RUNNING TIDE

Quantification Results

Sample 2023 Iceland Deployment

Abstract

This document was created at the completion of a Running Tide intervention and summarizes the performance, outcomes, and key deployment data. This report contains Quantification Results and represents the types and quality of data that is generated for each discrete Running Tide deployment.

Reference Documents	
Quantification Methodology	[See quantification methodology at docs.runningtide.com]
Protocol	Framework Protocol for multi-pathway biological and chemical carbon removal in the ocean, v2.0 - Link
Environmental Considerations	Running Tide's Catalog of Environmental Exposures - Link

1. Quantification Data Summary

CO2e Quantification		
Terr_added		
m_load	3037.30	tonnes
f_weight	100.00%	unitless
f_moisture	55.63%	unitless
f_TOC	50.33%	unitless
MR_CO2	3.664	unitless
Terr_added Total	**2,485.17**	**tCO2e**
Terr_loss		
m_DML	0.00	tCO2e
m_loss	0.00	tCO2e
Terr_loss Total	**0.00**	**tCO2e**
Terr_shed		
f_doc	1.243E-03	unitless
f_acid	0	unitless
Terr_shed Total	**3.09**	**tCO2e**
Terr_shal		
f_shal	0.054	unitless
Terr_shal Total	**134.83**	**tCO2e**
Terr_stor	0.000	tonnes CO2e
LUC_indirect	0.000	tonnes CO2e

CO2e Terrestrial	2,347.25 tCO2e

CO2e OAE	0 tCO2e

CO2e Macroalgae	0 tCO2e

OpMat_CO2e		
CO2e_Mat	126.879	tCO2e
CO2e_Prod	3.456	tCO2e
CO2e_Deploy	118.803	tCO2e
OpMat_CO2e Total	**249.14**	**tCO2e**

CapMat_CO2e		
CO2e_Cons	13.768	tCO2e
CO2e_Equip	100.472	tCO2e
CapMat_CO2e Total	**114.24**	**tCO2e**

Data Gap Coefficient		
Gap_CO2e	7.268	tCO2e
Data Gap Coefficien	**7.27**	**tCO2e**

CO2e Emissions	370.65 tCO2e

CO2e Removed	1,851.46 tCO2e

CO2e Terrestrial Uncertainty		
u_Terr_added		
ur_m_load	2.887E-03	unitless
u_f_weight	0	unitless
u_f_moisture	7.635E-03	unitless
u_f_TOC	9.895E-03	unitless
u_Terr_added Total	**65.32**	**tCO2e**
u_CO2eTerrestrial		
u_Terr_loss	5.00	tCO2e
ur_f_stor	0.00	unitless
ur_f_shal	0.046	unitless
ur_f_shed	1.540E-04	unitless
u_CO2eTerrestrial Tot	**125.14**	**tCO2e**

1.1. CO$_2$eTerrestrial Quantification
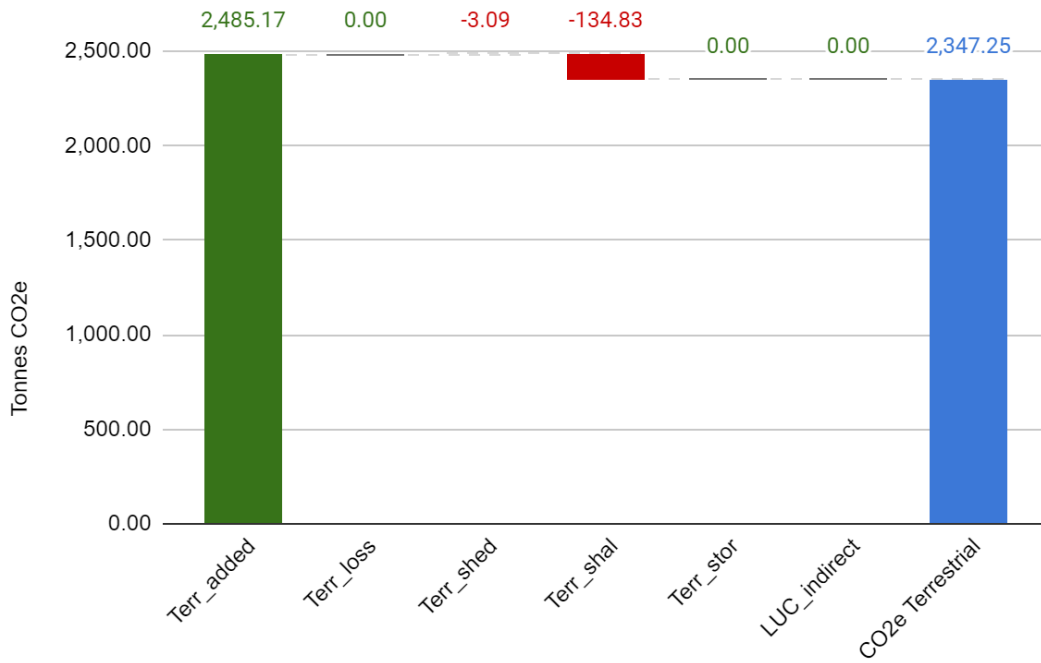
1.2. Project Emissions Quantification
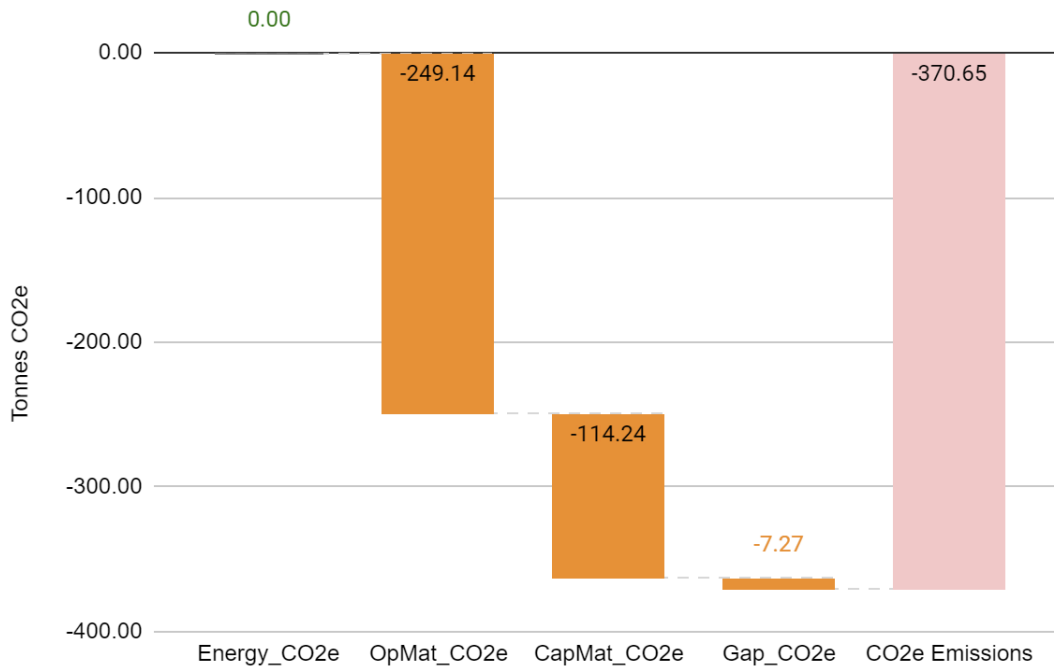
2.   Ocean Transport Quantification Details

Running Tide's Ocean Surface Transport Methodology (link) was used to determine the terminal location of the deployed carbon. Below are the results of that analysis:
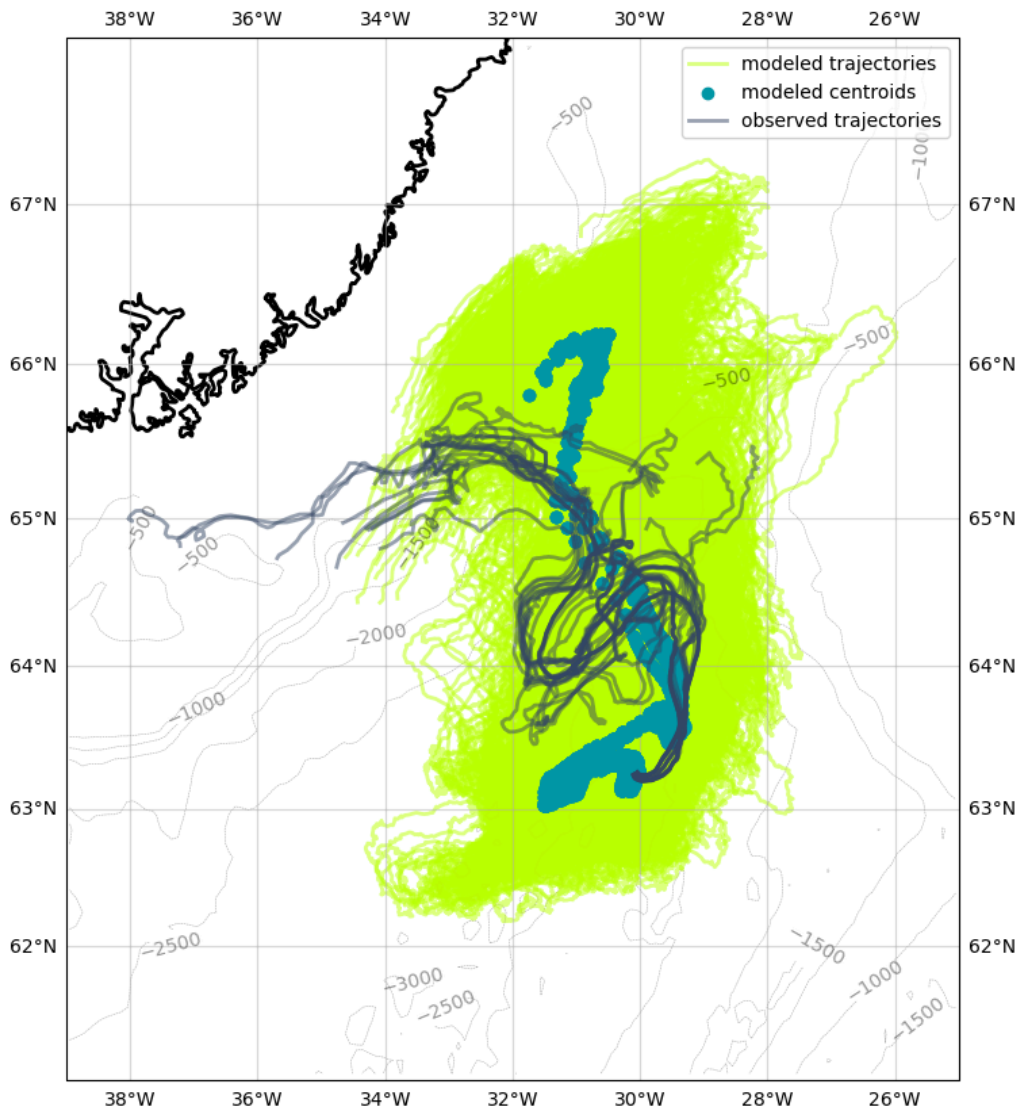

Figure 1: Plot of modeled and observed trajectories. The observed trajectories are used to tune the weights of the velocity vector fields as well as the diffusivity used in the model. The modeled trajectories depicted here represent 100 simulated parcels with the vector field weights and diffusivity that yielded the best results. The Monte Carlo simulations (not depicted here) perturb these values to capture a wider range of possible trajectories.
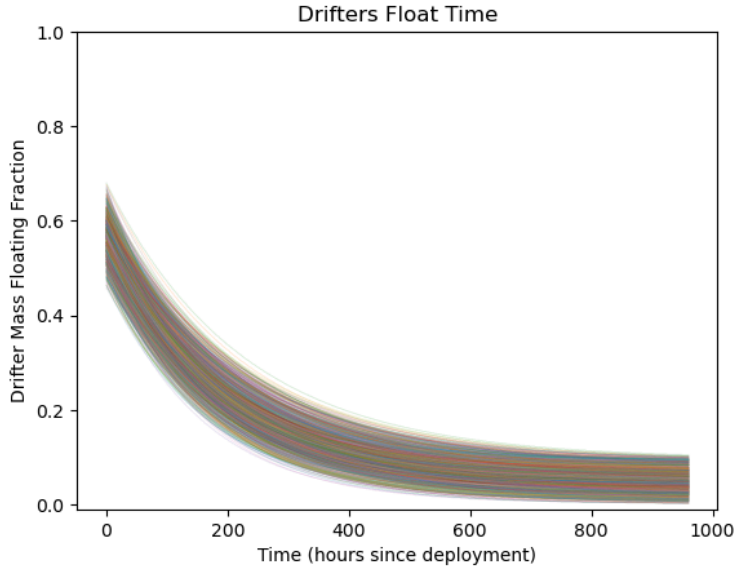
Figure 2: Plot depicting the float times for modeled trajectories during the 1000 Monte Carlo simulations. The curves were generated by fitting a modeled function to buoy float time data collected both in the lab and in situ. Function coefficients were then perturbed for each simulation.
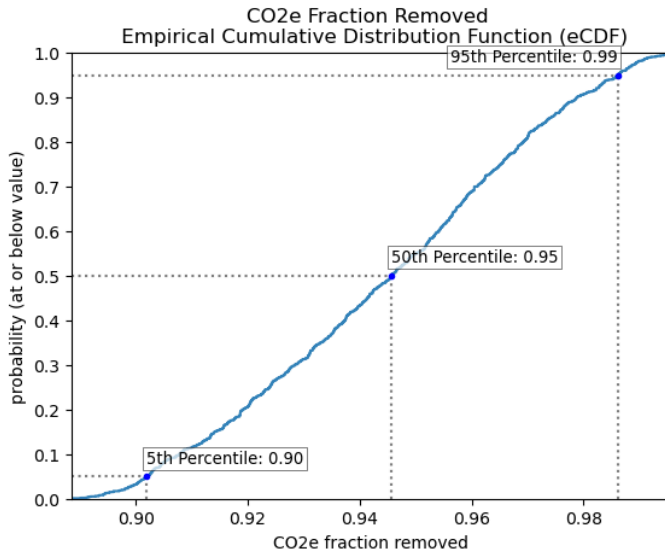

Figure 3: eCDF representing the fraction of CO2e removed in each of the 1000 Monte Carlo simulations. The final calculations use the 5th percentile value for a conservative estimate of how much CO2e was removed by the intervention.

Deployment Terminal Depth Histogram
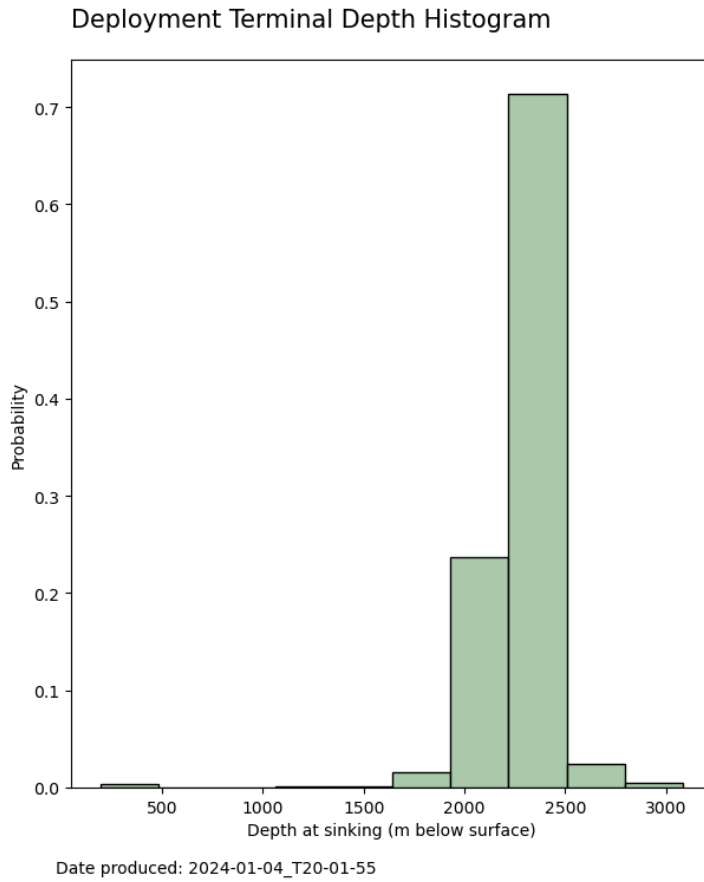

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Figure 4: Histogram depicting the probability of the terminal depths of deployed material for all Monte Carlo simulations.