Water Resources Research

Supporting Information for

The role of stratification on lakes' thermal response: The case of Lake Superior

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Introduction

Supporting information includes additional results concerning the comparison between δ_{sim} and δ_{est} (Figure S1), Test 5 and Test 6 (Figure S2), and the calibrated values of model parameters (Table S1).

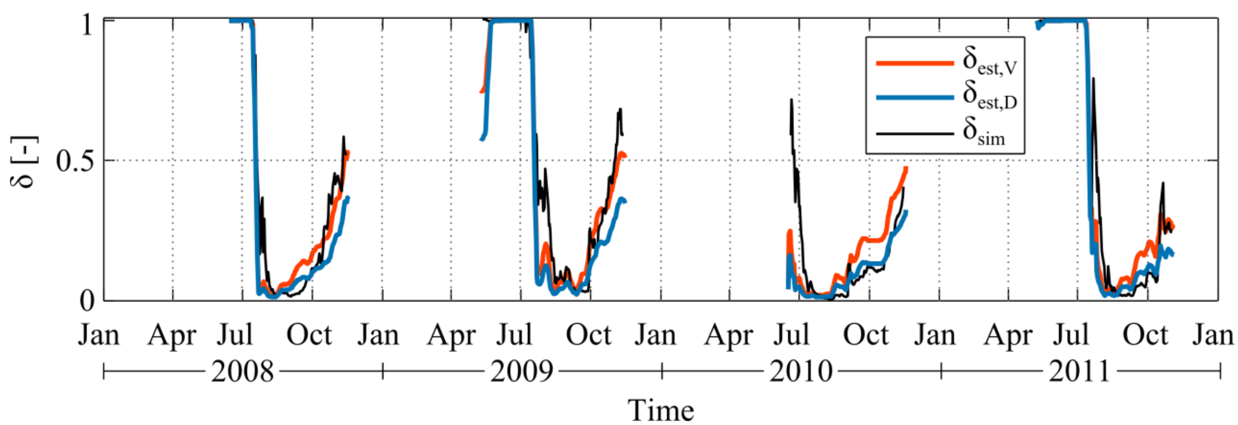

Figure S1. Comparison between δ simulated by *air2water* (δ_{sim}) and estimated from the analysis of water temperature profiles measured at the mooring station indicated in Figure 1 of the manuscript (δ_{est}). In the latter case, δ is evaluated following the procedure discussed in the manuscript, in terms of both dimensionless volume ($\delta_{est,V}$) and dimensionless depth ($\delta_{est,D}$), obtaining qualitatively similar results. For representation purposes δ_{est} has been filtered with a 7 days moving average.

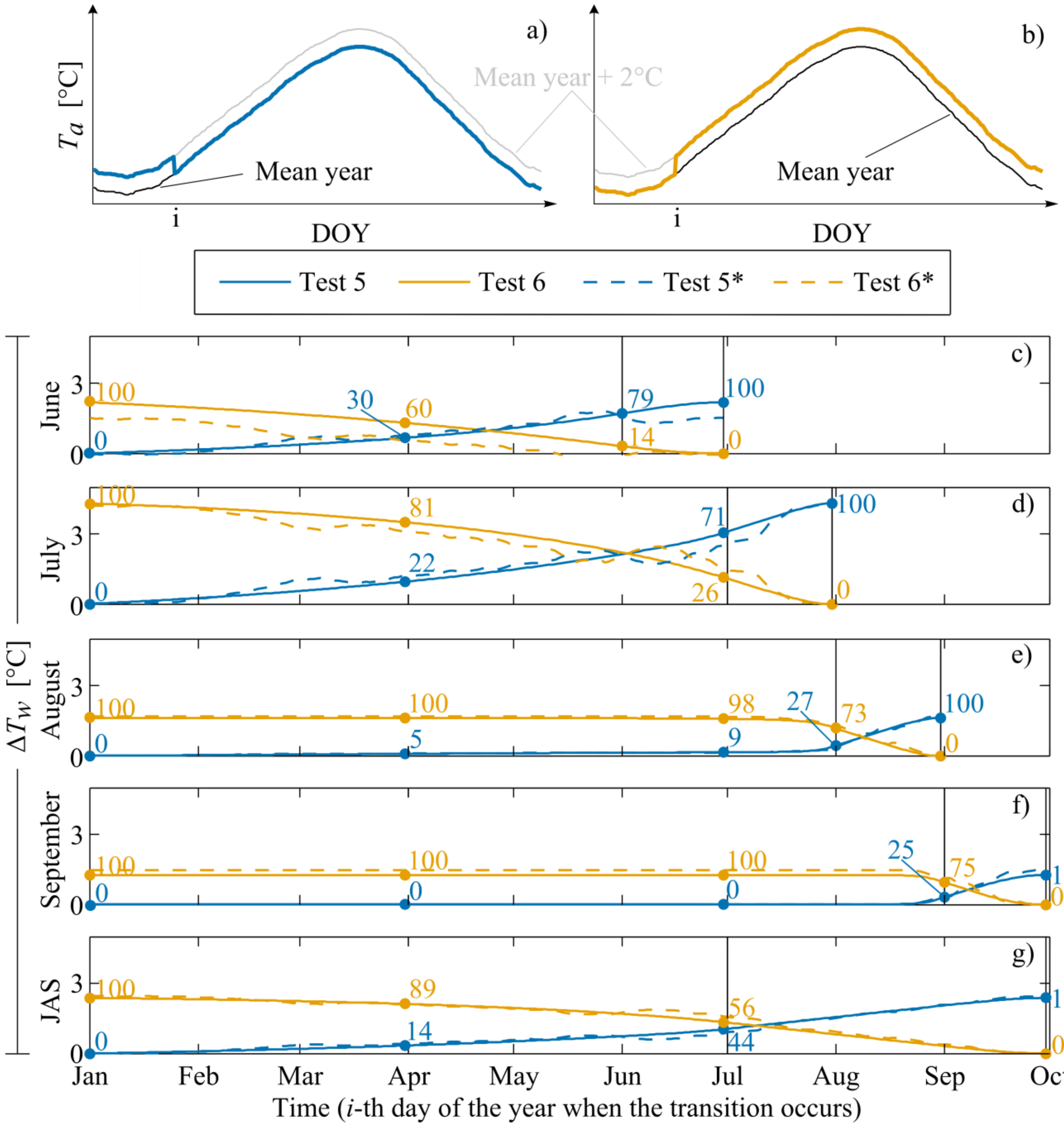

Figure S2. In addition to Test 5 and Test 6 presented in the manuscript, we show here Test 5* and Test 6* (dashed lines), where the warm year is represented by 1998 instead of the mean year plus 2°C. Neglecting small variations due to the more irregular pattern of air temperature difference, the results are essentially the same: June and July are affected by previous thermal conditions, while LST in August and September depends almost exclusively on the air temperature in that period. Interestingly, it is possible to recognize the effect of the exceptionally warm air temperature values in February (nearly 6°C warmer than in the mean year, on average) on the mean LST in June, July and, to a minor extent, also on JAS (subplots c, d and g).

Water temperature data series	a_1 (°C d^{-1})	a_2 (d^{-1})	a_3 (d^{-1})	a_4 (°C)	a_5 (°C d^{-1})	a_6 (-)	a_7 (°C)	a_8 (°C)	KGE (-)	RMSE (°C)	MAE (°C)	ME (°C)
GLERL	0.0227	0.00724	0.00972	3.94	0.0207	0.448	149.59	0.50	0.98	1.07	0.79	-0.4E-3
NDBC	-0.0029	0.00747	0.00791	2.99	0.0145	0.302	149.93	0.50	0.94	1.59	1.17	-8.6E-3

Table S1. Optimal values of *air2water* parameters, Kling-Gupta Efficiency index (KGE), Root Mean-Square Error (RMSE), Mean Absolute Error (MAE), and Mean Error (ME) obtained calibrating the model using GLERL and NDBC (station 45001) water temperature data.