SUSTAINED NON-EQUILIBRICITY, SENSITIVITY TO ULTRA-WEAK EXTERNAL FACTORS OF BICARBONATE SOLUTIONS AND THEIR ROLE IN BIOSPHERE.

УСТОЙЧИВО НЕРАВНОВЕСНОЕ СОСТОЯНИЕ И ЧУВСТВИТЕЛЬНОСТЬ К СВЕРХ-СЛАБЫМ ФАКТОРАМ ВНЕШНЕЙ СРЕДЫ БИКАРБОНАТНЫХ ВОД И ИХ РОЛЬ В БИОСФЕРЕ.

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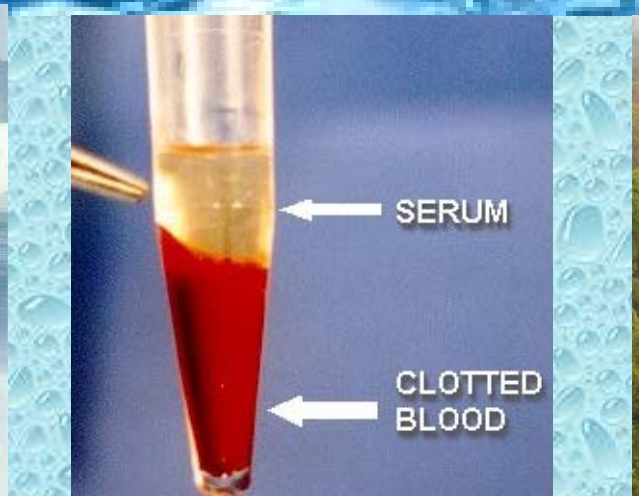
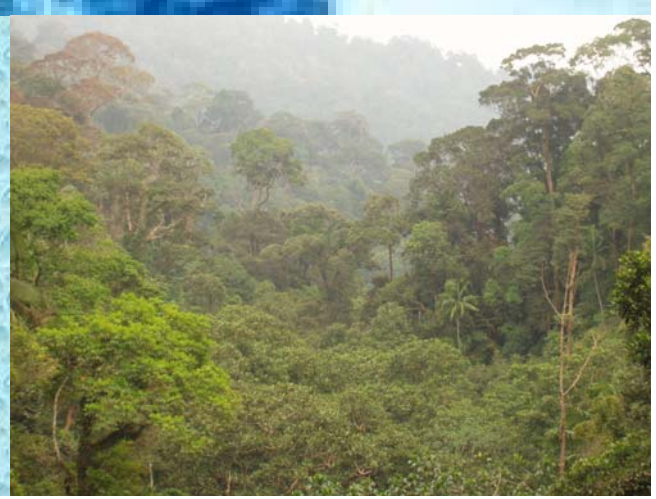
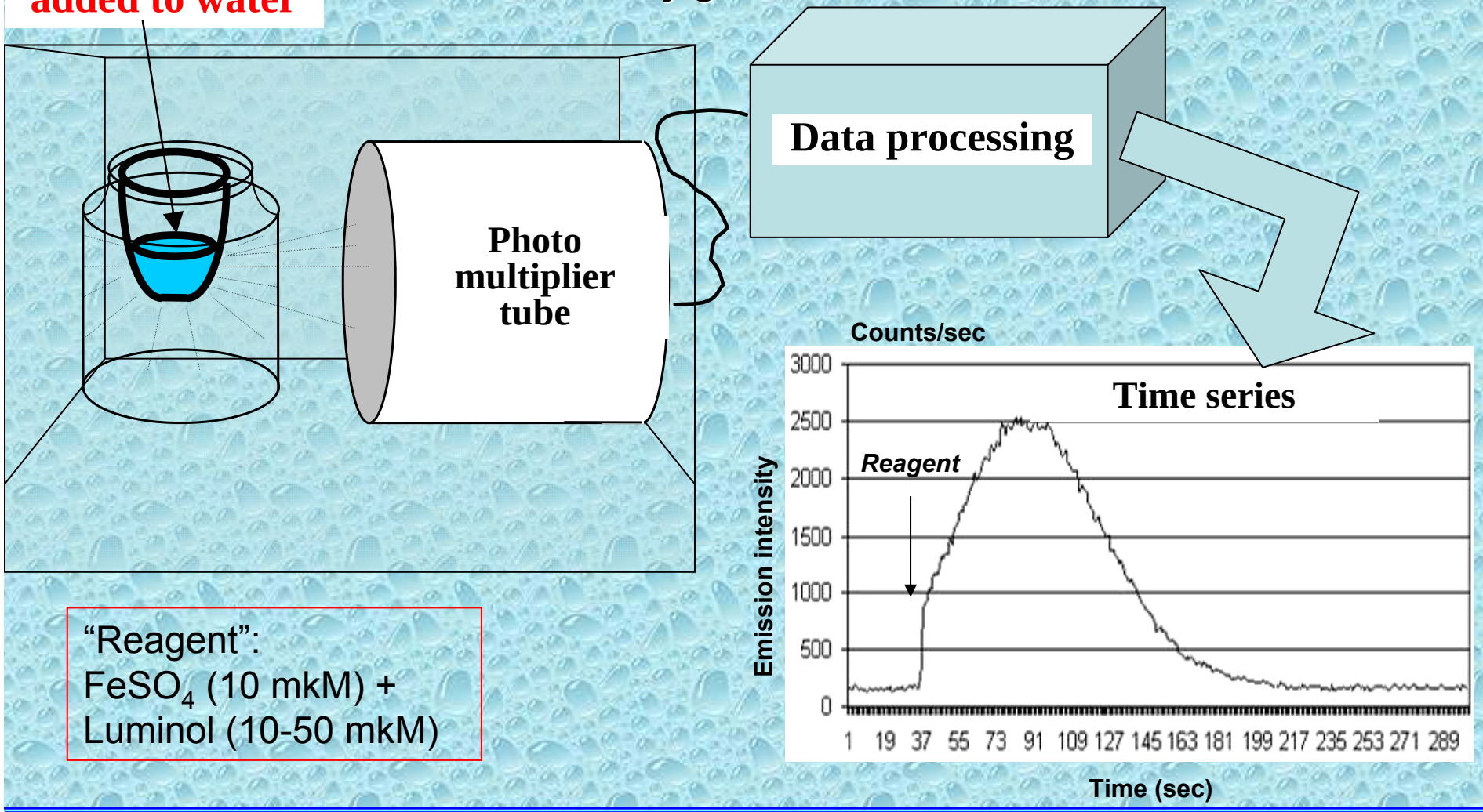
Any REAL water is always a solution, and (BI)CARBONATES are always present in any REAL water

$(CO_2(gas) \leftrightarrow CO_2(aq.) \leftrightarrow H_2CO_3 \leftrightarrow HCO_3^-)$





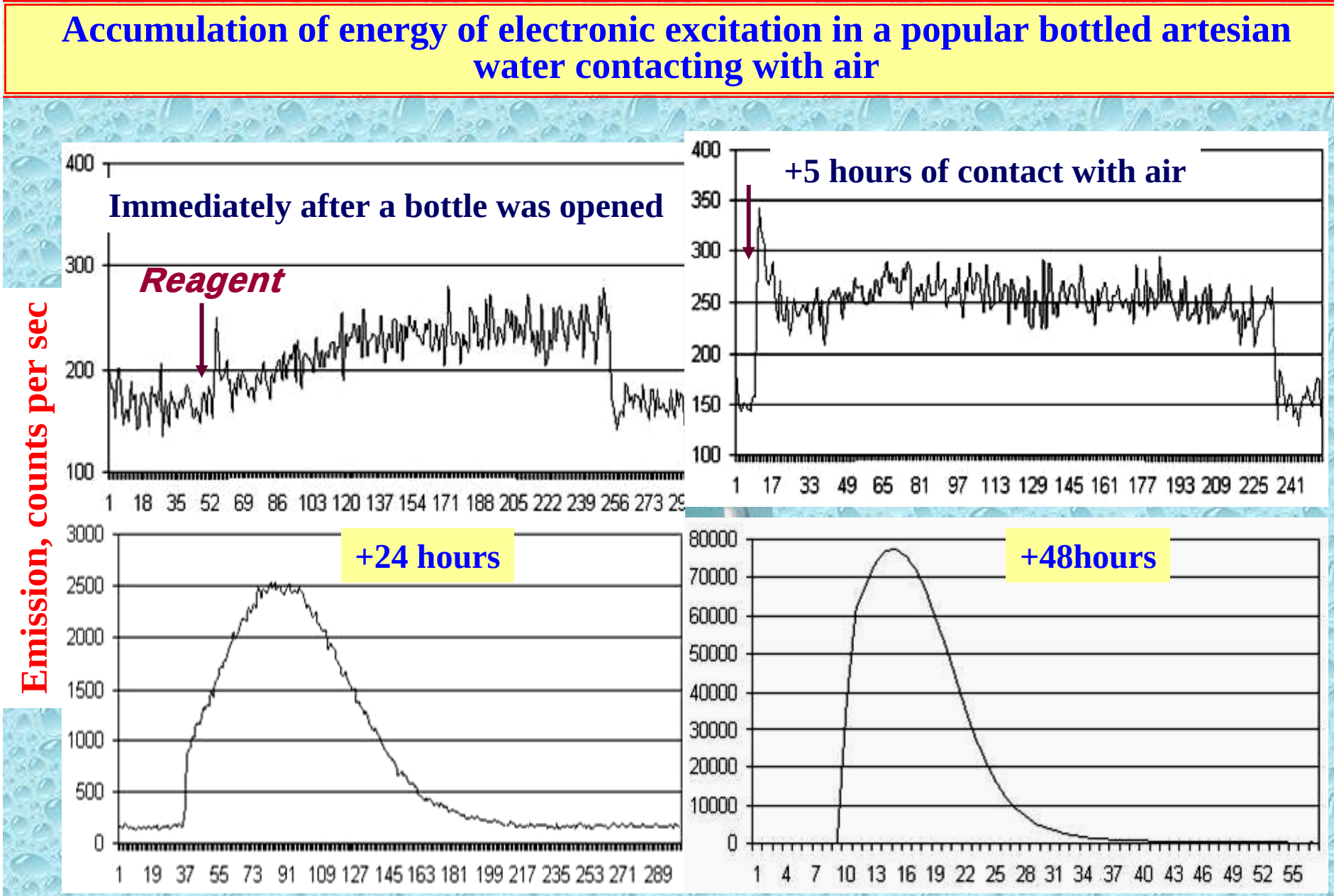
We discovered that addition of Fe (II) salts in catalytic quantities to bicarbonate waters results in the development of the wave of Luminol-amplified photon emission from them.
Thus processes in which Reactive Oxygen Species participate continuously go on in bicarbonate waters.



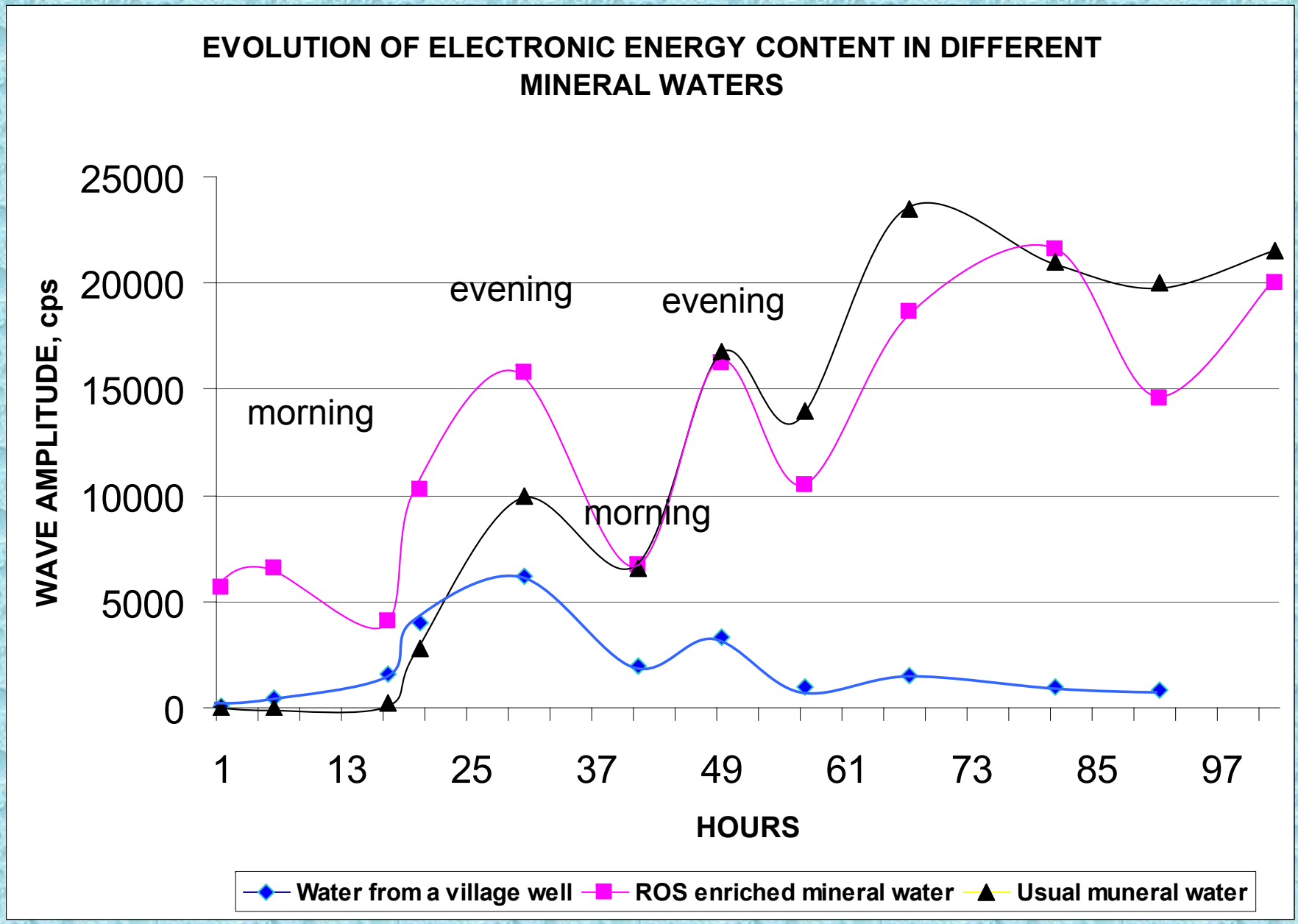
"Reagent":
$FeSO_4$ (10 mkM) +
Luminol (10-50 mkM)

Experimental set up for ultra weak photon emission measurements

Accumulation of energy of electronic excitation in a popular bottled artesian water contacting with air



Dynamic nature of artesian water activity



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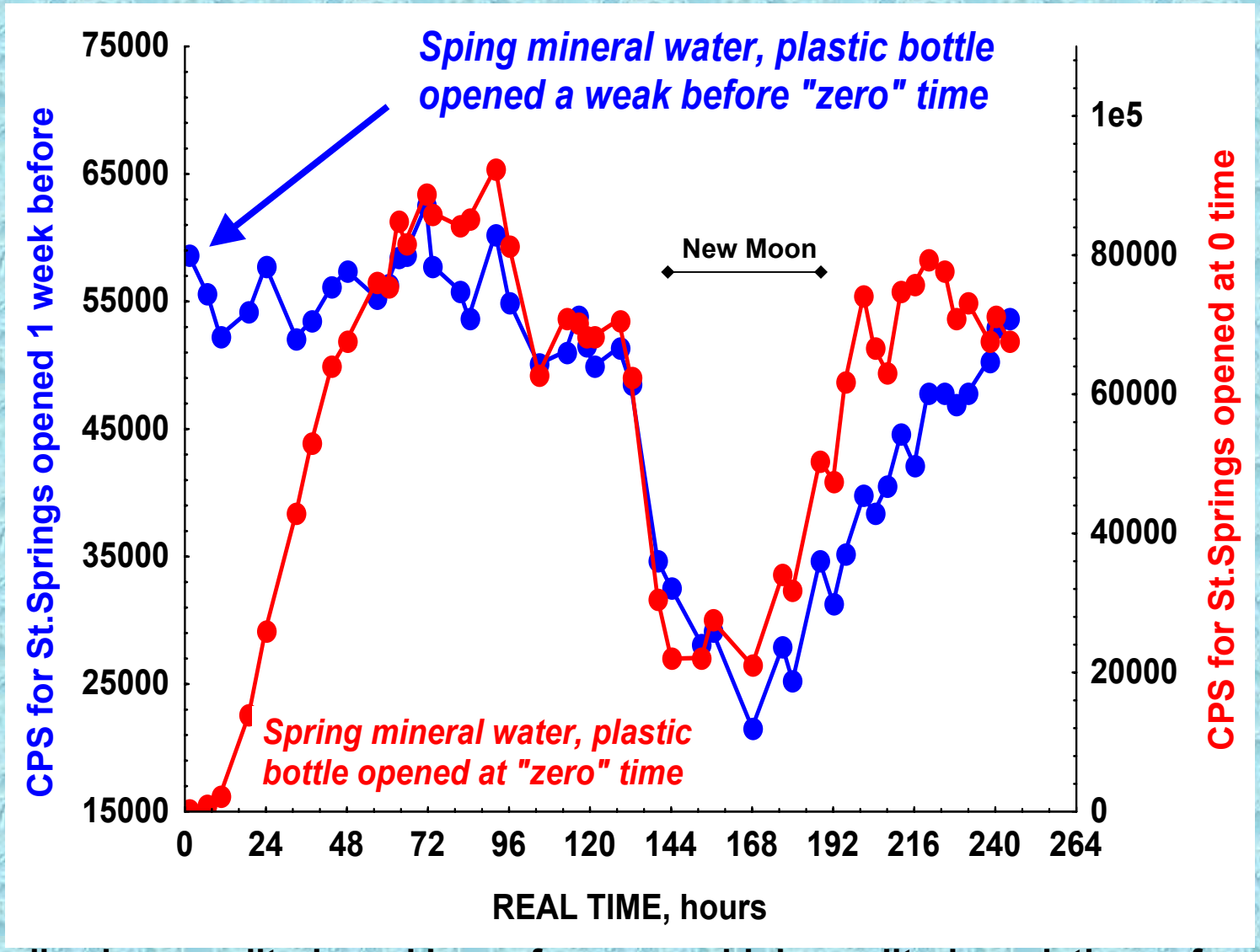
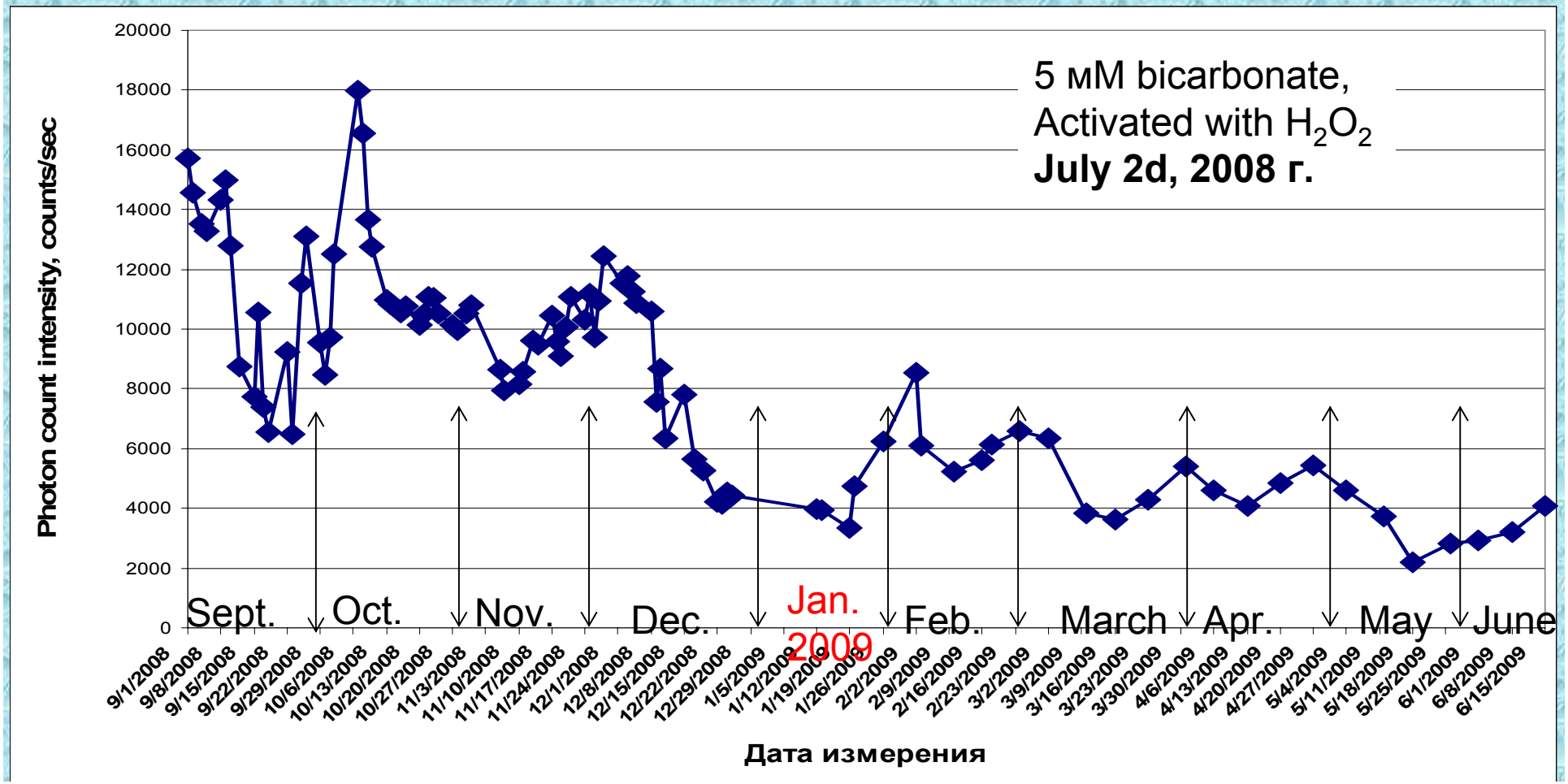
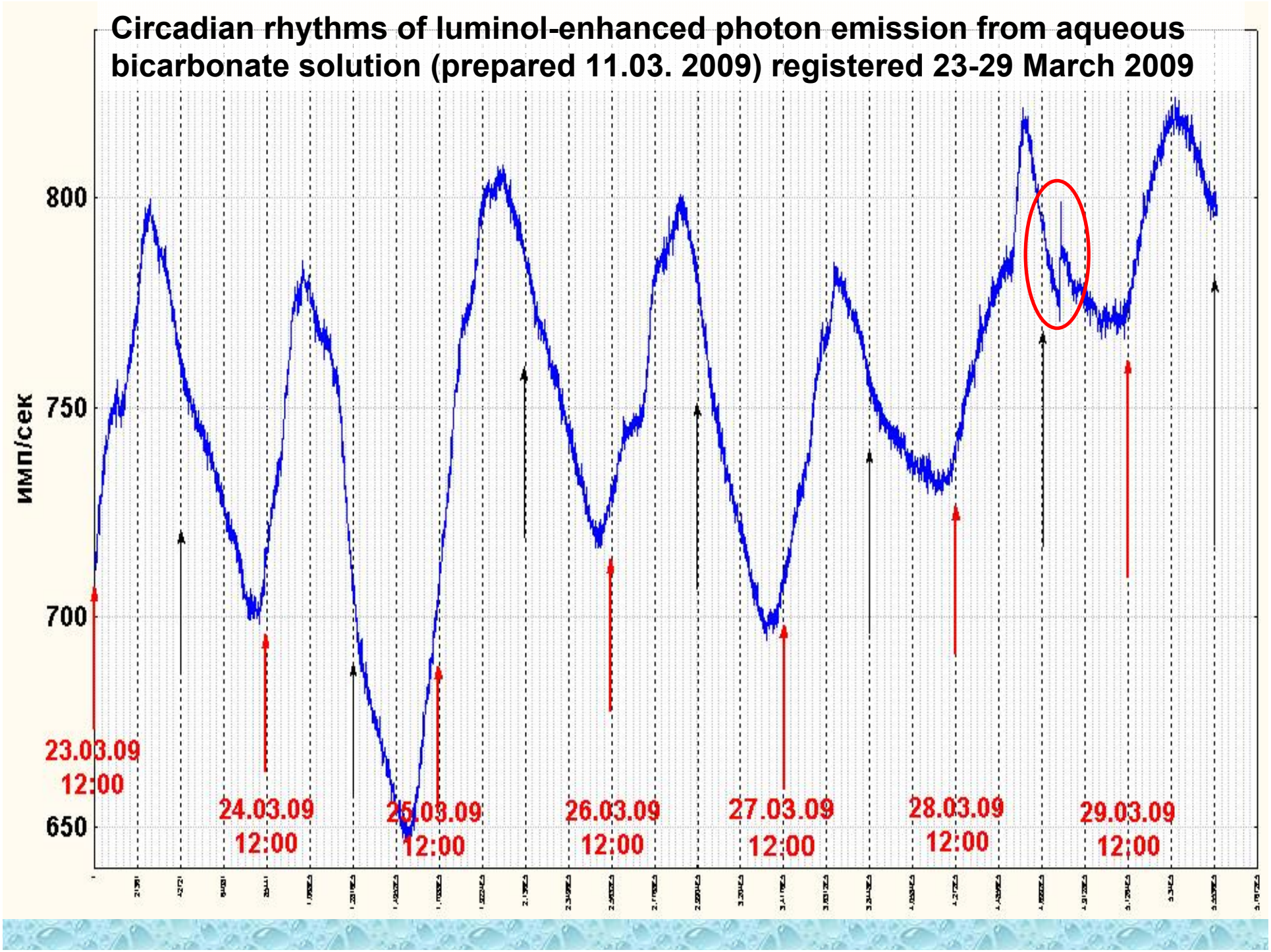


Circadian low amplitude and lower frequency, high amplitude variations of water activity are observed in long-term experiments

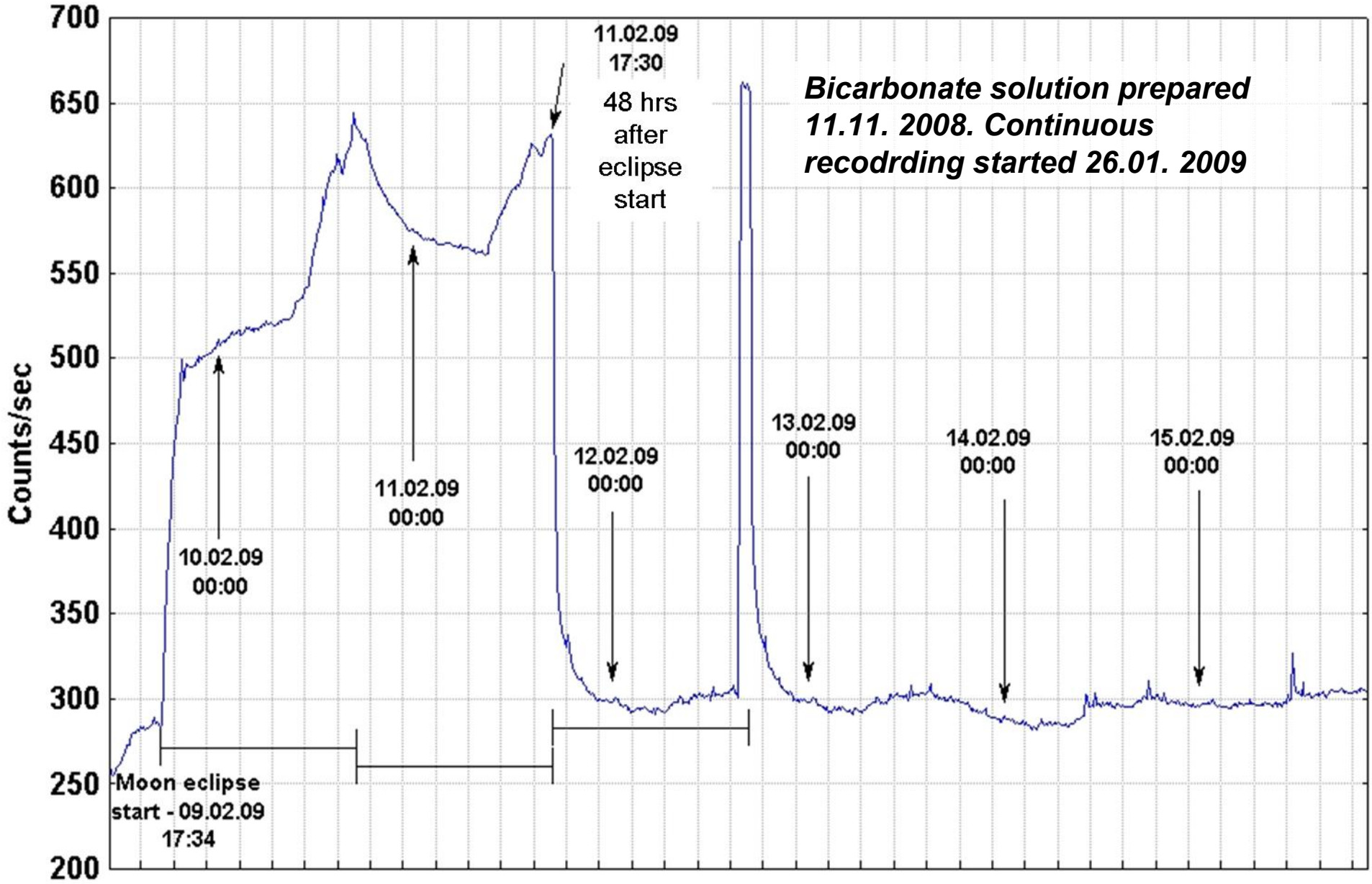
Addition of hydrogen peroxide (0,005-0,01%) to bicarbonate solutions results in strong amplification of photon emission in response to the "reagent".

Bicarbonate aqueous solutions activated with H_2O_2 bolum are permanent sources of UV and visible radiation without Fe(II) addition. They emit photons without contact with the air and in complete darkness for MONTHS!

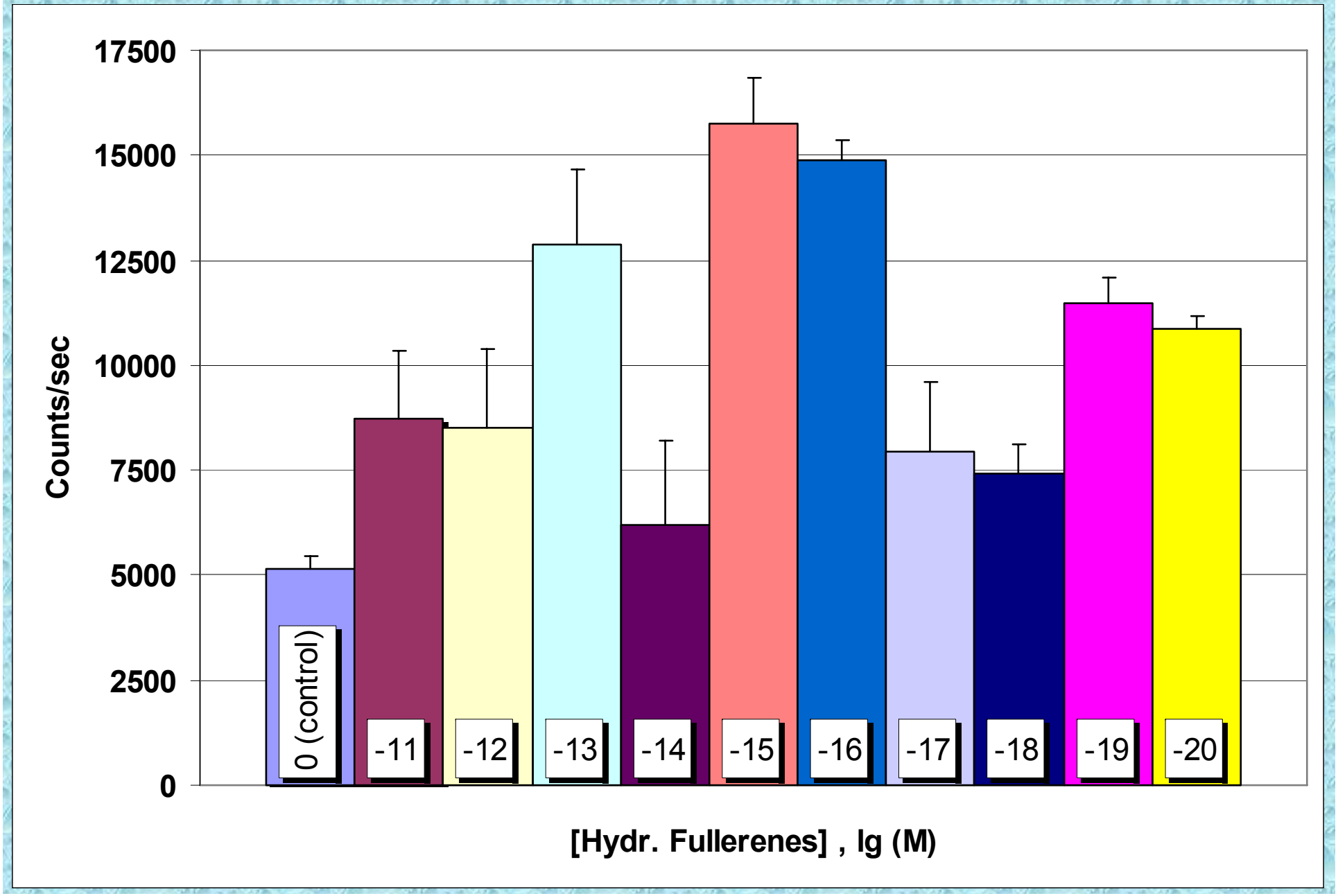



Circadian rhythms of luminol-enhanced photon emission from aqueous bicarbonate solution (prepared 11.03. 2009) registered 23-29 March 2009
имп/сек
800
750
700
650
23.03.09 12:00
24.03.09 12:00
25.03.09 12:00
26.03.09 12:00
27.03.09 12:00
28.03.09 12:00
29.03.09 12:00

Changes in photon emission intensity from activated bicarbonate aqueous solutions during and after the Moon's eclipse.



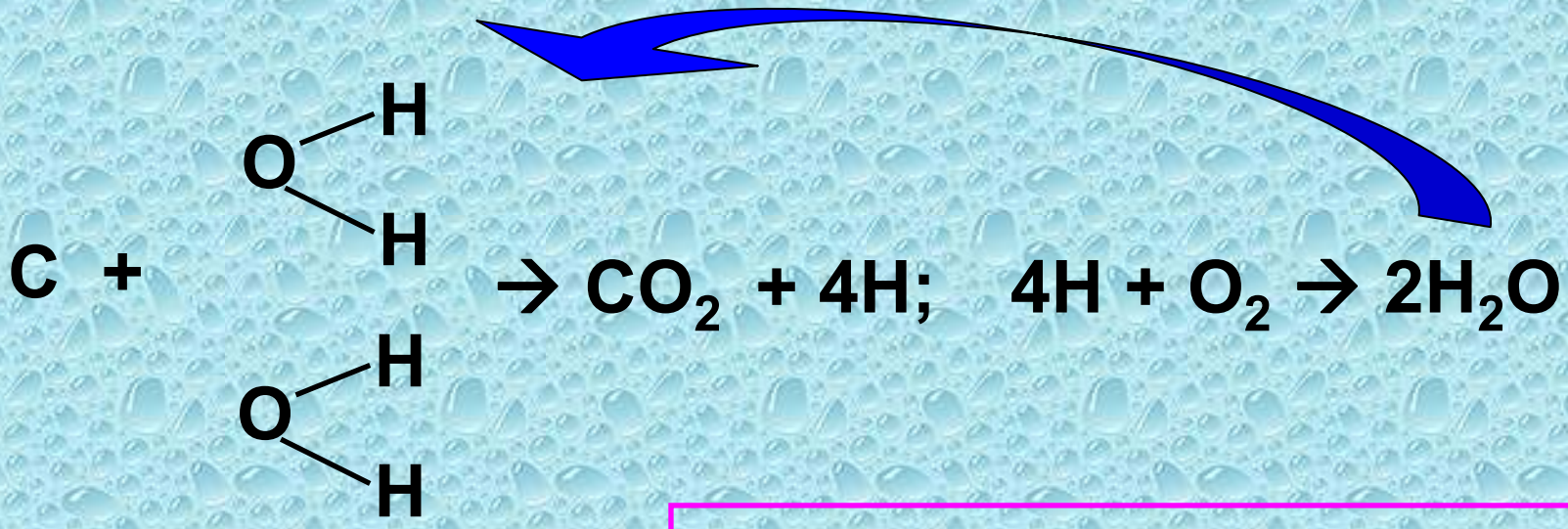
Photon emission intensity from activated bicarbonate aqueous solutions is sensitive to ultra-low doses of biologically active species.



The fundamental process that underlies photon emission from bicarbonate solutions is WATER BURNING.

Burning of carbon is in FACT WATER BURNING:

«…the carbone attracts the oxygen of the water, and forms carbonic acid, while the hydrogen of the water unites with oxygen of the vital air, and forms a new quantity of water equal to that decomposed».



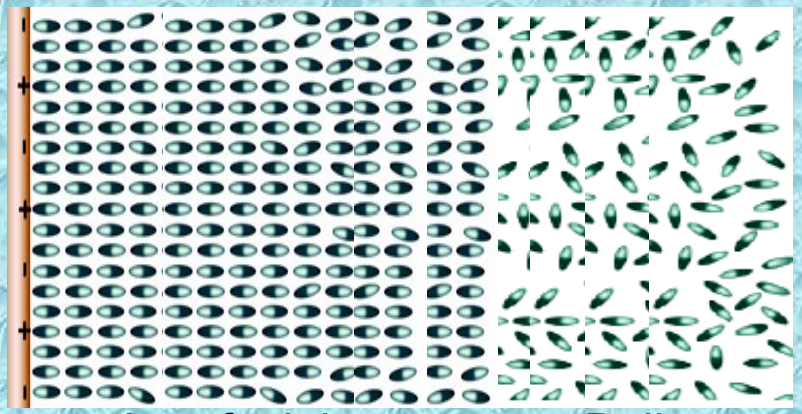
Elizabeth Fulhame. 1794.

Peculiar properties of water phase adjacent to hydrophilic interfaces (interfacial water)

(Jerald H. Pollack, 2003 – 2008)

Interfacial water is different from bulk water in density, freezing temperature, relative permittivity, viscosity, lower "structural temperature":

Thus, it is ***dynamically organized ≡ liquid-crystalline ≡ quazi-polymeric***



Interfacial water (Exclusion Zone Water) – a particular phase state of water – liquid-crystalline, quazi-polymeric water

MOST IMPORTANT PROPERTIES OF INTERFACIAL WATER FOR BIOENERGETICS:

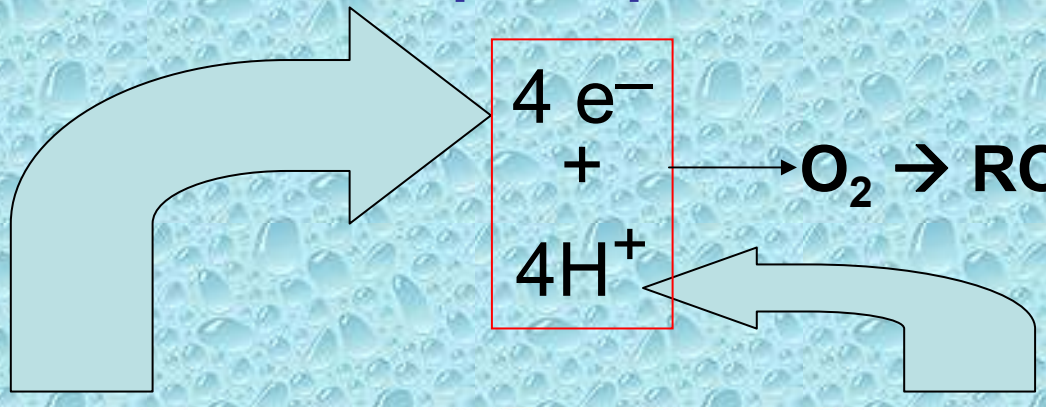
* Interfacial water is negatively charged (down to -150 mv) in respect to bulk water,
* Interfacial water has a strong absorbance peak with the maximum 270 nm,
* Thickness and electron donating capacity of IF-water increase under the action of radiant energy especially in IR part of the spectrum (peak at 3000 nm).

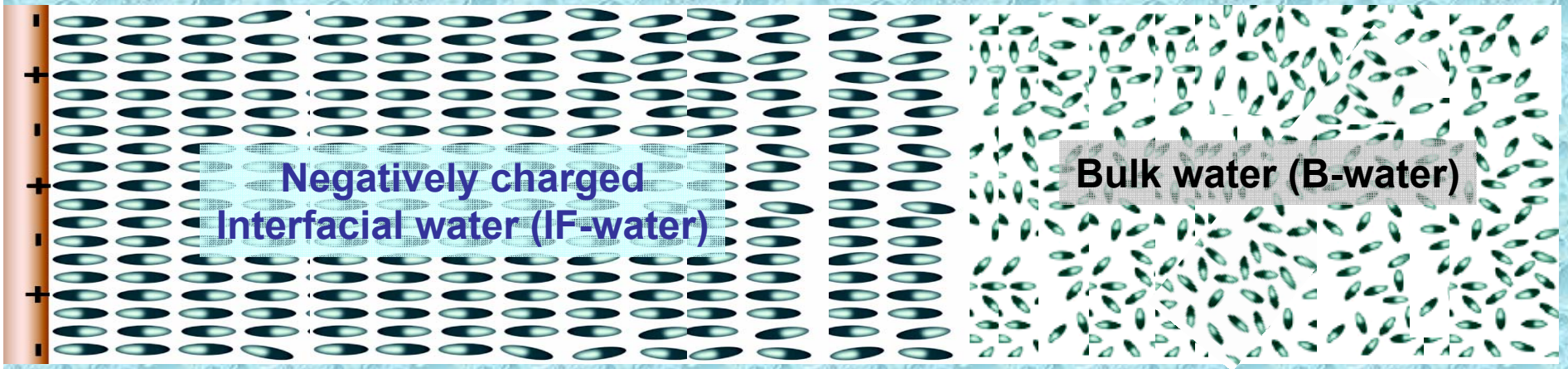
CONSEQUENSES:

INTERFACIAL water has reducing properties:

- Electrons in IF-water are excited (quazi-free) and may be donated to appropriate acceptors
- Low density energy ("heat") supports electron-donor properties of interfacial water

The principle of water burning





Overall reaction

$2H_2O$ (IF-water) + O_2 → O_2 + $2H_2O$ (Bulk water)

+ (Electronic excitation energy)

But this process can not stabely proceed without catalysis

We suggest that (bi)carbonates catalyze water burning ("water respiration")

$$(CO_{2(gas)} \leftrightarrow CO_{2(aq.)} \leftrightarrow H_2CO_3 \leftrightarrow HCO_3^-)$$

(BI)CARBONATES ARE NESSESARY FOR AEROBIC RESPIRATION

At the level of an organism,
At the level of a cell,
At the molecular level

CARBONATES participate in the processes related to generation, transformation and accumulation of energy in aqueous systems because:

Carbonates participate in free radical reactions

CO_2 is a good electron acceptor (e.g. from EZ-water)

$CO_2 + e^- \rightarrow \bullet CO_2^-$ (strong reducer)

Carbonates «smoothen» oxidative processes in water

scavenging hydroxyl radicals •OH

$HCO_3^- + \bullet OH \rightarrow \bullet CO_3^-$ (strong oxidant) $+ H_2O$

CARBONATE RADICALS initiate cyclic and chain processes and promote in aqueous systems self-organization and development:

$2\bullet CO_3^- + 2H^+ \rightarrow \rightarrow \rightarrow$ organics! + energy

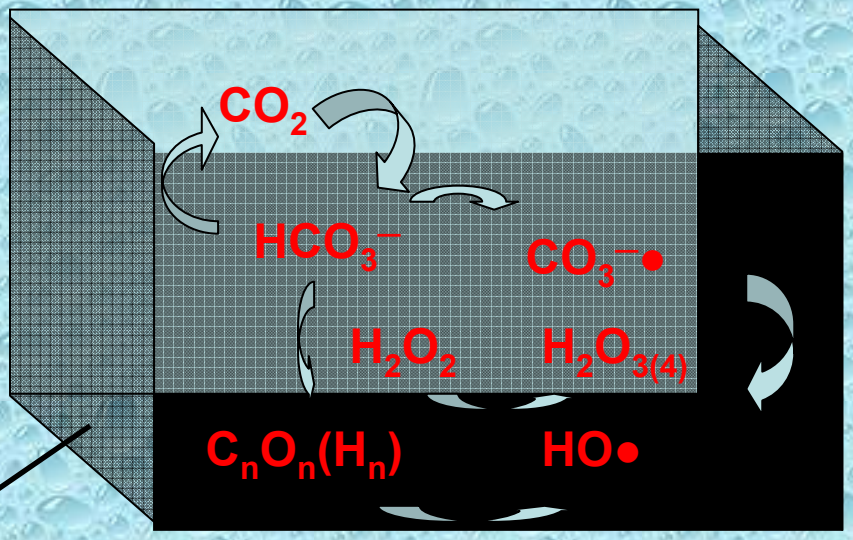
Overall reaction

$2H_2O$ (IF-water) + O_2 → O_2 + $2H_2O$ (Bulk water)

+ (Electronic excitation energy)

Nedds the “black box” with catalysts:

$2H_2O$ (IF-water) + O_2 + →



→ O_2 + $2H_2O$ (Bulk water)

If CO_2 is present in biphasic aqueous system (IF-water/Bulk water):

(Bi)carbonates will promote water oxidation ("water burning") being a source of high density free energy,

A lot of active particles will emerge in this system:

$-O-C\equiv O^+$, $HO\bullet$, $CO_3^{-}\bullet$, $O_2^{-}\bullet$, $\bullet C\equiv O^+$, $H_2C=O$… (organics!)

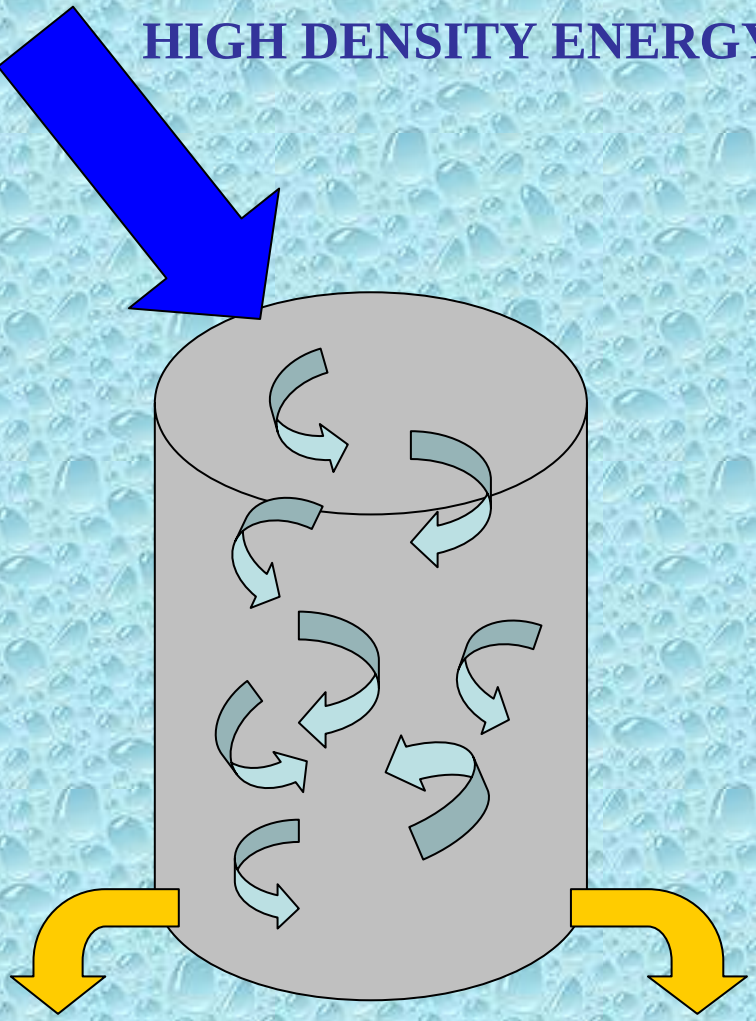
If N_2 is present it will be excited, ionized, and opportunity for emergence of complex organic compounds including polymers will arise

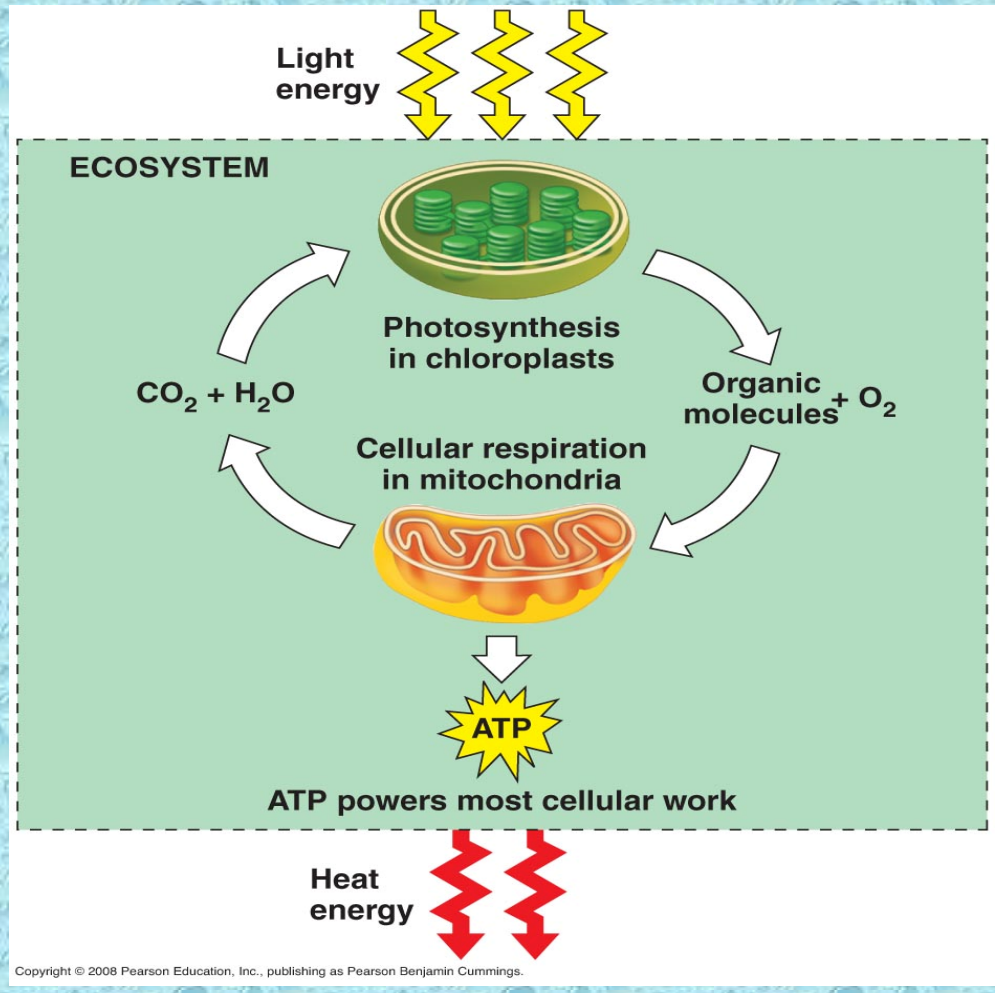
$H_2C=O + NH_3 \rightarrow$ amino acids, heterocyclic compounds including nucleic acid bases

What is the external source of energy feeding activated confined bicarbonate solutions and supporting them in a stable non-equilibrium state for many months?

Standard explanation of the origin of “self”-organization and non-equilibrium state of open systems (including the Biosphere)

HIGH DENSITY ENERGY (free energy, «LIGHT»)

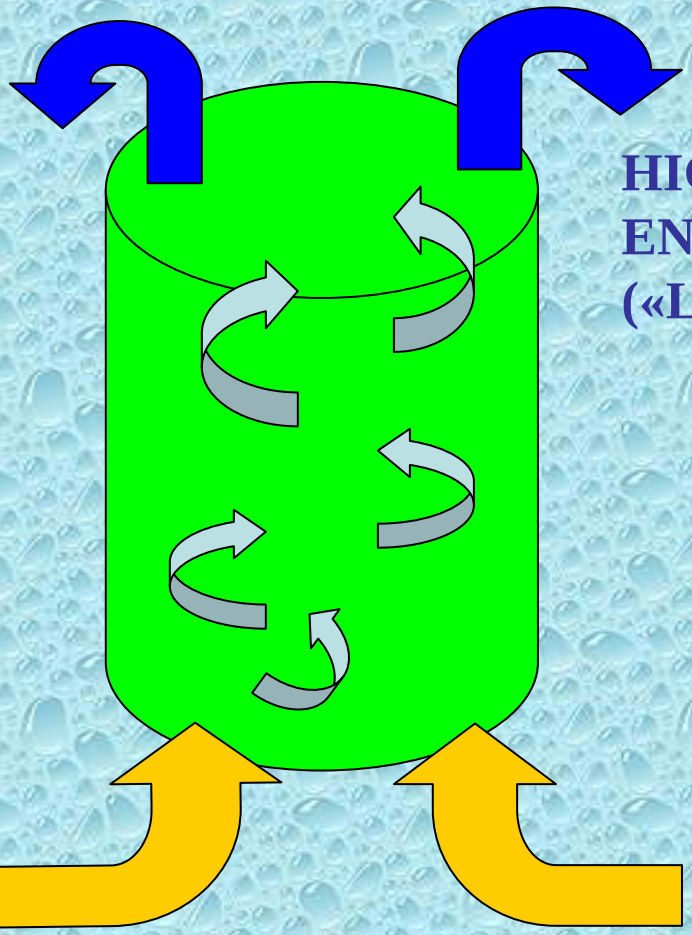




Machine (passive) system
efficiency < 100%

LOW DENSITY ENERGY («HEAT»)

Persistent Non-Equilibrium systems (Living Systems according to Ervin Bauer) are capable due to their dynamical organization to extract energy from the environment and transform it into free energy served for useful work performance



HIGH DENSITY ENERGY («LIGHT»)

LOW DENSITY ENERGY («HEAT»)

Activated bicarbonate solution («Efficiency» = 100%)
Is it a living system analog?


СПАСИБО
Thank you!