Supplementary Material: BRAN3 evaluation

This supplement provides an evaluation of Bluelink ReANalysis 3 against the same *in-situ* station observations that the ETAS model was evaluated against in the main paper (Section 3). Tables S1–S5 and Figures S1–S3 here are analogous to Tables 3–7 and Figures 2, 3 and 5 in the main document.

Table S1: Evaluation of coastal sea levels. Shown are the observed and model simulated seasonal cycle amplitude (mean to peak in cm; A), seasonal cycle phase (day-of-year at which peak occurs; ϕ_0) and skill scores for total (d), residual (d'), and annual averaged (d^{an}) sea level time series.

Tide gauge	A_{mod} (A_{obs})	$\phi_{0,mod}$ ($\phi_{0,obs}$)	d	d'	d^{an}
Hobart	5.86 (4.64)	148 (202)	0.61	0.56	0.63
Spring Bay	5.77 (3.36)	145 (188)	0.61	0.55	0.78

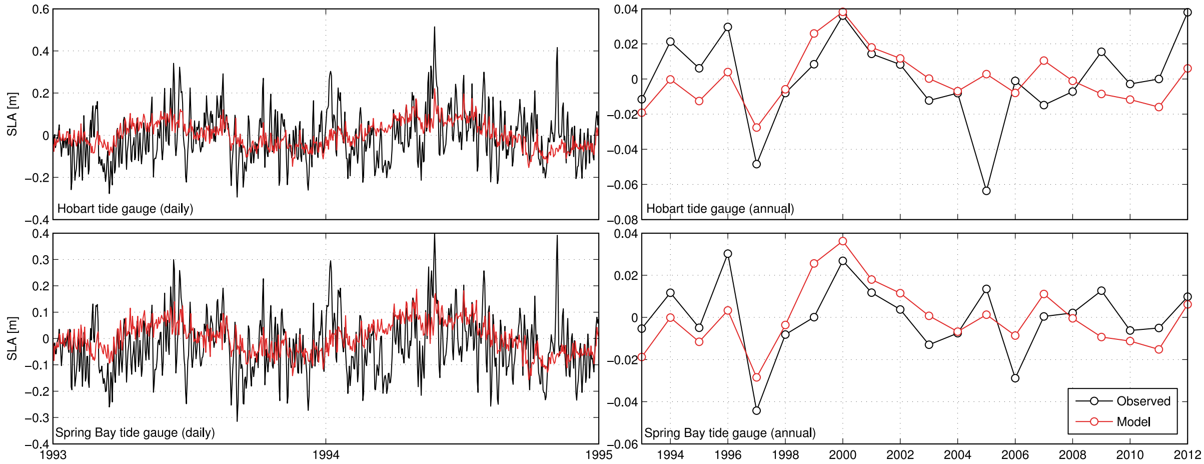

Figure S1: Coastal sea level time series. Shown are (left) daily averages and (right) annual anomalies of observed (black) and model simulated (red) sea levels at (upper) Hobart and (lower) Spring Bay tide gauges. The daily averages are only shown over a two-year subset for clarity.

Table S2: Evaluation of temperature and salinity at Maria Island historical time series. Shown are the observed and model simulated mean (in °C for T and PSU for S; μ), seasonal cycle amplitude (mean to peak, same units; A), seasonal cycle phase (month-of-year at which peak occurs; ϕ_0) and skill scores for total (d), residual (d'), and annual averaged (d^{an}) time series of temperature T and salinity S.

Variable (Depth)	μ_{mod} (μ_{obs})	A_{mod} (A_{obs})	$\phi_{0,\mathrm{mod}}$ ($\phi_{0,\mathrm{obs}}$)	d	d'	d^{an}
T (0 m)	14.05 (14.55)	2.66 (2.51)	1 (1)	0.97	0.80	0.75
T (10 m)	14.03 (14.33)	2.66 (2.46)	3 (3)	0.99	0.84	0.83
T (20 m)	13.99 (14.22)	2.65 (2.32)	3 (3)	0.99	0.81	0.79
T (30 m)	13.98 (14.18)	2.63 (2.27)	3 (3)	0.99	0.82	0.81
T (40 m)	13.82 (14.01)	2.47 (2.13)	3 (3)	0.98	0.80	0.79
T (50 m)	13.79 (13.90)	2.42 (1.96)	8 (6)	0.98	0.77	0.77
S (0 m)	34.88 (35.22)	0.07 (0.21)	3 (3)	0.46	0.58	0.59
S (10 m)	34.88 (35.22)	0.07 (0.23)	3 (3)	0.46	0.61	0.62
S (20 m)	34.88 (35.22)	0.07 (0.21)	3 (3)	0.45	0.59	0.61
S (30 m)	34.88 (35.21)	0.07 (0.22)	3 (3)	0.45	0.61	0.61
S (40 m)	34.89 (35.21)	0.07 (0.21)	3 (4)	0.45	0.59	0.61
S (50 m)	34.89 (35.20)	0.07 (0.20)	3 (4)	0.44	0.58	0.59

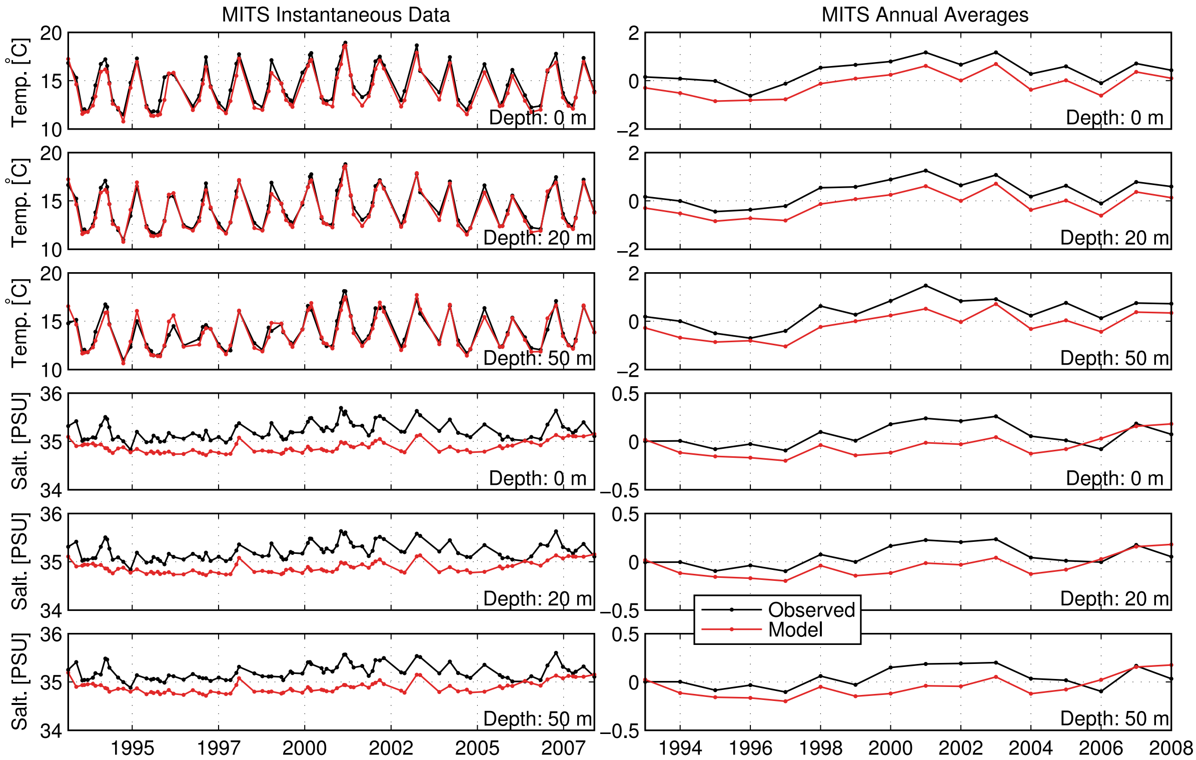

Figure S2: Historical temperature and salinity from the Maria Island Time Series (MITS). Shown are (left) instantaneous measurements and (right) annual averages of observed (black) and model simulated (red) temperature (upper panels) and salinity (lower panels). Time series are shown only at 0 m, 20 m, and 50 m depths (10 m, 30 m, and 40 m are excluded) for simplicity.

Table S3: Evaluation of WQM and ADCP measurements at Maria Island time series. Shown are the observed and model simulated mean (in °C for T, PSU for S, and cm/s for u and v; μ), seasonal cycle amplitude (mean to peak, same units; A), seasonal cycle phase (day-of-year at which peak occurs; ϕ_0) and skill scores for total (d), residual (d'), and monthly-averaged (d^{mth}) time series of zonal current u, meridional current v, temperature T and salinity S.

Variable (Depth)	μ_{mod} (μ_{obs})	A_{mod} (A_{obs})	$\phi_{0,\mathrm{mod}}$ ($\phi_{0,\mathrm{obs}}$)	d	d'	d^{mth}
u (14 m)	-1.87 (2.95)	1.15 (1.86)	29 (176)	0.37	0.22	0.28
u (18 m)	-1.24 (2.38)	0.95 (1.26)	31 (183)	0.35	0.19	0.15
u (22 m)	-1.24 (2.16)	0.95 (1.37)	31 (185)	0.35	0.20	0.14
u (26 m)	-0.59 (1.93)	0.49 (1.27)	41 (186)	0.36	0.27	0.14
u (30 m)	0.17 (1.69)	0.40 (1.17)	187 (189)	0.39	0.36	0.26
u (34 m)	0.17 (1.46)	0.40 (1.02)	187 (194)	0.40	0.38	0.30
u (38 m)	1.30 (1.30)	1.23 (0.99)	205 (198)	0.47	0.46	0.51
u (42 m)	2.73 (1.22)	1.93 (0.99)	205 (203)	0.51	0.52	0.61
u (46 m)	2.73 (1.22)	1.93 (1.07)	205 (207)	0.51	0.52	0.60
u (50 m)	2.66 (1.26)	2.04 (1.09)	205 (212)	0.52	0.53	0.60
u (54 m)	2.66 (1.32)	2.04 (1.13)	205 (217)	0.54	0.54	0.60
u (58 m)	2.81 (1.42)	2.37 (1.16)	206 (221)	0.56	0.56	0.60
u (62 m)	2.81 (1.56)	2.37 (1.19)	206 (223)	0.58	0.58	0.61
u (66 m)	3.17 (1.73)	2.86 (1.22)	208 (222)	0.60	0.59	0.60
u (70 m)	3.17 (1.94)	2.86 (1.20)	208 (220)	0.62	0.61	0.61
u (74 m)	3.17 (2.15)	2.86 (1.18)	208 (216)	0.64	0.63	0.62
u (78 m)	4.01 (2.27)	3.34 (1.17)	210 (210)	0.62	0.63	0.57
u (82 m)	4.01 (2.18)	3.34 (1.31)	210 (209)	0.64	0.64	0.56
v (14 m)	7.22 (4.43)	5.80 (2.94)	209 (230)	0.66	0.64	0.63
v (18 m)	6.78 (4.66)	5.84 (2.67)	209 (234)	0.64	0.62	0.64
v (22 m)	6.78 (5.31)	5.84 (3.04)	209 (217)	0.66	0.64	0.69
v (26 m)	6.82 (5.64)	5.95 (3.23)	209 (213)	0.67	0.65	0.69
v (30 m)	6.88 (5.61)	5.86 (3.06)	210 (212)	0.66	0.63	0.66
v (34 m)	6.88 (5.54)	5.86 (2.76)	210 (215)	0.66	0.64	0.65
v (38 m)	5.80 (5.53)	4.85 (2.56)	210 (214)	0.63	0.60	0.64
v (42 m)	7.67 (5.53)	5.05 (2.43)	205 (214)	0.66	0.65	0.71
v (46 m)	7.67 (5.61)	5.05 (2.52)	205 (212)	0.66	0.65	0.70
v (50 m)	7.81 (5.69)	5.29 (2.71)	206 (209)	0.66	0.65	0.69
v (54 m)	7.81 (5.73)	5.29 (2.96)	206 (208)	0.67	0.65	0.68
v (58 m)	7.71 (5.71)	5.43 (3.26)	207 (207)	0.67	0.65	0.69
v (62 m)	7.71 (5.63)	5.43 (3.56)	207 (206)	0.67	0.65	0.69
v (66 m)	7.39 (5.48)	5.40 (3.88)	207 (205)	0.68	0.65	0.70
v (70 m)	7.39 (5.21)	5.40 (4.20)	207 (205)	0.68	0.65	0.70
v (74 m)	7.39 (4.79)	5.40 (4.50)	207 (206)	0.68	0.66	0.70
v (78 m)	6.98 (4.25)	5.35 (4.71)	207 (207)	0.68	0.65	0.71
v (82 m)	6.98 (3.60)	5.35 (4.54)	207 (208)	0.68	0.65	0.68
T (19 m)	14.29 (14.38)	2.55 (2.58)	61 (64)	0.99	0.84	0.62
T (85 m)	13.95 (13.57)	2.01 (1.62)	74 (83)	0.94	0.78	0.47
S (19 m)	35.10 (35.27)	0.05 (0.12)	108 (97)	0.20	0.18	0.01
S (85 m)	35.16 (35.24)	0.04 (0.07)	87 (126)	0.14	0.16	0.01

Table S4: Evaluation of Aquadopp velocity measurements in Storm Bay. Shown are the observed and model simulated mean (in cm/s; μ) and skill scores for total (d), residual (d'), and monthly-averaged (d^{mth}) time series of zonal current u and meridional current v.

Variable (Depth)	μ_{mod} (μ_{obs})	d	d'	d^{mth}
u (20 m)	6.61 (1.21)	0.35	0.38	0.58
u (65 m)	8.96 (1.65)	0.32	0.38	0.40
v (20 m)	-0.35 (1.96)	0.38	0.37	0.31
v (65 m)	-1.00 (1.42)	0.30	0.26	0.17

Table S5: Evaluation of near-bottom temperature logger time series. Shown are the observed and model simulated mean (in °C; μ), seasonal cycle amplitude (mean to peak, same units; A), seasonal cycle phase (day-of-year at which peak occurs; ϕ_0) and skill scores for total (d), residual (d'), and monthly-averaged (d^{mth}) time series at each station.

Site	μ_{mod} (μ_{obs})	A_{mod} (A_{obs})	$\phi_{0,\mathrm{mod}}$ ($\phi_{0,\mathrm{obs}}$)	d	d'	d^{mth}
Eddystone Point	14.62 (14.54)	3.34 (2.82)	57 (64)	0.97	0.85	0.85
Bicheno	14.44 (14.37)	3.10 (2.64)	62 (67)	0.98	0.86	0.91
Swansea	13.83 (14.47)	4.16 (4.33)	49 (47)	0.97	0.80	0.85
Coles Bay	13.74 (14.17)	4.64 (4.22)	47 (44)	0.97	0.78	0.79
Hazards Beach	13.65 (14.37)	4.64 (4.14)	46 (42)	0.97	0.82	0.85
Schouten Island	14.28 (14.34)	3.34 (3.02)	59 (60)	0.98	0.78	0.88
Magistrates Point	14.00 (14.30)	3.20 (2.88)	55 (59)	0.98	0.87	0.93
Cape Peron	13.88 (14.25)	3.08 (2.78)	55 (60)	0.97	0.88	0.92
Iron Pot	13.82 (13.99)	3.47 (3.48)	49 (50)	0.99	0.77	0.79
One Tree Point	13.80 (13.98)	2.53 (2.88)	51 (56)	0.97	0.78	0.85
Wedge Island	13.85 (13.70)	2.35 (3.41)	57 (55)	0.93	0.84	0.91
Tasman Island	14.05 (14.27)	2.15 (2.92)	61 (57)	0.94	0.74	0.76
George III Reef	13.91 (13.62)	1.87 (2.12)	58 (53)	0.97	0.89	0.92
Mouldies Hole	14.00 (13.87)	1.79 (1.91)	60 (54)	0.96	0.82	0.86

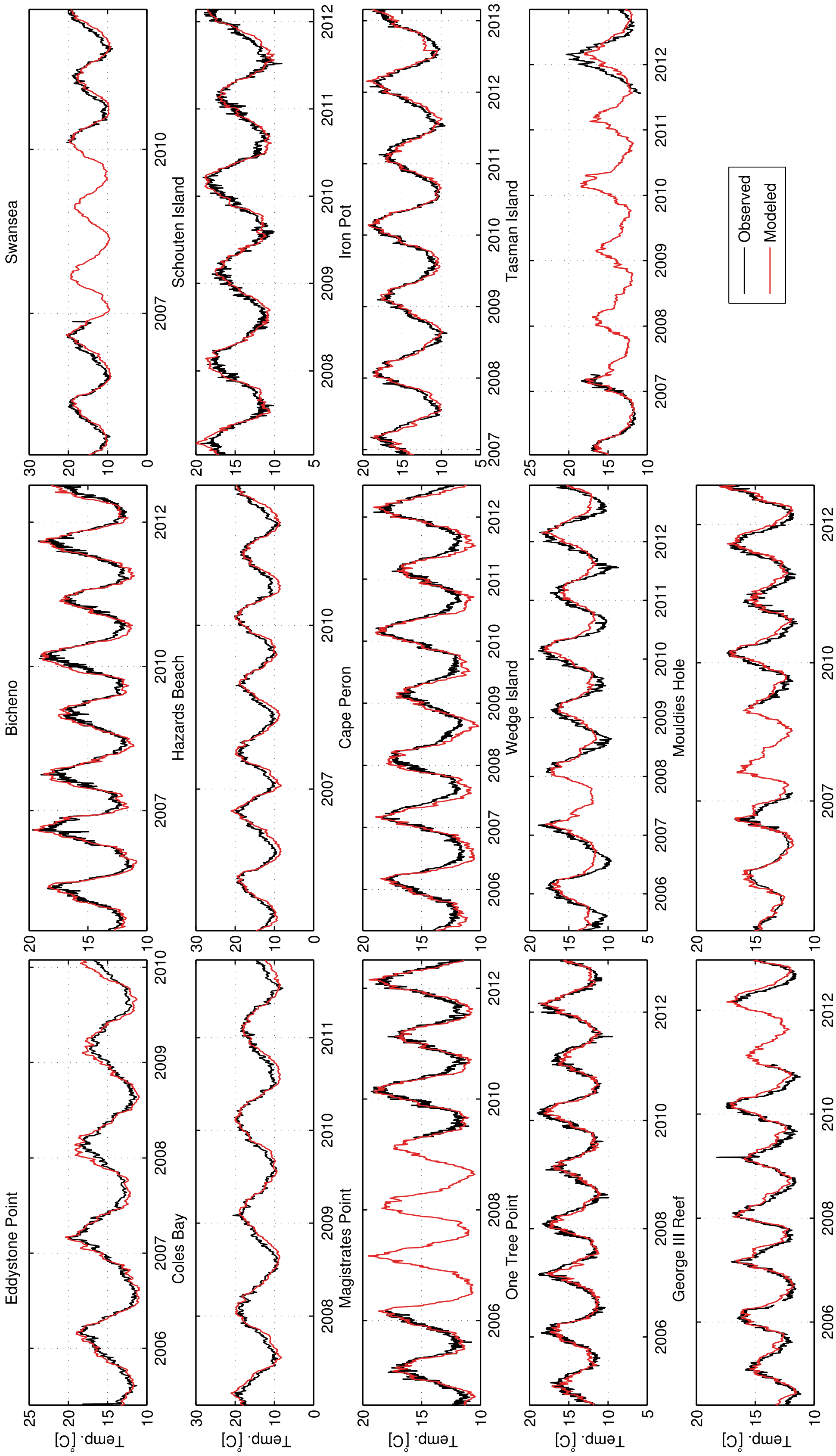

Figure S3: Temperature time series from near-bottom temperature loggers across the eastern Tasmania continental shelf. Shown are daily measurements of observed (black) and model simulated (red) near-bottom temperatures.