

Supporting Information

Table S1. Satellite Images characteristics

N	L8 Image ID	Path/R ow	Year	In situ Date	Image Date	Days differences
1	LC08_L1TP_233089_20170306_2020090 5_02_T1	233/89	2017	13, 14, 15 Mar.	06 Mar.	7, 8, 9
2	LC08_L1TP_233089_20170728_2020090 3_02_T1	233/89	2017	1, 2 Aug.	28 Jul.	5,6
3	LC08_L1TP_233089_20180325_2020090 1_02_T1	233/89	2018	13, 14, 15 Mar.	25 Mar.	8, 9, 10
4	LC08_L1TP_233089_20190803_2020082 7_02_T1	233/89	2019	5- 7Aug.	03 Aug.	3, 4, 5
5	LC08_L1TP_233089_20200227_2020082 2_02_T1	233/89	2020	12, 13 Feb.	27 Feb.	14,13
6	LC08_L1TP_233089_20200314_2020082 2_02_T1	233/89	2020	10, 11 Mar.	14 Marz.	5,6
7	LC08_L1TP_233089_20200906_2020091 8_02_T1	233/89	2020	24-27 Aug. 14, 15 Sep	06 Sep.	11, 12, 13 9,10
8	LC08_L1TP_233089_20201125_2021031 6_02_T1	233/89	2020	16, 17 Nov.	25 Nov.	9,10
9	LC08_L1TP_233089_20210112_2021030 8_02_T1	233/89	2021	18, 19 Jan.	12 Jan.	7,8
10	LC08_L1TP_233089_20210317_2021032 8_02_T1	233/89	2021	16, 17 Mar.	17 Mar.	0,1
11	LC08_L1TP_233089_20210504_2021051 7_02_T1	233/89	2021	11,12 May	04 May.	8,9
12	LC08_L1TP_233089_20210605_2021061 4_02_T1	233/89	2021	15,16 Jun.	05 Jun.	11,12
13	LC08_L1TP_233089_20210723_2021072 9_02_T1	233/89	2021	13, 14 Jul.	23 Jul.	11,12
14	LC08_L1TP_233089_20210808_2021081 9_02_T1	233/89	2021	9,10 Aug.	08 Aug.	1,2

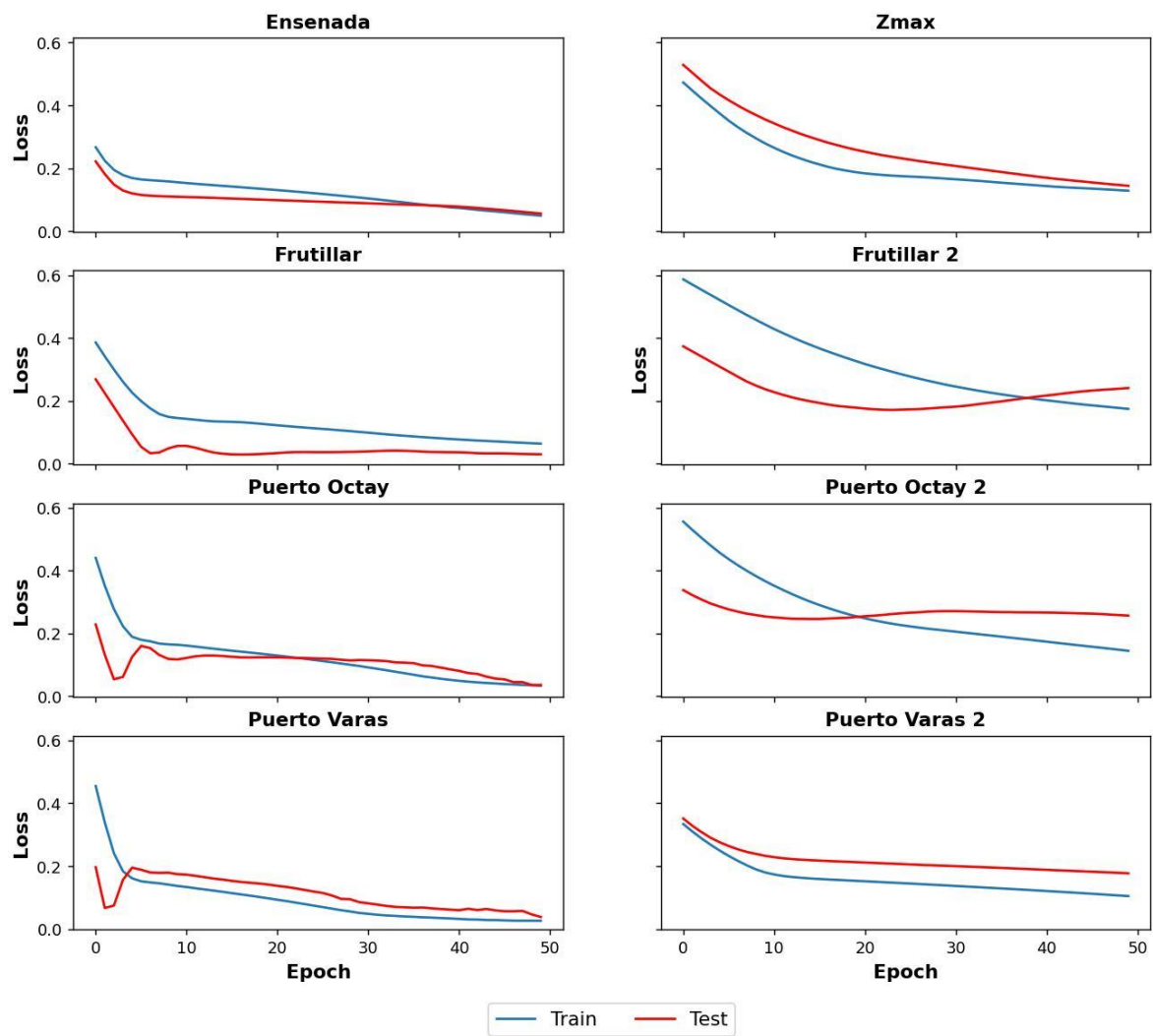


Figure S1. Error Case A, LSTM model

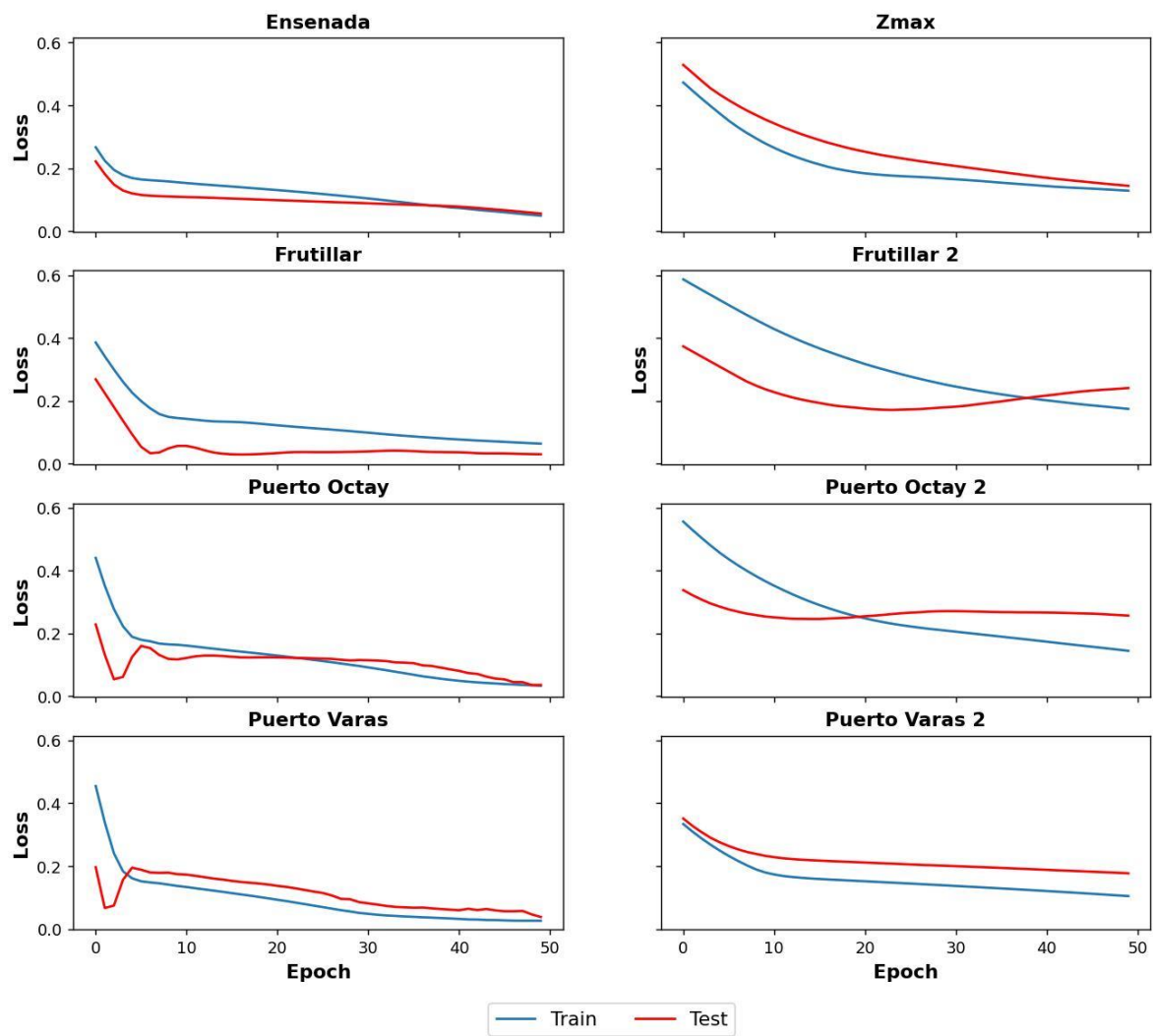


Figure S2. Error Case A RNN network.

Table S2. Behavior of limnological parameters in the Lake Llanquihue

Parameters	Statistics	Summer								Autumn				Winter								Spring			
		LI-1	LI-2	LI-3	LI-4	LI-5	LI-6	LI-7	LI-8	LI-1	LI-3	LI-5	LI-7	LI-1	LI-2	LI-3	LI-4	LI-5	LI-6	LI-7	LI-8	LI-1	LI-3	LI-5	LI-7
Chl-a (ug/L)	Average	0.7	0.8	0.5	0.8	0.5	0.7	0.7	1.2	0.9	0.9	0.8	0.8	1.3	1.2	1.5	1.2	1.5	1.6	1.3	1.1	0.5	0.5	0.5	0.5
	Max	2.5	1.7	2.2	1.5	1.8	2.2	2.4	1.6	1.7	2	1.4	1.9	2.6	1.4	2.9	1.4	3.2	2.5	3.3	2	1	1.4	1.4	1.4
	Min	0.2	0.2	0.1	0.4	0.1	0.3	0.1	0.5	0.5	0.4	0.5	0.4	0.3	0.7	0.6	0.8	0.6	0.8	0.3	0.5	0.1	0.1	0.1	0.1
	SD	0.5	0.5	0.5	0.4	0.5	0.6	0.6	0.4	0.4	0.4	0.2	0.4	0.6	0.3	0.6	0.2	0.6	0.6	0.7	0.6	0.3	0.4	0.3	0.3
	CV(%)	0.8	0.6	0.9	0.5	0.8	0.8	0.9	0.4	0.4	0.5	0.3	0.5	0.5	0.2	0.3	0.1	0.4	0.4	0.5	0.5	0.5	0.7	0.7	0.6
	n	24	10	24	11	22	14	28	4	20	20	18	18	21	5	21	5	22	5	22	5	24	21	22	26
PT (ug/L)	Average	8.5	0.04	7.8	0.4	6.7	0.03	4.9	0.1	10.6	12.1	9.2	10.2	7	1.3	6.9	0.9	6.8	0.8	8.3	1.2	6.3	6.1	6.7	6.1
	Max	31	0.3	36.6	3	25	0.2	41	0.3	48	56	40.9	42.3	14.8	5.9	14.9	3	44	3	49.7	4.1	16	15	35.5	14
	Min	2	0.003	2	0.003	0.002	0.003	0.003	0.003	3	1	1	1	1	0.005	1	0.009	0.001	0.004	0.003	0.004	2	1	1.3	0.003
	SD	7.1	0.1	9.2	0.9	6.2	1.03	7.9	0.1	8.7	11.6	8.5	9.1	3.8	2.3	3.9	1.4	7.5	1.4	10.8	1.8	4.3	3.6	6.9	4.1
	CV(%)	0.8	2.1	1.1	2.6	0.9	35.5	1.6	1.7	0.8	0.9	0.9	0.9	0.5	1.8	0.5	1.7	1.1	1.7	1.3	1.5	0.7	0.6	1.03	0.6
	n	26	13	26	18	24	18	33	8	22	22	22	22	32	7	30	7	34	7	34	6	28	26	28	29
NT (mg/L)	Average	0.06	0.06	0.02	0.02	0.05	0.05	0.05	0.06	0.11	0.07	0.07	0.08	0.05	0.05	0.05	0.05	0.06	0.06	0.09	0.04	0.1	0.1	0.09	0.08
	Max	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.6	0.17	0.17	0.19	0.1	0.1	0.13	0.13	0.16	0.16	0.16	0.06	0.2	0.3	0.2	0.19
	Min	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.04	0.01	0.02	0.003	0.02	0.02
	SD	0.07	0.07	0.05	0.05	0.04	0.04	0.04	0.04	0.12	0.04	0.05	0.05	0.04	0.04	0.05	0.05	0.06	0.06	0.06	0.02	0.05	0.05	0.05	0.05
	CV(%)	1.14	1.15	1	1	0.9	0.9	0.8	0.7	1.09	0.6	0.6	0.67	0.7	0.7	0.9	0.9	1.13	1.13	0.6	0.7	0.45	0.5	0.5	0.67
	n	6	7	5	5	6	7	6	4	24	18	21	28	5	5	5	5	4	4	3	3	33	34	32	28
SD (m)	Average	14.3	15.5	16.8	15	16	15.3	17.5	17.8	14.7	16.3	14.1	18	14	13.9	13.4	14.6	11.4	13	17.9	14.1	15.2	15.1	14.4	19.3
	Max	20.8	20.5	23.2	17.5	23.8	21	30	24.5	19	22.5	20	30	19	16	19	17	15.5	18	30	17	19	19	18	30
	Min	9.5	11	11.7	13	11	11.5	10	12	11	12.2	9.5	12	9.5	11.5	9.5	9.5	6	9	11	12	12	12.5	12	13.5
	SD	2.5	3.4	2.9	1.58	3.38	3.13	4.25	4.19	2.5	3.2	3.8	5.9	2.8	1.91	2.5	2.7	2.4	3.3	4.39	2.4	2.3	1.7	1.6	4.5
	CV(%)	0.17	0.21	0.17	0.1	0.2	0.2	0.24	0.2	0.17	0.19	0.2	0.3	0.19	0.13	0.19	0.19	0.2	0.2	0.2	0.17	0.15	0.11	0.11	0.2
	n	32	16	34	18	30	20	45	10	26	30	22	28	26	8	30	8	30	7	32	6	30	32	30	35
T (°C)	Average	17.6	17.5	17.4	17.3	16.8	17.3	17.5	17.4	13.8	13.8	13.9	14	10.7	11.1	10.7	10.9	10.7	10.8	10.7	11.1	12.5	12.4	12.4	12.6
	Max	20	19.1	19.3	17.9	19.2	17.8	19.6	18	14.9	15	15.7	15.9	11.7	11.5	12	11.5	11.7	11.6	11.8	11.6	14.5	14.1	14.2	15
	Min	16.5	16.4	16.4	16.2	15.2	16.3	15.7	16.4	12.7	12.8	12.4	12.6	10.1	10.7	10	10.6	10.3	10.3	10.4	1.6	9.8	9.6	10.1	10.6
	SD	1.03	0.8	0.8	0.5	0.9	0.46	0.8	0.6	0.7	0.7	0.9	0.9	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.3	1.3	1.04	1.04	1.3
	CV(%)	0.05	0.04	0.04	0.03	0.05	0.02	0.04	0.03	0.05	0.05	0.06	0.06	0.03	0.02	0.03	0.02	0.03	0.03	0.03	0.03	0.1	0.08	1.04	0.1
	n	15	8	15	10	16	10	23	5	13	13	11	12	17	7	16	7	17	8	21	6	16	15	16	16