

Verification MEMO

Attention To XPRIZE Judges,



This is one of several shots of pH levels in water being seen in our lab. We also observed these levels over days, and noted that the pH would remain close to the initial levels for a week, and then slowly lower to neutral over three months. This showed that the initially reactive OH* radical would stabilize into hydroxide ions.

Our data room shows most of our activities and can be accessed at:

https://drive.google.com/drive/folders/1Xd9wc6J_UewWlwOjsdceBV21YWLkb9hI?usp=sharing

We had Paul Burgener, Jan Langton, and Zbigniew Twardowski as IRAP Industrial technology advisors over the five years of active work. Donald Hugh D’Arcy Evans of Green Carbon Recovery Ltd. Came over from England with a due diligence delegation in 2012, and he is providing a letter., which will attach to this MEMO.

We just met with several professors at the University of Calgary and they echoed to us that the pH reading is an accurate measure of the OH*, and OH- species.

“In solution, exposed to air, the hydroxide ion reacts rapidly with atmospheric [carbon dioxide](#), acting as an acid, to form, initially, the [bicarbonate](#) ion.

OH⁻ + CO₂ ⇌ HCO⁻ “ Wikipedia <https://en.wikipedia.org/wiki/Hydroxide>.

We are also claiming the above, and that the OH-ion would react proportionately to atmospheric abundance of species that can be hydrolysed. Since CO₂ is over 420ppm, and the next species like SO₂ have levels in the .0004ppm range, a lot of CO₂ can be hydrolysed, as the OH- will become well mixed, or react:

Simple Calculator of *OH/OH- Needs	
Airshed Constituents in ppm	
CAP	ppm
CO	0.871
Sox	0.0004
N2O	0.3299
CH4	1.86279
PM 2.5	0.0246
O3	0.0246
Nox	0.0155 .010-.045
*CO2	420
VOC	0.0593
SGHG basket	0.018638 synthetic GHGs or CFC gases
Total Reactant Flux	423.206728
(*)OH ppm over an hour	
PPB-PPM (*)OH natural	0.0108 0.006*1800 seconds per 3600 s)
added PPM (*)OH	0 1.1 , 2.2, 1.5,3
.25 assist	0.0027 25% builds up in air
Total Flux 24 hour	0.0135 sample every 2 seconds
	24 H
DEFICIT OF OH	423.193228 PPM per 24 H.***
OH produced in 24 H	0.5184 based on steady state, 2 s extinction
24 hour OH deficit	422.545228
Fraction GHG without CO2	0.007283268 %
GHG Total Fraction &%	423.082328 0.9997060538 % w concentrated OH*/OH-
CAP Total Fraction &%	0.1244 0.1246940326 % w/ concentrated OH*

This table above is an apportionment exercise. The Oh will encounter a react with these species reliably according to peer reviewed literature. Below, we located a CO2 solubility with pH curve. This indicates that pH levels over 9.4 will really hydrolyse CO2 into the carbonate system of the Earth. This is a very large

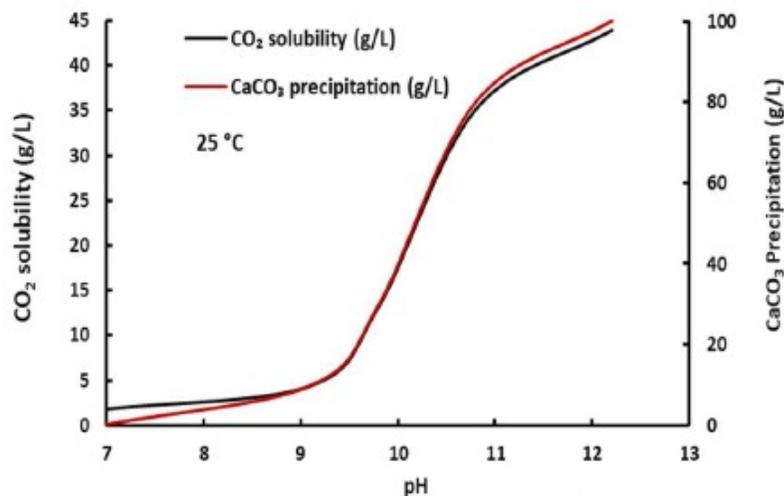
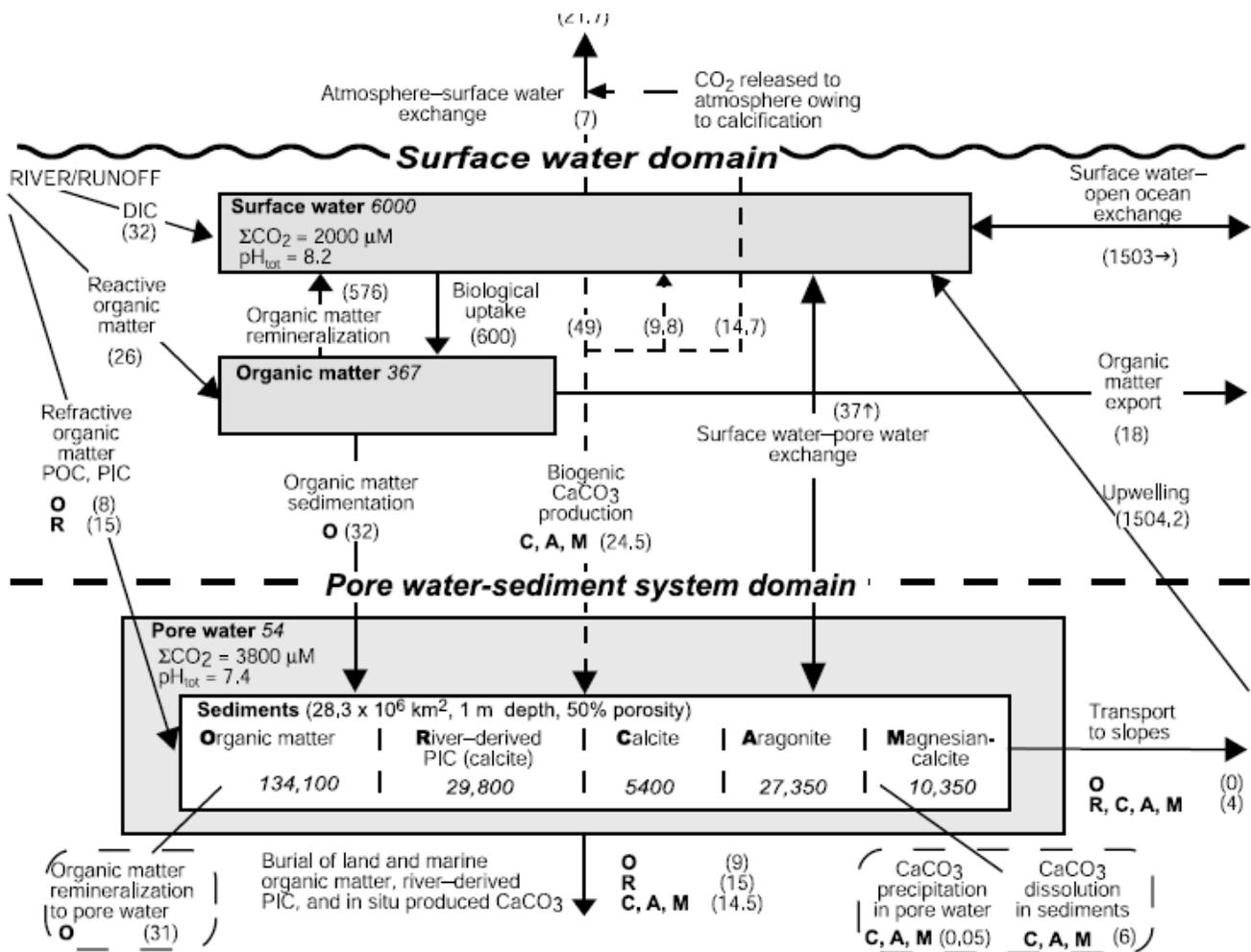


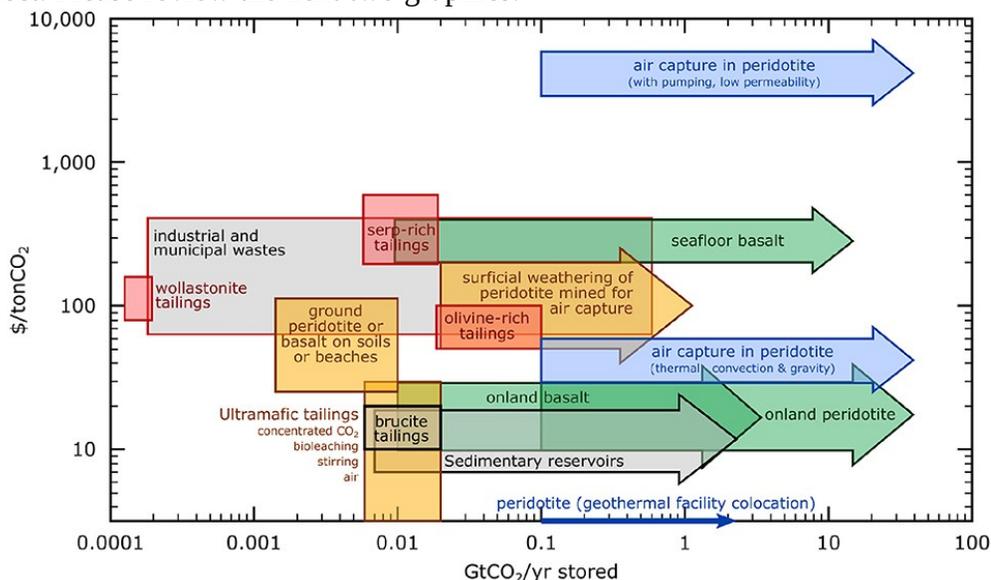
Figure 1: CO₂ solubility dependency to pH at 25 °C and equivalent CaCO₃ precipitation.



From: Coastal ocean CO₂-carbonic acid-carbonate sediment system of the Anthropocene, Andreas J. Andersson,¹ Fred T. Mackenzie,¹ and Abraham Lerman²

This graph shows the level of quantification being done for CaCO₃.

Because of the GT scale of the Earth System, we believe that the GT scaling of our technology would catalyze the storage of carbon at ground and in the ocean because the elevated pH would enable this bulk effect. Please review the next two graphics.



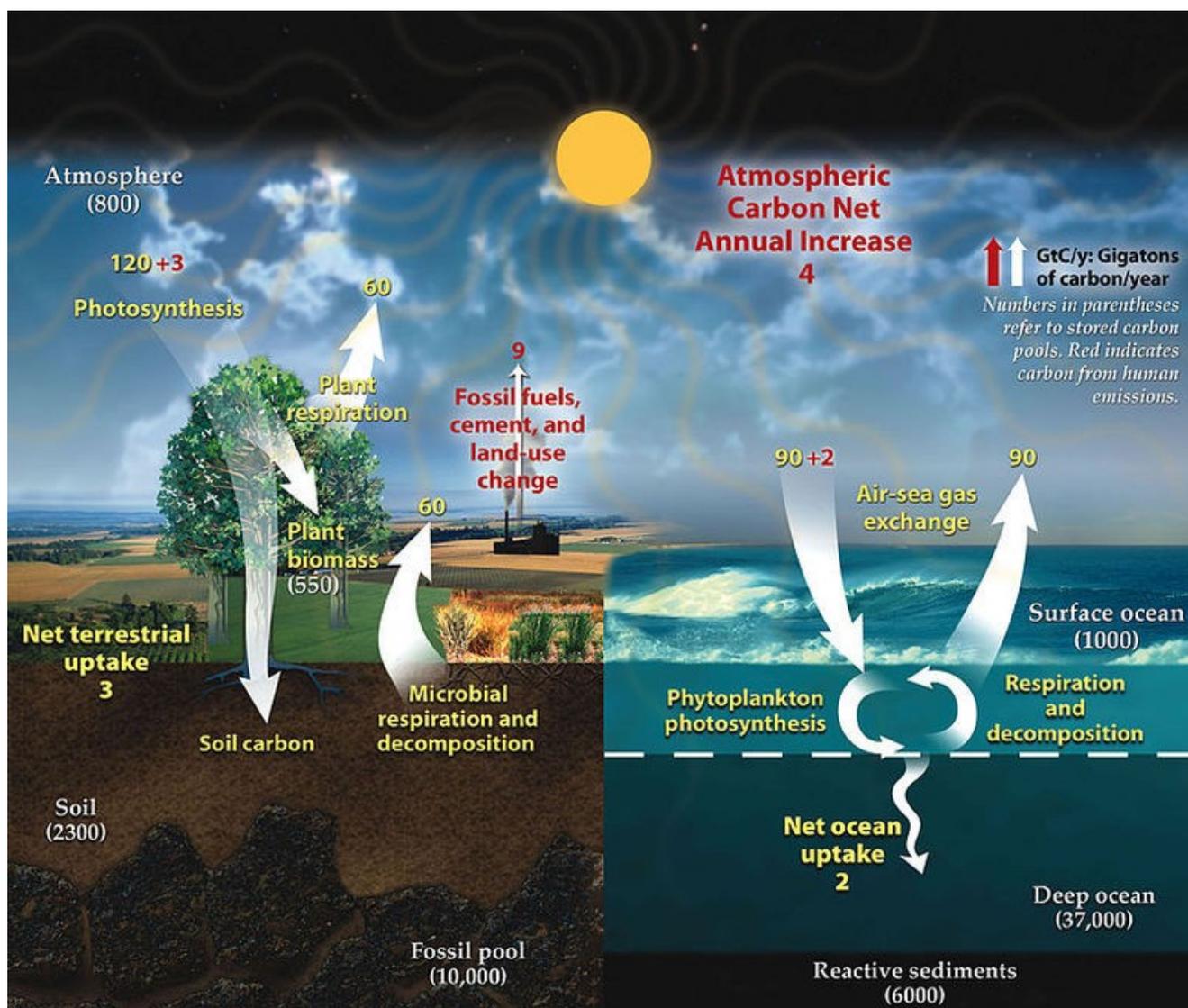


Figure 1. The carbon cycle of the Earth. Numbers represent the mass of carbon in gigatonnes (not the molecules, just carbon alone) that is cycled in a year. **Yellow** text is the natural carbon cycle, with **red** text showing human effects.[2] Notice that the 9 gigatonnes of carbon that humans are emitting (~35 gigatonnes of carbon dioxide) becomes an extra 4 gigatonnes in the atmosphere, an extra 3 gigatonnes of photosynthesis and an extra 2 gigatonnes in the ocean every year. This is how humans are changing the natural carbon cycle. https://energyeducation.ca/encyclopedia/Carbon_flux

In summary, the natural OH* system was not designed for excessive pollution pulses, but its long history and full study has revealed that it does react with virtually everything in the atmosphere, and at lower pollution levels, the OH is the main historical pollution sink. We propose that boosting the OH* and OH- levels would follow this tried and true pathway of ecosystem service, and provide the removals needed, with no handling of residues; the residues are handled by the Earth system. We will include a management parameters document to show what would need watching in a globally scaled release.

I wish to include the Wikipedia Encyclopedic Exposition on Oxidation because it amply describes this phenomenon, and is referenced if you wish to go further: “The increased oxygen concentrations

provided a new opportunity for [biological diversification](#), “
https://en.wikipedia.org/wiki/Great_Oxidation_Event . Pay particular attention to the “Consequences of Oxidation” Section. Also: <https://www.pnas.org/content/117/19/10414m> and
<https://thewonderofscience.com/phenomenon/2018/6/15/the-great-oxygenation-event>.

What we are proposing to do also is to, if we can, also increase the biodiversity metric of the Earth, where there is an extinction cycle occurring, as well as lower temperature by executing a controlled hydroxyl release. We also include for you a set of draft parameters that we would monitor at scale to ensure the planetary environment’s safety which is an important exercise to initiate. Biodiversity, global cooling, good air quality, increased mineral diversity for water systems. are all *desired* consequences of this kind of oxidation proposal. It may be very true that part of the extinctions happening at present are due to depressed oxidation, namely CH₄/SGHG oxidation, and CO₂ rain out are now insufficient for the fluxes that humans are causing, and warming levels are now quite dangerous, The extremes are here, and oxidation would temper these extremes and create a good air quality legacy while cooling the planet.

Thank You,
Viva Cundliffe, PhD abd CEO ReductionTech Inc.
January 15th 2022