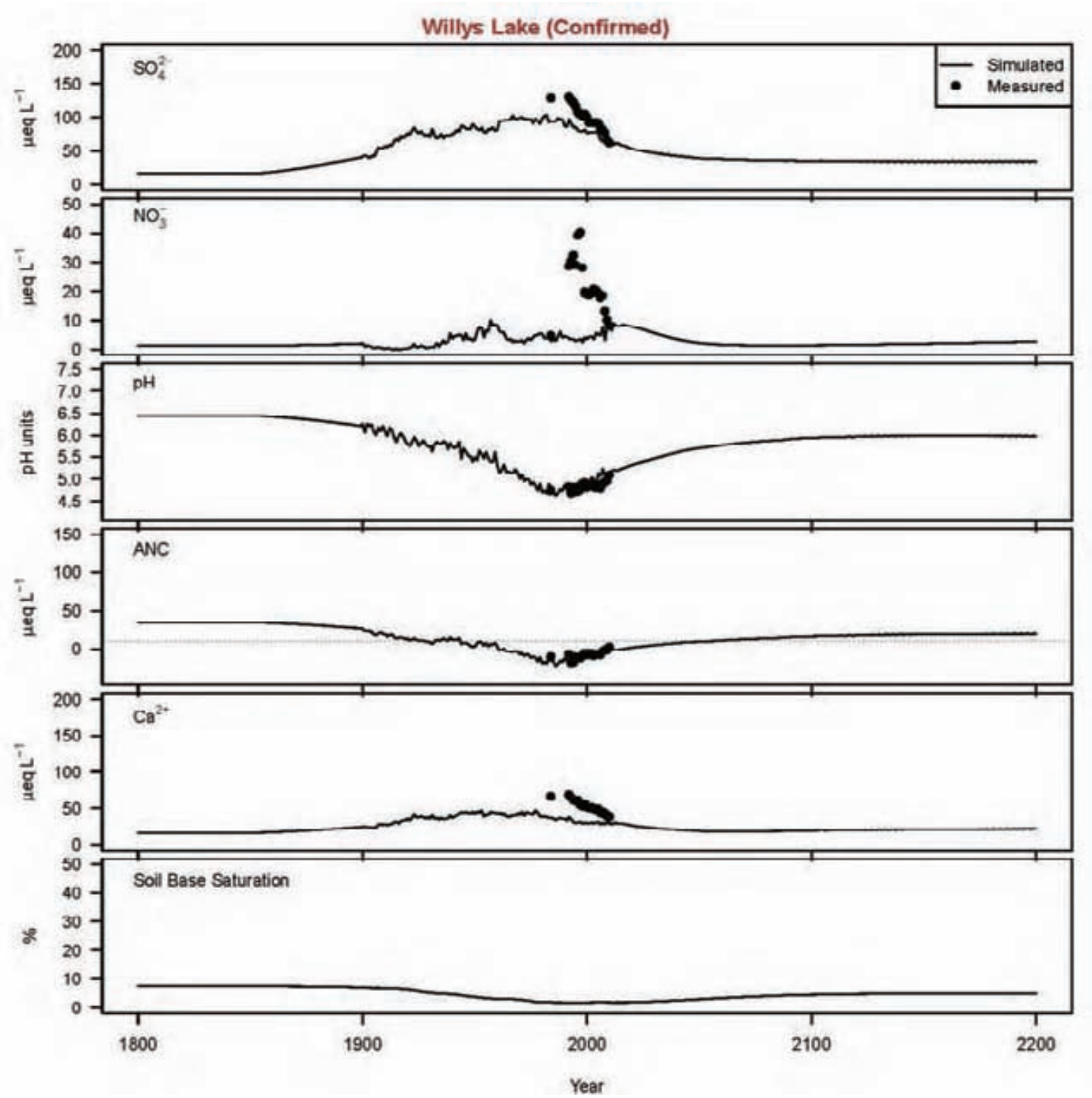

Queer Lake (Confirmed)
Simulated
Measured
Daitom-inferred
SO_4^{2-}
NO_3^-
pH
ANC
Ca^{2+}
Soil Base Saturation
μeq L⁻¹
pH units
%
Year
1800
1900
2000
2100
2200


Rock Pond (Confirmed)
Simulated
Measured
SO_4^{2-}
NO_3^-
pH
ANC
Ca^{2+}
Soil Base Saturation
μeq L⁻¹
pH units
%
Year
1800
1900
2000
2100
2200


Sagamore Lake (Confirmed)
Simulated
Measured
SO_4^{2-}
NO_3^-
pH
ANC
Ca^{2+}
Soil Base Saturation
μeq L⁻¹
pH units
%
Year
1800
1900
2000
2100
2200


Sunday Lake (Confirmed)
Simulated
Measured
SO_4^{2-}
NO_3^-
pH
ANC
Ca^{2+}
Soil Base Saturation
μeq L⁻¹
pH units
%
Year
1800
1900
2000
2100
2200


Willis Lake (Confirmed)
Simulated
Measured
SO_4^{2-}
NO_3^-
pH
ANC
Ca^{2+}
Soil Base Saturation
μeq L⁻¹
pH units
%
Year
1800
1900
2000
2100
2200


Willys Lake (Confirmed)
Simulated
Measured
SO_4^{2-}
NO_3^-
pH
ANC
Ca^{2+}
Soil Base Saturation
μeq L⁻¹
pH units
%
Year
1800
1900
2000
2100
2200

Appendix 2
PnET-BGC parameters used in model application to the 128 TMDL lakes

PnET-BGC Calibration Parameters

Parameter Set	SO4Ad (mol/kg)[a]	Site Doc[b]	CEC (eq/kg)[c]	WHAM DocFrac[d]	Weathering rate ($g/m^2/month$)								Tableau file			Pmass[1] soil[f]
					Na^+	Mg^{2+}	Al^{3+}	K^+	Ca^{2+}	S	F	Si	X_2Ca[e]	X_3Al[e]	XSO4[e]	
Class 1	0.0155	0.0211	0.1025	0.582	0.045	0.021	0.743	0.011	0.198	0.06	0.491	0.821	-5.6	-3.388	9.521	-2.1
Class 2	0.0155	0.0133	0.096	0.383	0.047	0.015	0.192	0.01	0.052	0.023	0.318	0.81	-3.98	-3.788	9.321	-2.5
Class 3	0.0055	0.0138	0.0802	0.84	0.009	0.006	0.074	0.008	0.027	0.011	0.009	0.149	-4	-4.488	9.021	-2.85
Class 4	0.0155	0.0198	0.0887	0.386	0.045	0.023	0.094	0.003	0.24	0.06	0.076	1.283	-5.7	-3.388	9.521	-2
Class 5	0.0055	0.018	0.0849	0.837	0.045	0.02	0.374	0.012	0.042	0.018	0.212	0.688	-3.8	-3.388	9.521	-2.3
Class 6	0.0155	0.0133	0.096	0.383	0.047	0.015	0.192	0.01	0.0522	0.023	0.318	0.81	-3.98	-3.788	9.321	-2.2
Class 7	0.0155	0.0133	0.096	0.383	0.047	0.015	0.192	0.01	0.0422	0.023	0.318	0.81	-3.98	-3.788	9.321	-2.2
Class 8	0.0155	0.0133	0.096	0.383	0.047	0.015	0.192	0.01	0.0422	0.023	0.318	0.81	-3.98	-3.788	9.321	-2.1
Class 9	0.0155	0.0133	0.096	0.383	0.047	0.015	0.192	0.01	0.0322	0.023	0.318	0.81	-3.98	-3.788	9.321	-2.1

[a] SO_4^{2-} adsorption capacity

[b] Site density, moles of organic anions sites per mole of organic C

[c] Cation Exchange Capacity

[d] DOC partitioning coefficient

[e] Selectivity coefficients, log K

[f] Partial pressure of CO_2 in soil, unit: log (atm)