

A CLOSE LOOK AT THE PHENOMENA OF NATURAL CARBONATION

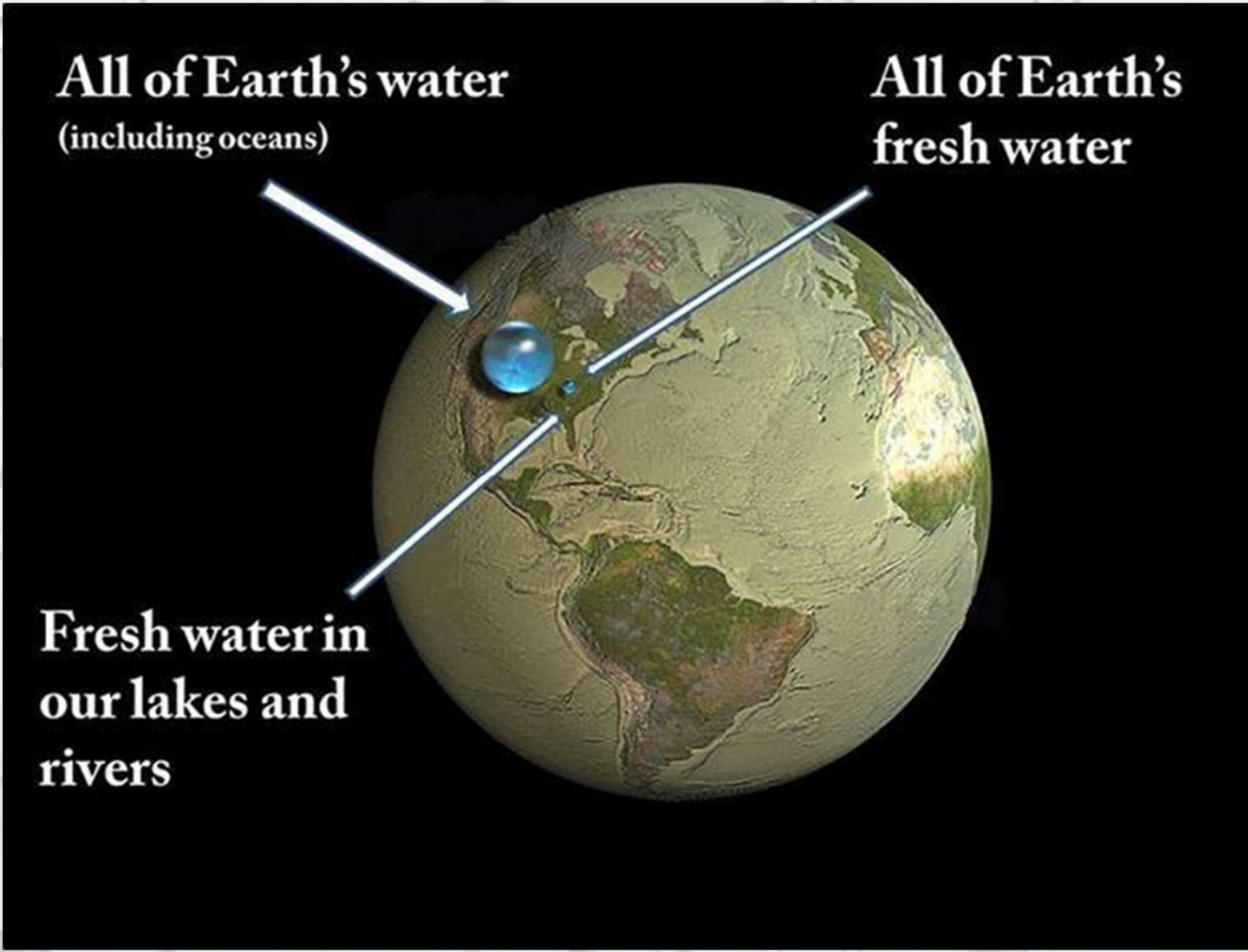
MANUEL ANTUNES DA SILVA

HIDROGEOLOGIST / WATER SOMMELIER



FINE WATERS SUMMIT
Stockholm, 25 and 26 April 2019





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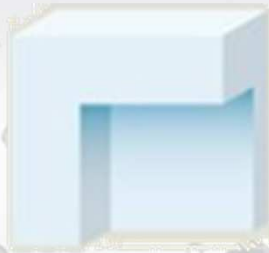


FRESH WATER ON EARTH

About 97.5% of all water on Earth is salt water

Only 2.5% of all the water on Earth is fresh water

70%
Frozen in Antarctica and Greenland



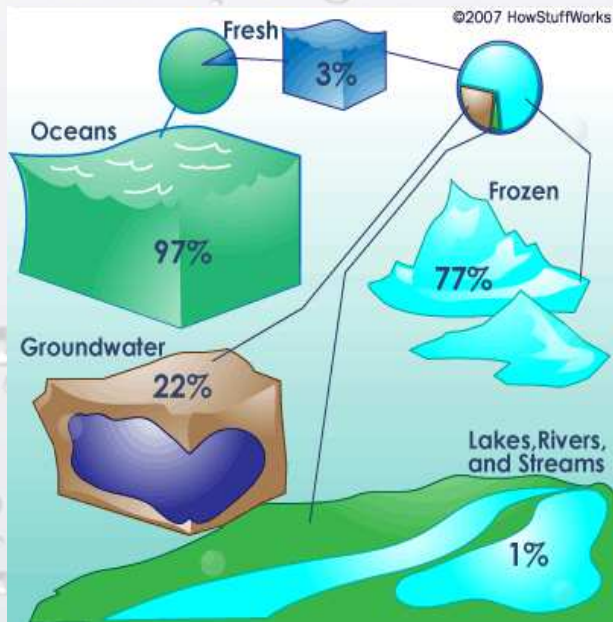
Most of it lies too deep underground or exists as soil moisture



1% Available
for withdrawal and human use



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CO₂ RICH



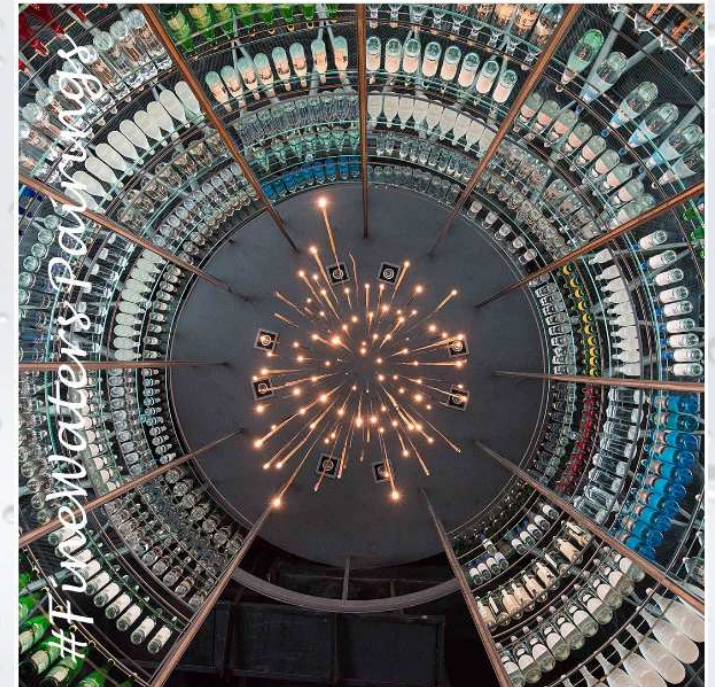
NMWW

Natural Mineral Water



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Fine Waters Pairings



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NATURAL MINERAL WATER



Generation Factors



Lithology

Original Purity

Granites, Quartzites,
Limesotnes,
Sandstones
...

Terroir

Vintage

Residence time

Pressure + Temperature

HOW CHEMICAL REACTIONS OCCUR

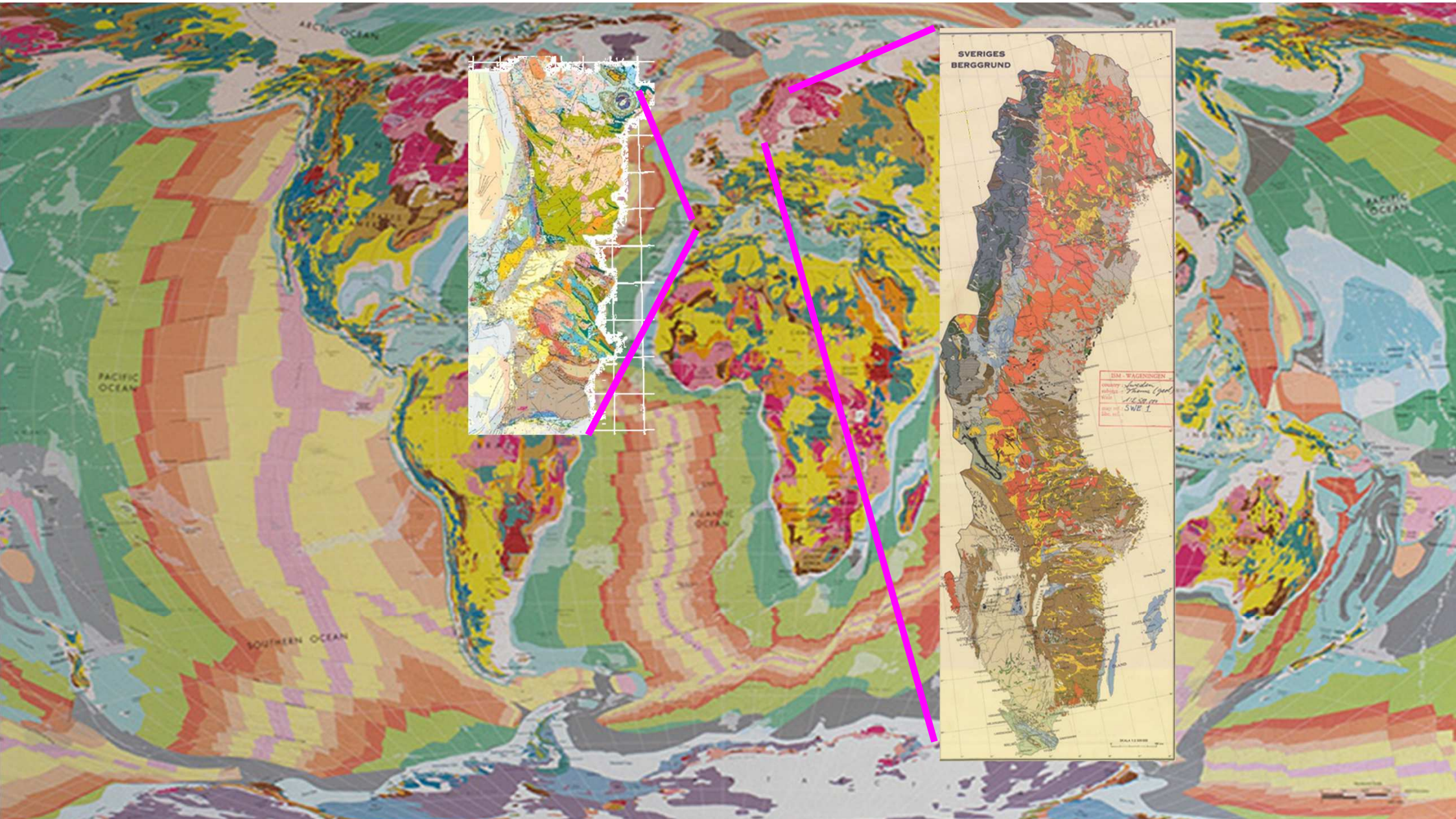
Water/Rock Interaction

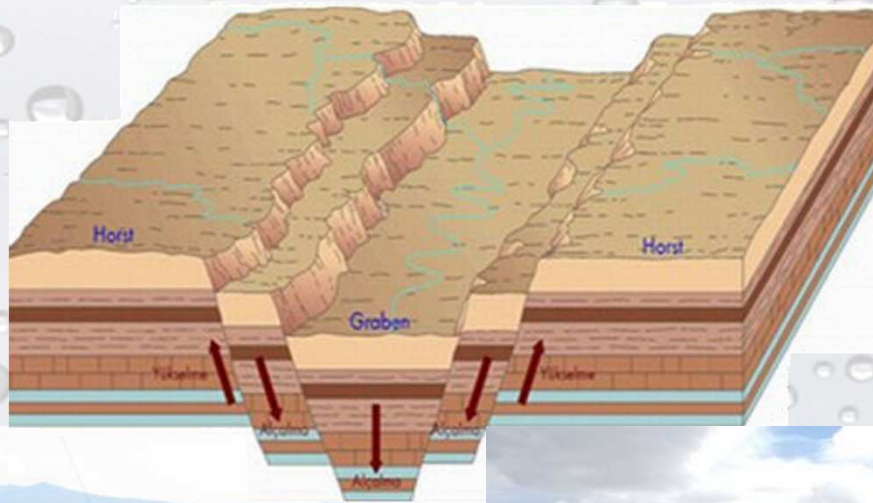
Addition of Gases

Addition of Minerals



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CO₂

Rare geological conditions can produce naturally carbonated water

What is the Origin?

- Organic matter degradation
- Metamorphic devolatilization
- Interaction with carbonates
- Magmatic degassing

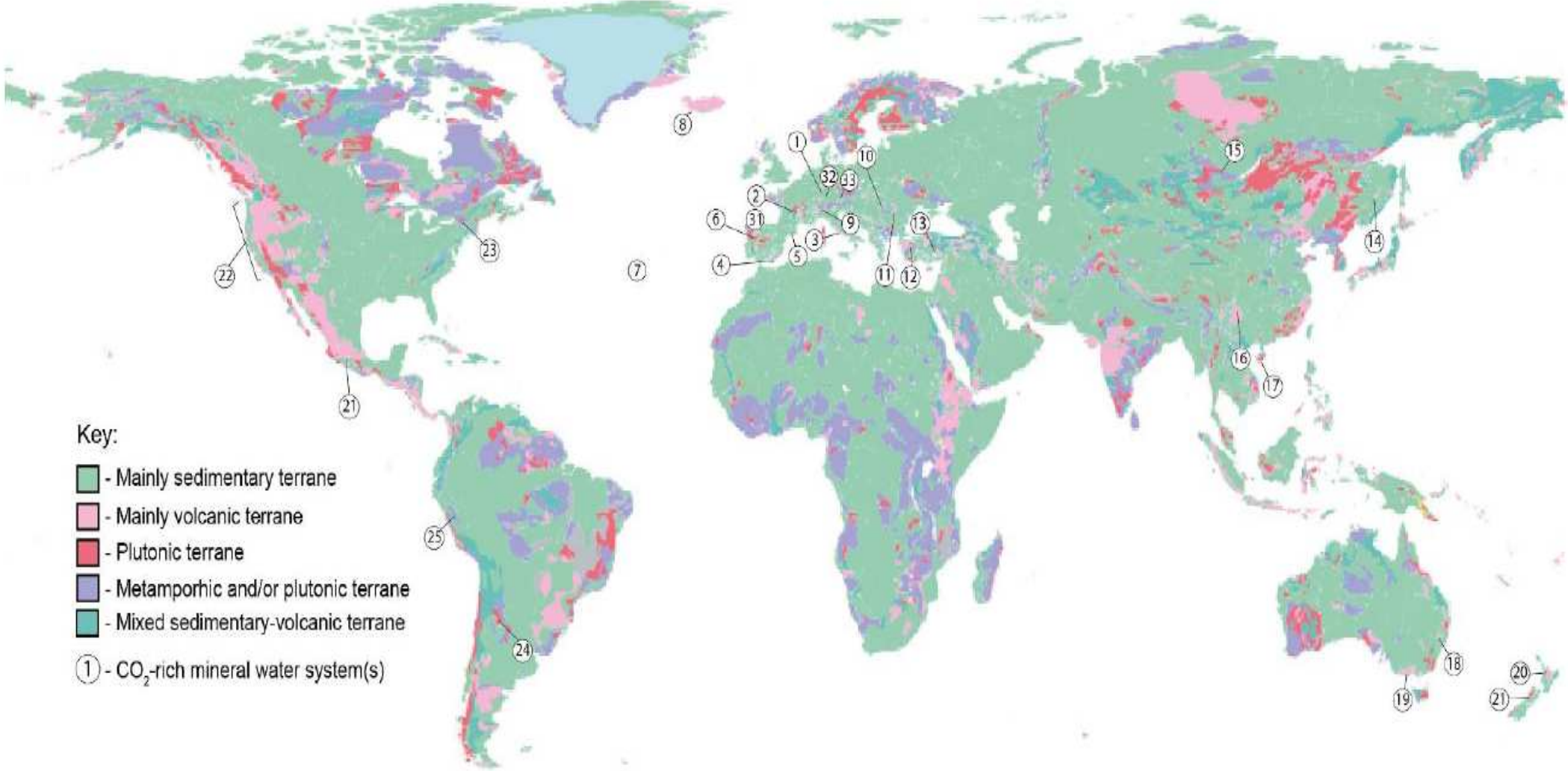
**SUPER
BOCK
GROUP**



Vitalis
ÁGUA MINERAL NATURAL



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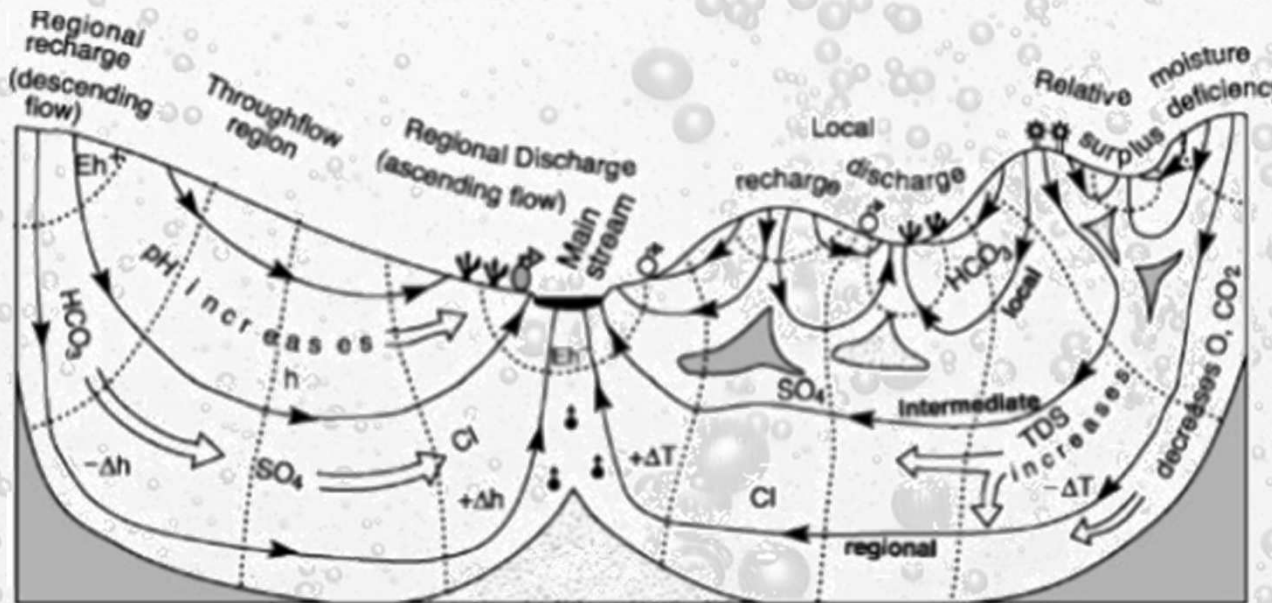


Key:
- Mainly sedimentary terrane
- Mainly volcanic terrane
- Plutonic terrane
- Metamorphic and/or plutonic terrane
- Mixed sedimentary-volcanic terrane
① - CO₂-rich mineral water system(s)

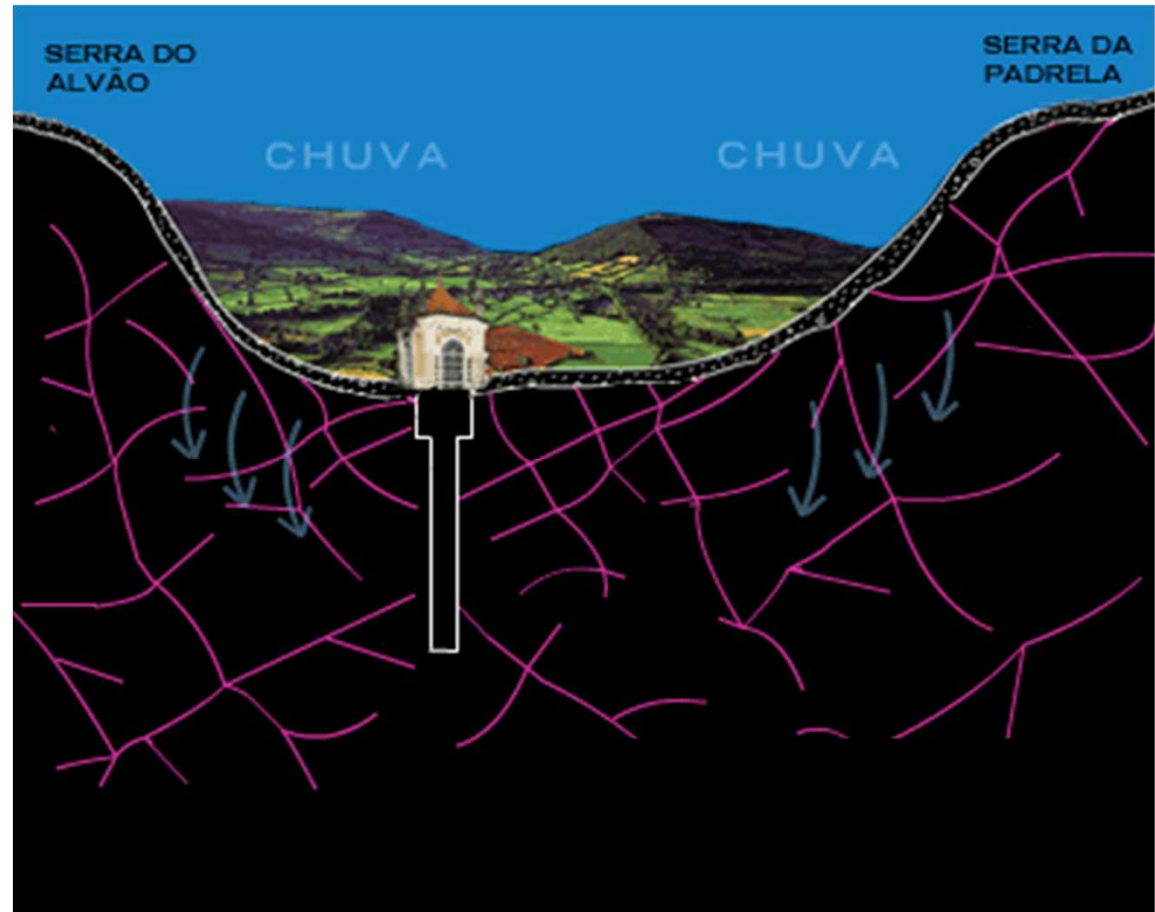
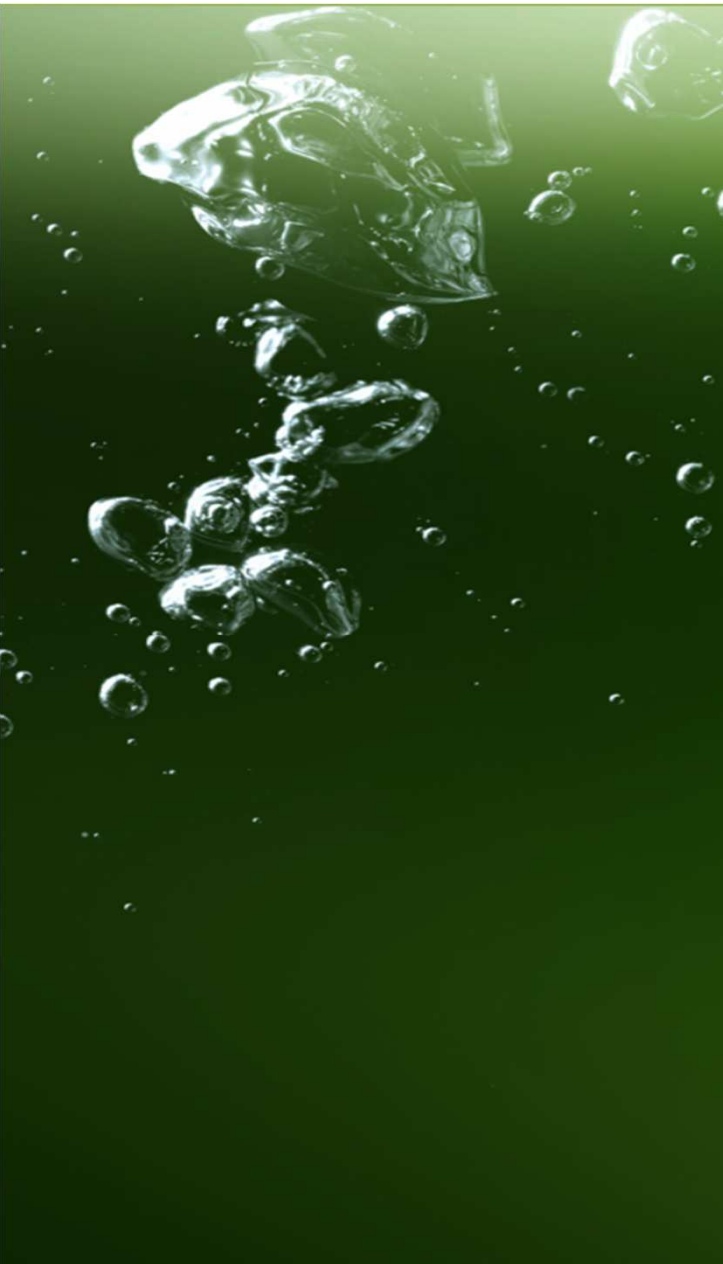


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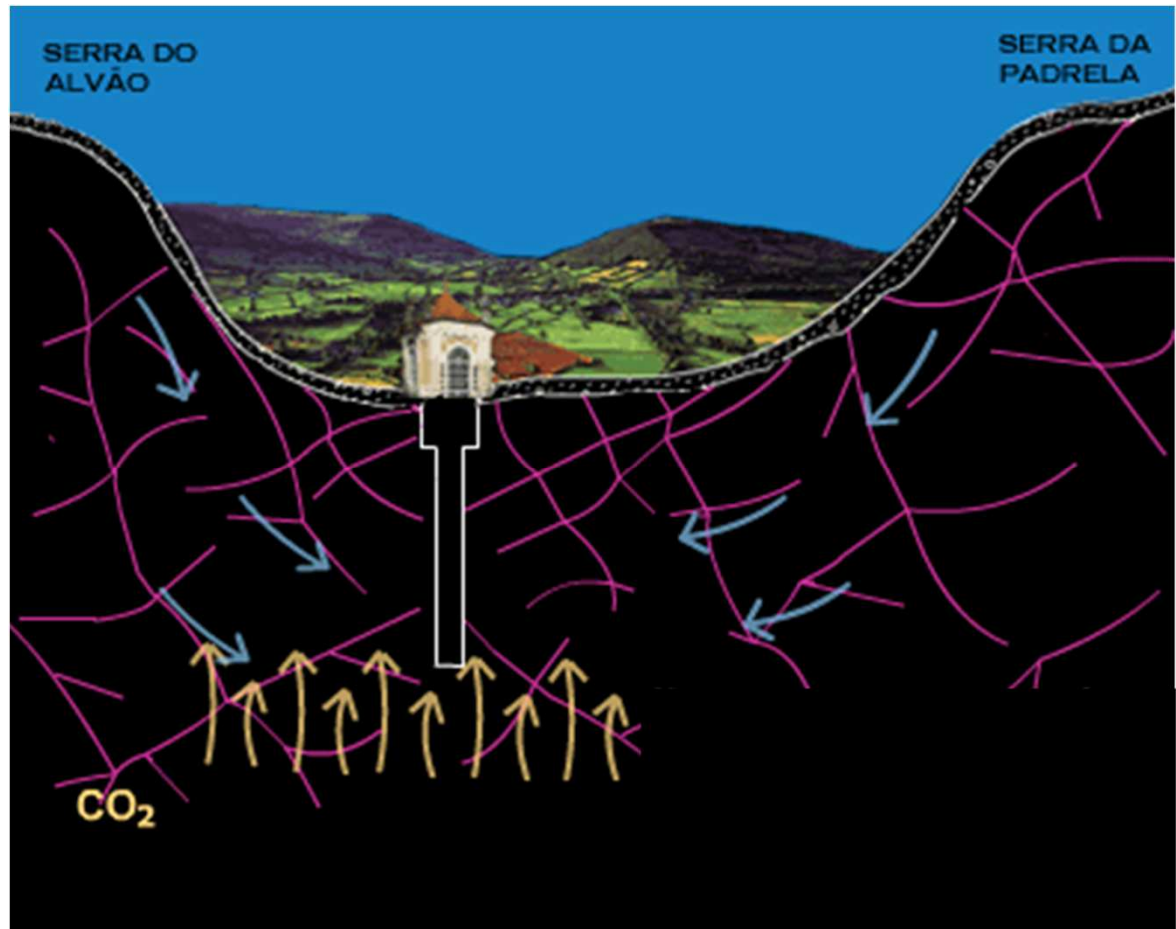
Conceptual Model of CO₂ Rich Natural Mineral Water Systems



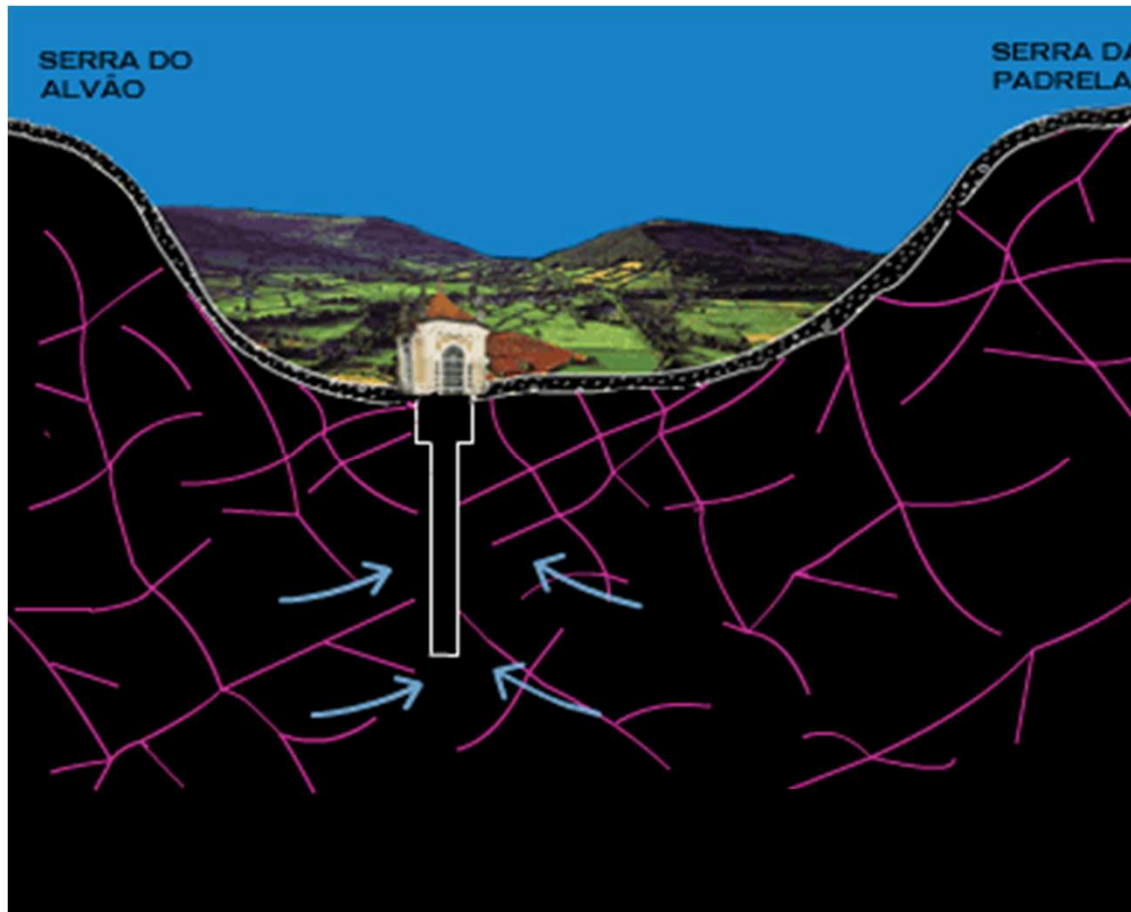
- Geology
- Tectonic structure
- Origin of CO₂
- Flow paths of CO₂
- Flow paths of water
- Recharge
- Discharge
- Geochemistry
(dominant anions and cations, TDS, pH)
- Isotopic signatures



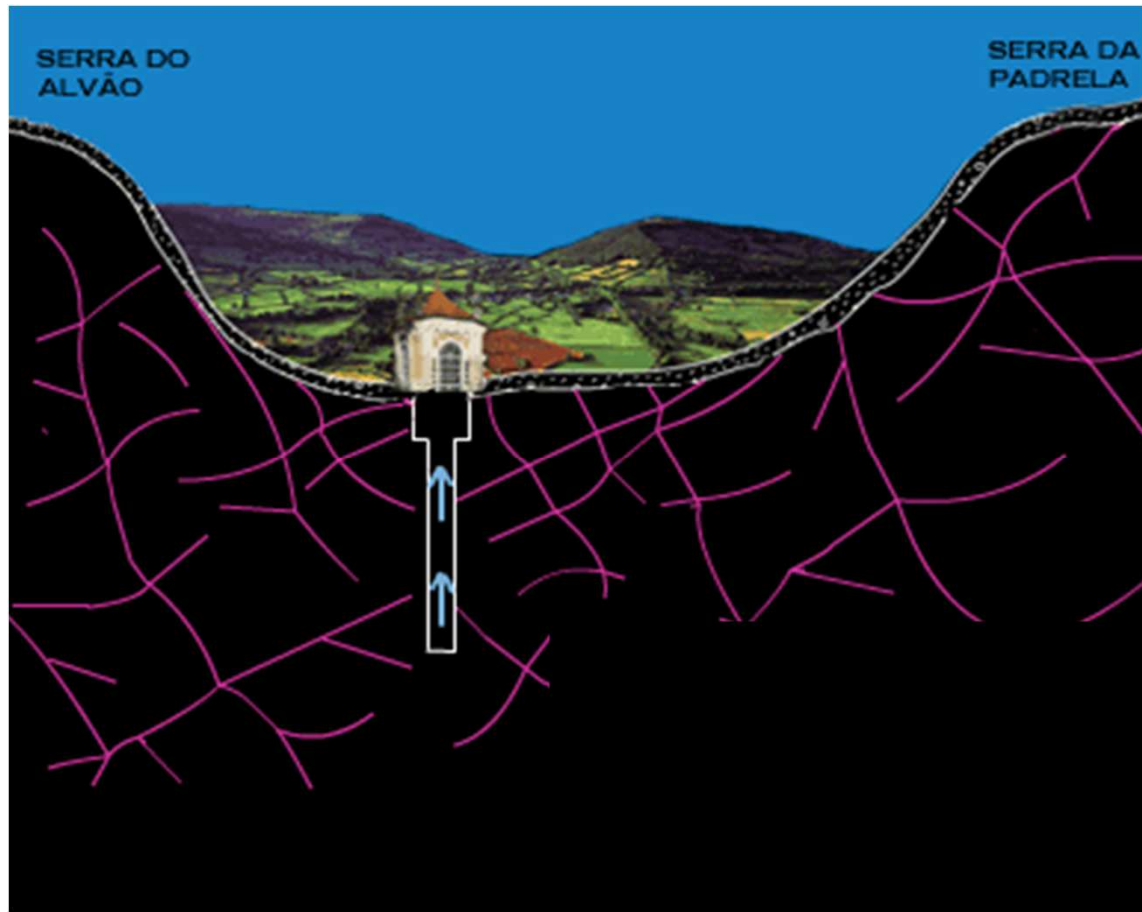
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A glass of water with a cork stopper, set against a background of rippling water. The glass is partially filled with water, and the cork is visible at the top. The background shows a close-up of water ripples, creating a textured, shimmering effect. The lighting is warm, highlighting the clarity of the water and the reflections on the glass.

“The water is the Natures Carrier.” (Leonardo da Vinci)
“The water is as the land through it flows.” (Teofrasto)
“The water is the beginning of all things.” (Tales de Mileto)

CO₂ RICH
NATURAL MINERAL WATER
100% NATURE MADE
100% PURE
ORIGINAL PURITY

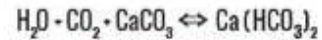


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Natural Impregnation

(Underground Hydrogeological Aquifer):

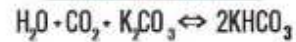
Calcium Bicarbonates



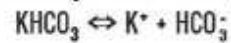
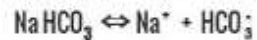
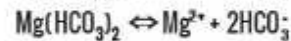
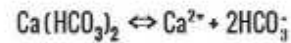
Magnesium Bicarbonates



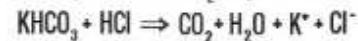
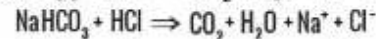
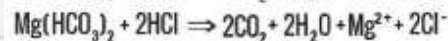
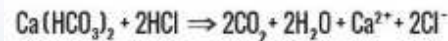
Potassium Bicarbonates



Calcium, Magnesium, and Potassium bicarbonates present in natural sparkling mineral water increase its **alkalinity**.



Digestion Process

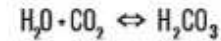


The increased
alkalinity

buffers
excess acidity in the stomach.

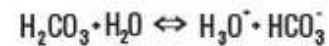
Artificial Impregnation Process

(Bottling Line):



Carbonic acid H_2CO_3 resulting from artificial impregnation of water with CO_2 is unstable and **highly acidic**.

Consumption Process



There are no cations (minerals) to form bicarbonates. The carbon dioxide (CO_2) is released aggressively, increasing gastric **acidity**. This may cause stomach distention, acid reflux, ulcers, and hypertension.

- NATURAL MINERALS
- SLOW PROCESS
- IDEAL ACIDITY IN THE STOMACH
- NATURAL BICARBONATES

VS

- NO MINERALS
- AGRESSIVE PROCESS
- HIGH LEVEL OF ACIDITY
IN THE STOMACH

Natural sparkling water is not the same as soda water.
When it comes to health, they act differently on the body.

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NATURAL MINERAL WATER



CO₂ RICH NATURAL MINERAL WATER



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Bottled Water

naturally carbonated natural mineral water

the carbon dioxide content from the spring and bottling is the same as at source

natural mineral water fortified with gas from the spring

the carbon dioxide content is greater than that established at source

carbonated natural mineral water

has been added carbon dioxide of an origin other than the water table or deposit from which the water comes

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DESDE 1884
V
VIDAGO



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BALLANCE - Carbonation Levels of Bottled Water



Still no carbonation



Effervescent smallest possible bubbles



Light noticeable small bubbles



Classic sparkling water



Bold big loud bubbles



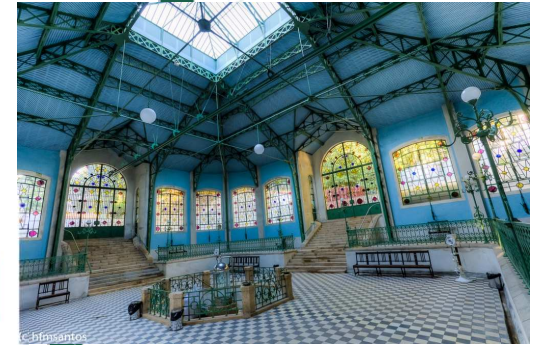


Feel Welcome to Portugal!

Welcome to our
fine and finest Waters!



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A man with short hair, wearing a dark blue button-down shirt, is smiling broadly and holding four wine glasses in front of him. The glasses are arranged in two pairs, one in each hand. The background is dark with some green foliage visible on the right side.

Thank you!

Manuel Antunes da Silva

antunes.silva@superbockgroup.com

MAntunesDaSilva.WaterSommelier@gmail.com