

Leveling Off of Gas Fluxes and Steady State Saturation Anomalies at Very High Wind Speeds

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Introduction

This supporting information contains two figures, which shows global wind data to put this study into context and data from the invasion and evasion experiments, and two tables, one which gives detailed information on each of the experiments and one which lists the initial saturation anomalies in the invasion and evasion experiments.

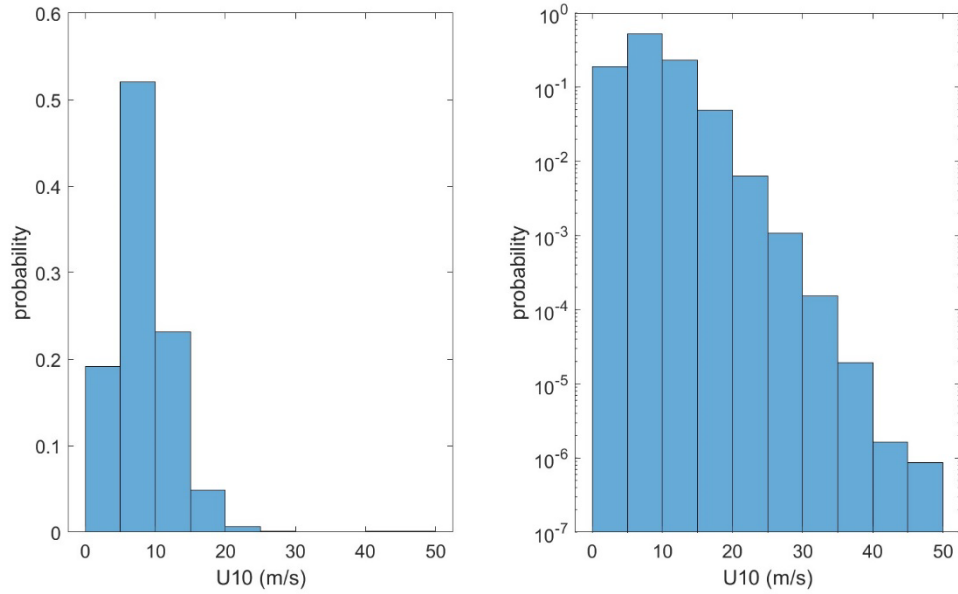


Figure S1. Left: Normalized histogram of global wind speed at 10 m above ocean surface from all ASCAT-B scatterometer for the years of 2020 and 2021. Right: The same data plotted on a log scale so that the probabilities of wind speeds > 20 m s $^{-1}$ can be seen more clearly. Data for these plots was based on gridded Level 2 data from METOP-B as produced and distributed by NASA'S Remote Sensing Systems and sponsored by the NASA Ocean Vector Winds Science Team. Data are available at www.remss.com.

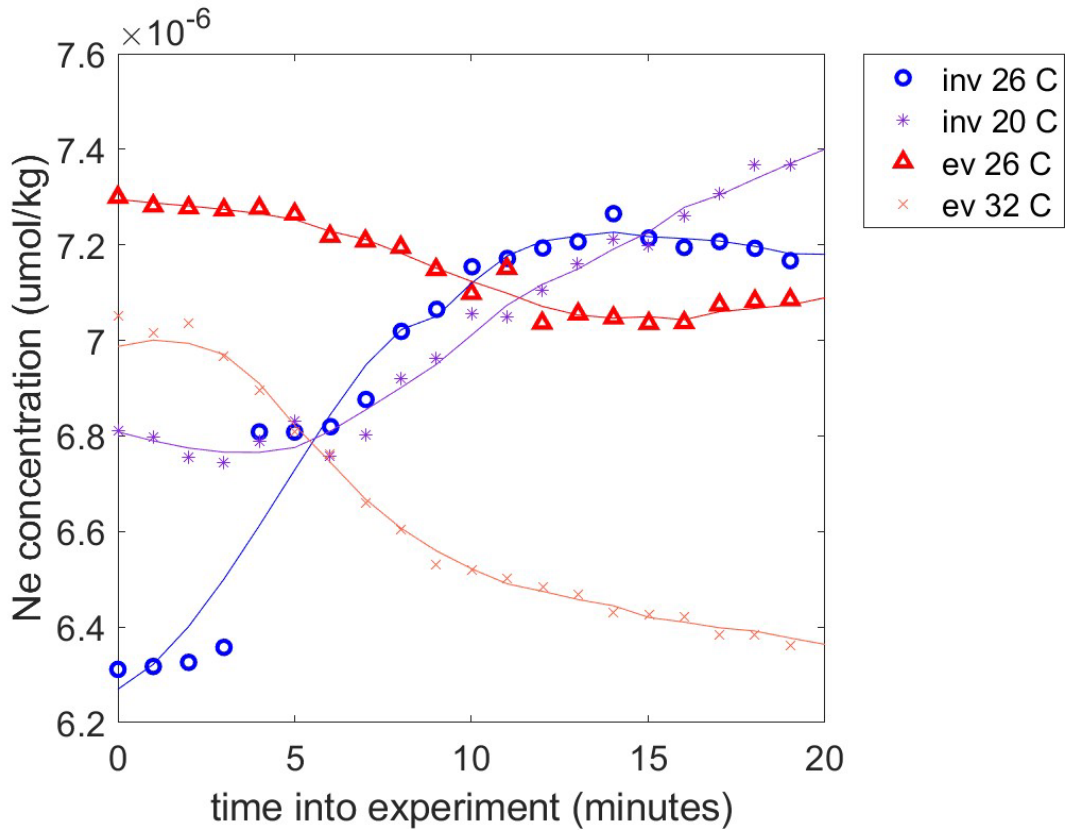


Figure S2. Concentration of Ne from the first 20 minutes of the invasion experiments (blue) and evasion experiments (red). The flux of Ne was calculated as the slope of the Ne concentration from minutes 2 to 12 of the experiment. Note how the fluxes in the invasion experiment are larger (steeper changes in concentration) than in the evasion experiments.

Table S1. Detailed experimental conditions for the 35 experiments conducted with varying water temperatures, wind speeds, and wave types. Experiment start/end times are UMT time

Exp. #	Date	Start time	End time	Water temp (°C)	Wind speed u10 (m s⁻¹)	Wave type	Wave frequency (Hz)/ Peak period (sec)	Wave amplitude (m)
1	7/10/18	15:39	16:52	26	35	monochromatic	1 Hz	0.15
2	7/10/18	18:52	19:58	26	20	monochromatic	1 Hz	0.15
3	7/10/18	21:38	23:03	26	25	monochromatic	1 Hz	0.15
4	7/11/18	2:43	3:26	26	40	monochromatic	1 Hz	0.15
5	7/11/18	4:44	5:18	26	45	monochromatic	1 Hz	0.15
6	7/11/18	6:56	7:37	26	50	monochromatic	1 Hz	0.15
7	7/11/18	13:45	14:42	26	30	monochromatic	1 Hz	0.15
8	7/11/18	16:45	17:50	26	35	monochromatic	1 Hz	0.15
9	7/11/18	20:02	21:07	20	35	monochromatic	1 Hz	0.15
10	7/11/18	23:10	0:05	20	20	monochromatic	1 Hz	0.15
11	7/12/18	2:26	3:17	20	40	monochromatic	1 Hz	0.15
12	7/12/18	4:32	5:20	20	45	monochromatic	1 Hz	0.15
13	7/12/18	6:30	7:11	20	50	monochromatic	1 Hz	0.15
14	7/12/18	13:40	14:58	20	25	monochromatic	1 Hz	0.15
15	7/12/18	16:15	16:57	20	30	monochromatic	1 Hz	0.15
16	7/12/18	17:48	18:31	20	35	monochromatic	1 Hz	0.15
17	7/12/18	21:45	22:46	26	35	monochromatic	1 Hz	0.15
18	7/13/18	1:08	1:48	32	35	monochromatic	1 Hz	0.15
19	7/13/18	2:43	3:24	32	40	monochromatic	1 Hz	0.15
20	7/13/18	4:57	5:32	32	45	monochromatic	1 Hz	0.15

21	7/13/18	6:32	7:09	32	50	monochromatic	1 Hz	0.15
22	7/13/18	13:58	14:55	32	20	monochromatic	1 Hz	0.15
23	7/13/18	17:36	18:20	32	25	monochromatic	1 Hz	0.15
24	7/13/18	19:31	20:21	32	30	monochromatic	1 Hz	0.15
25	7/13/18	22:55	23:33	26	35	JONSWAP	0.65 sec	0.5
26	7/14/18	3:01	3:44	26	40	JONSWAP	1 sec	0.5
27	7/14/18	4:55	5:30	26	40	JONSWAP	1 sec	0.15
28	7/14/18	6:35	7:08	26	45	JONSWAP	1 sec	0.15
29	7/14/18	7:53	8:24	26	50	JONSWAP	1 sec	0.15
30	7/14/18	14:33	15:39	26	10.6	JONSWAP	1 sec	0.15
31	7/14/18	15:46	16:49	26	20	JONSWAP	1 sec	0.15
32	7/14/18	17:43	18:31	26	25	JONSWAP	1 sec	0.15
33	7/14/18	19:25	20:10	26	30	JONSWAP	1 sec	0.15
34	7/14/18	20:56	21:39	26	35	JONSWAP	1 sec	0.15
35	7/14/18	23:23	0:12	32	20	monochromatic	1 Hz	0.15

Table S2. Initial saturation anomalies of noble gases Neon, Argon, Krypton and Xenon, calculated from concentrations measured by the GEMS at the start of the invasion-evasion experiments

Experiment Number	Temperature change prior to experiment	Ne Sat. Anom (%)	Ar Sat. Anom (%)	Kr Sat. Anom (%)	Xe Sat. Anom (%)
1	32 → 26 °C	-9.5	-14.4	-15.0	-15.8
9	26 → 20 °C	-4.8	-7.5	-8.2	-11.0
17	20 → 26 °C	4.9	6.7	7.1	8.0
18	26 → 32 °C	1.6	5.8	6.4	7.1