

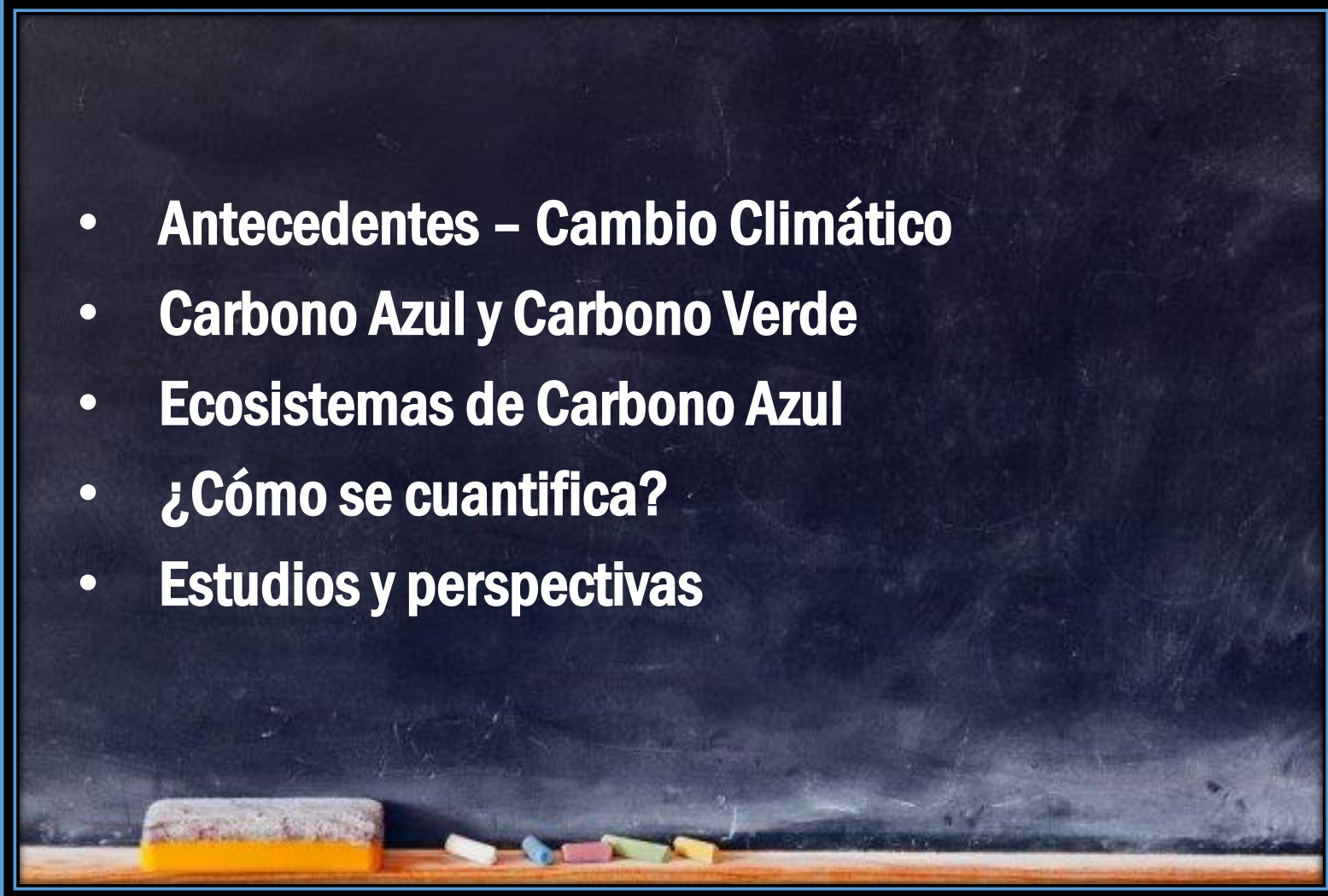
Carbono Azul

Oceanografía Química
2021

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Ernesto Brugnoli

Temario

- **Antecedentes – Cambio Climático**
- **Carbono Azul y Carbono Verde**
- **Ecosistemas de Carbono Azul**
- **¿Cómo se cuantifica?**
- **Estudios y perspectivas**



A photograph of a dense field of green rice plants, likely in a paddy field. The plants are tall and have long, narrow leaves. The background is a clear, bright blue sky. The text "Antecedentes" is overlaid in the center of the image in a white, cursive font.

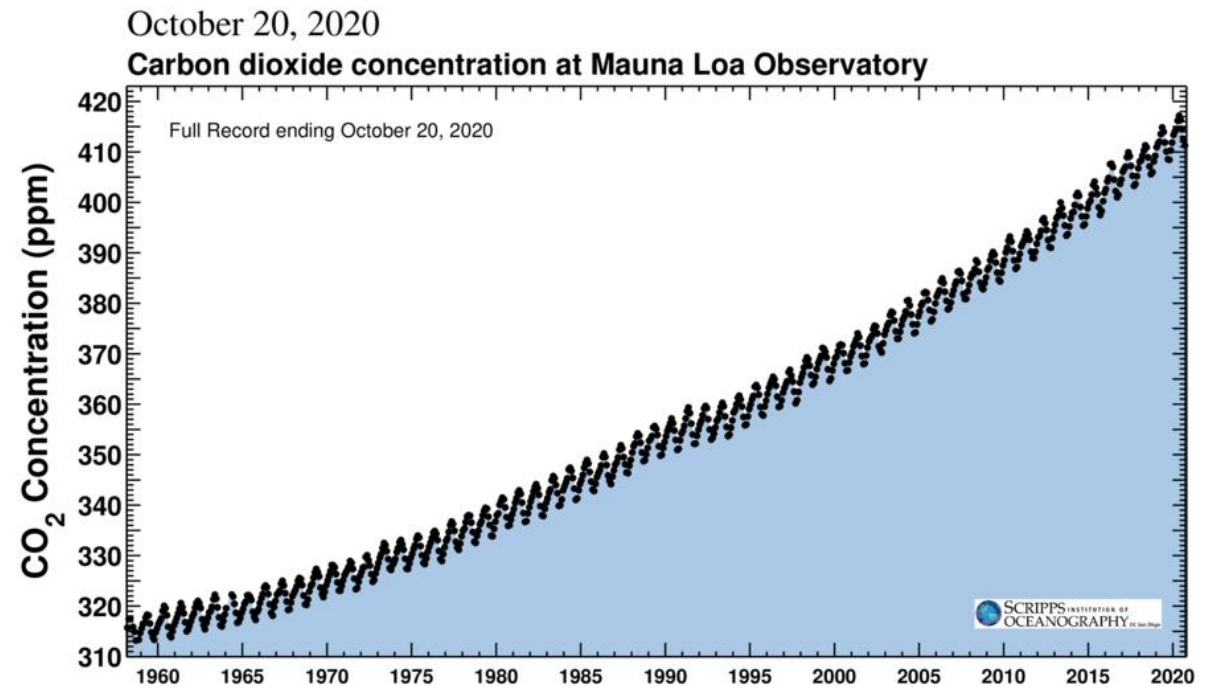
Antecedentes

CO₂

150 %

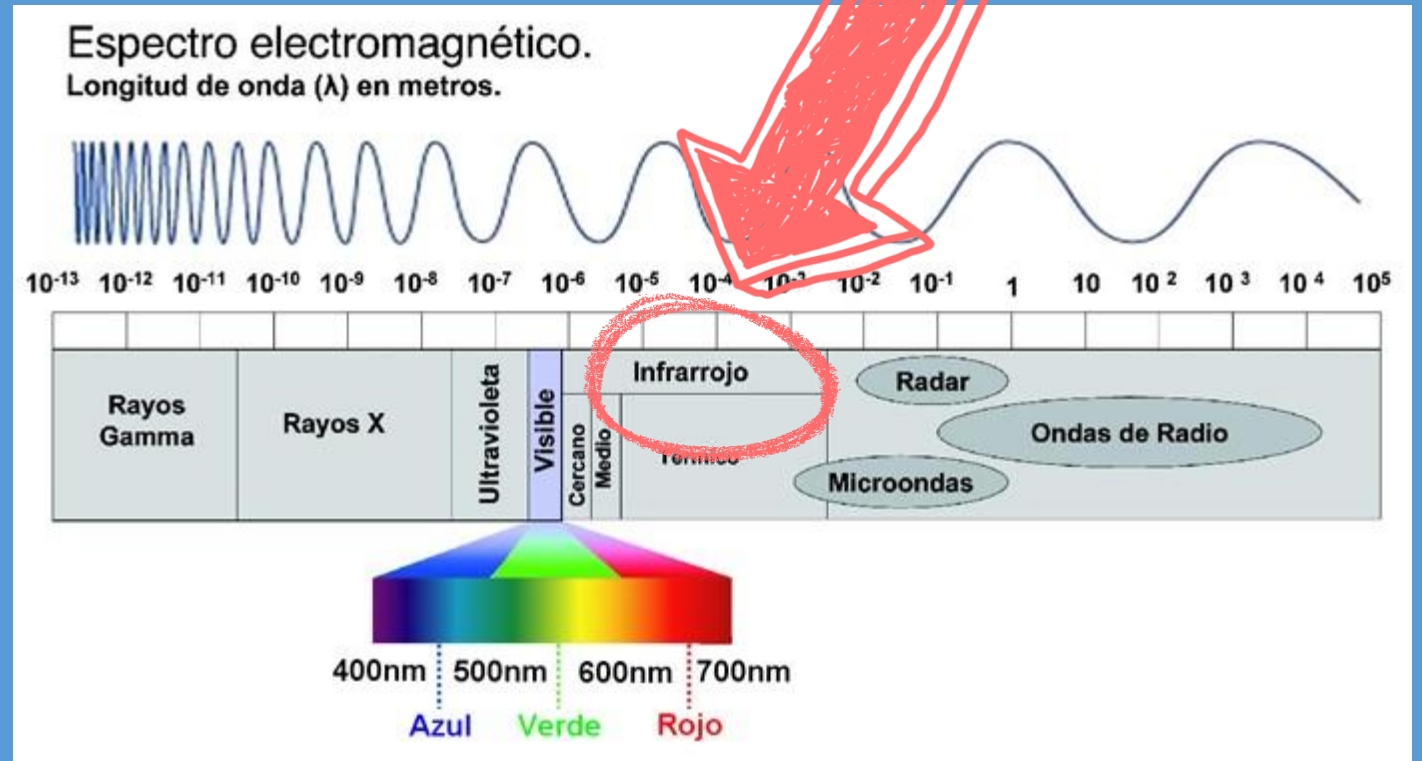
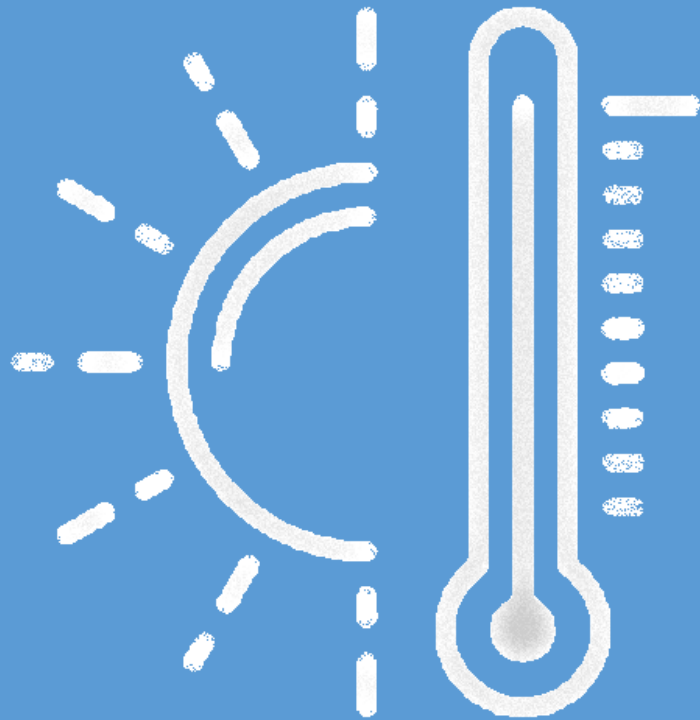
Latest CO₂ reading: 419.14 ppm

Pre industrial (1750) :
280 ± 10 ppm

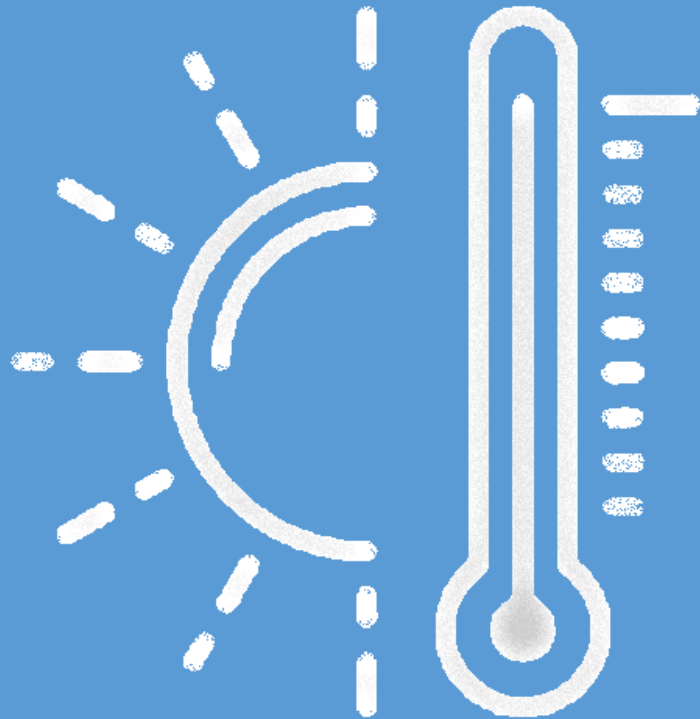


<https://scripps.ucsd.edu/programs/keelingcurve/>

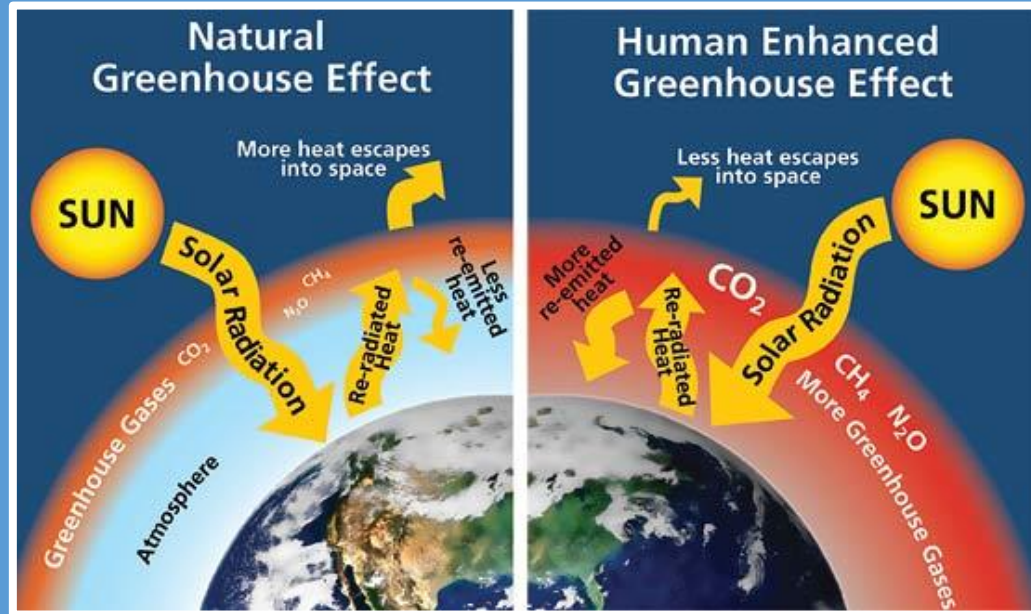
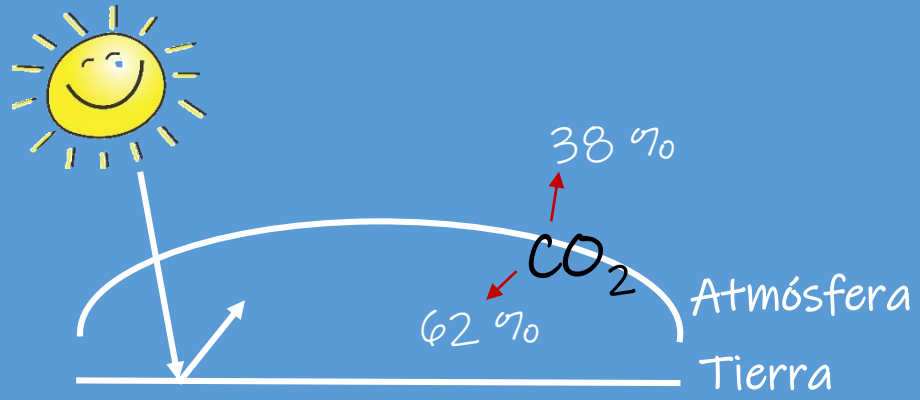
CO₂



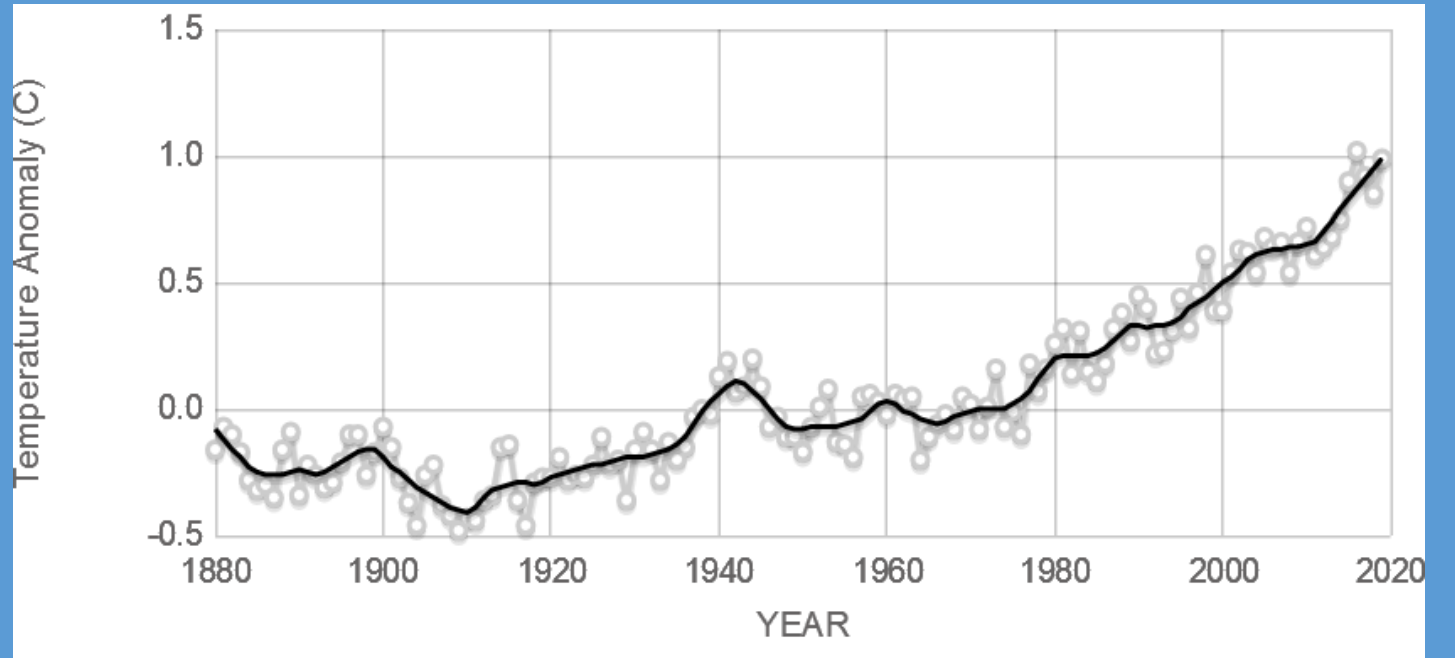
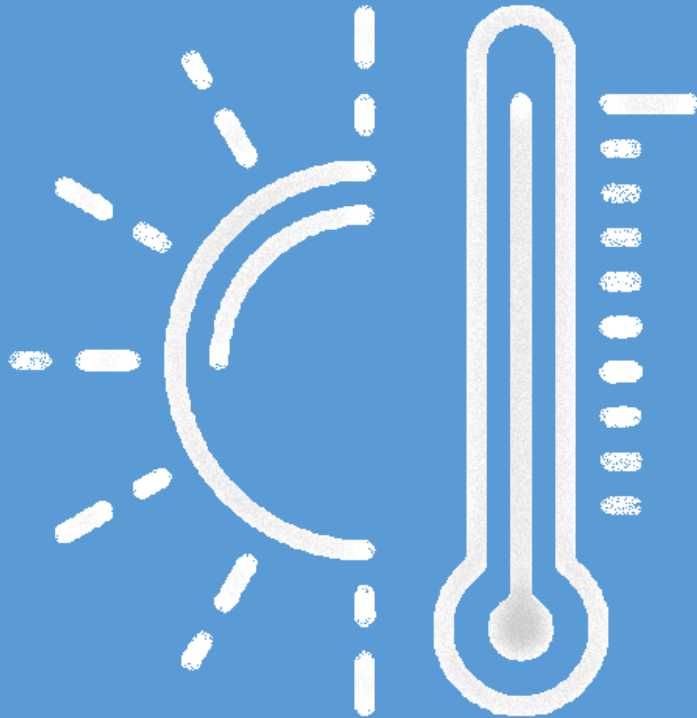
CO₂



-18 °C sin GEI



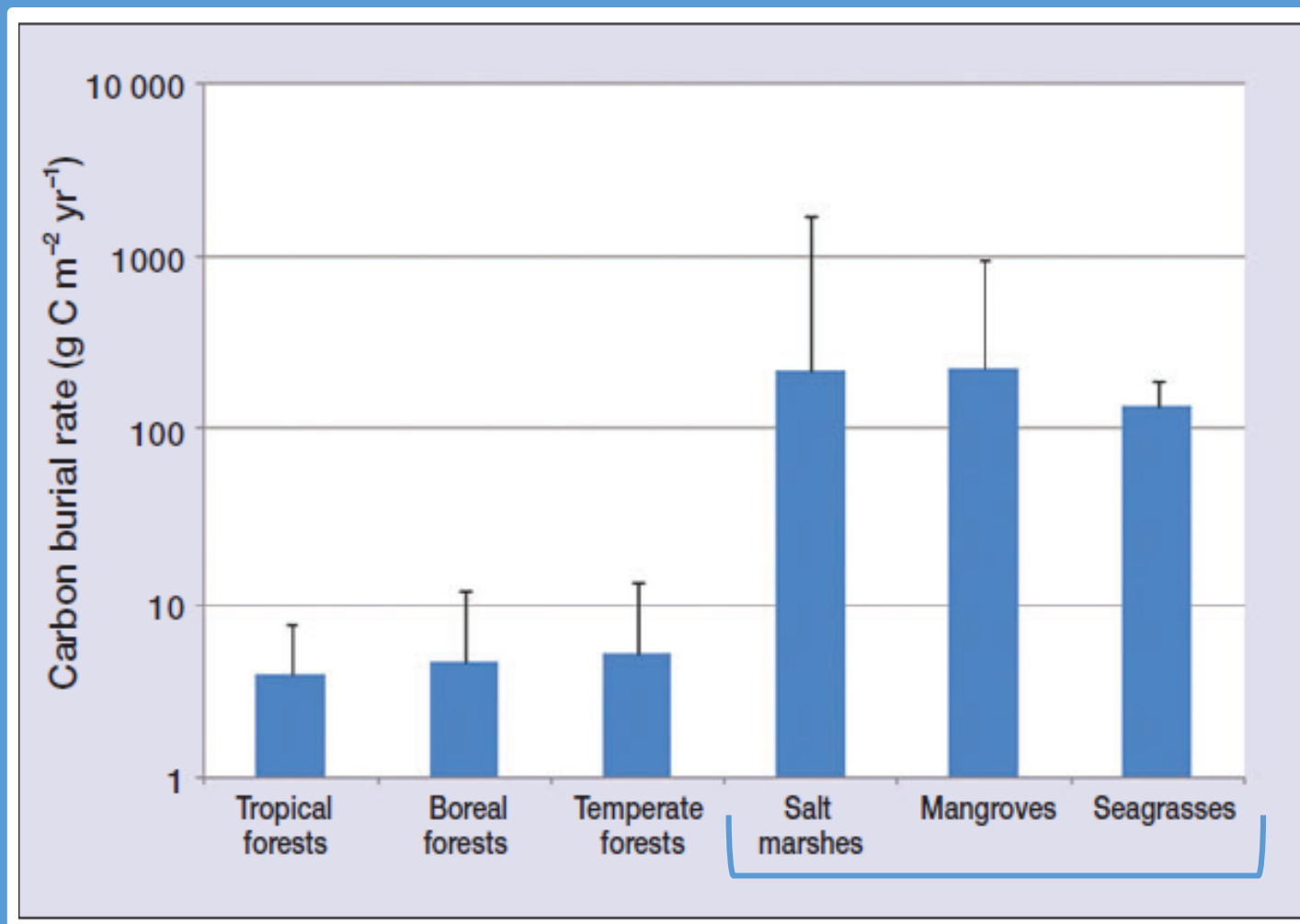
CO₂



<https://climate.nasa.gov/vital-signs/global-temperature/>

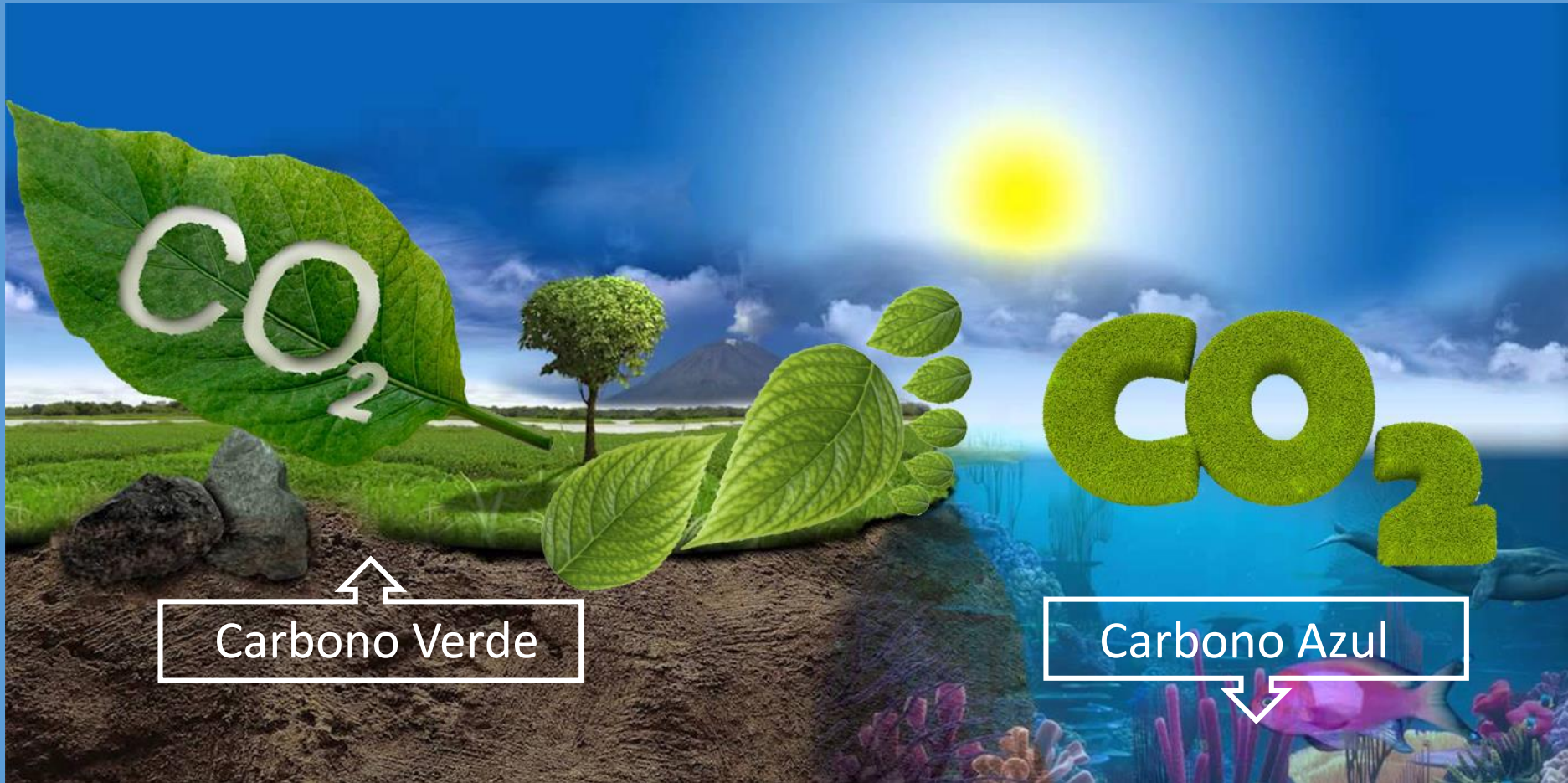
Video - <https://youtu.be/YLFLxQ0t07A>

CO₂ – Almacenamiento de Carbono en sistemas naturales

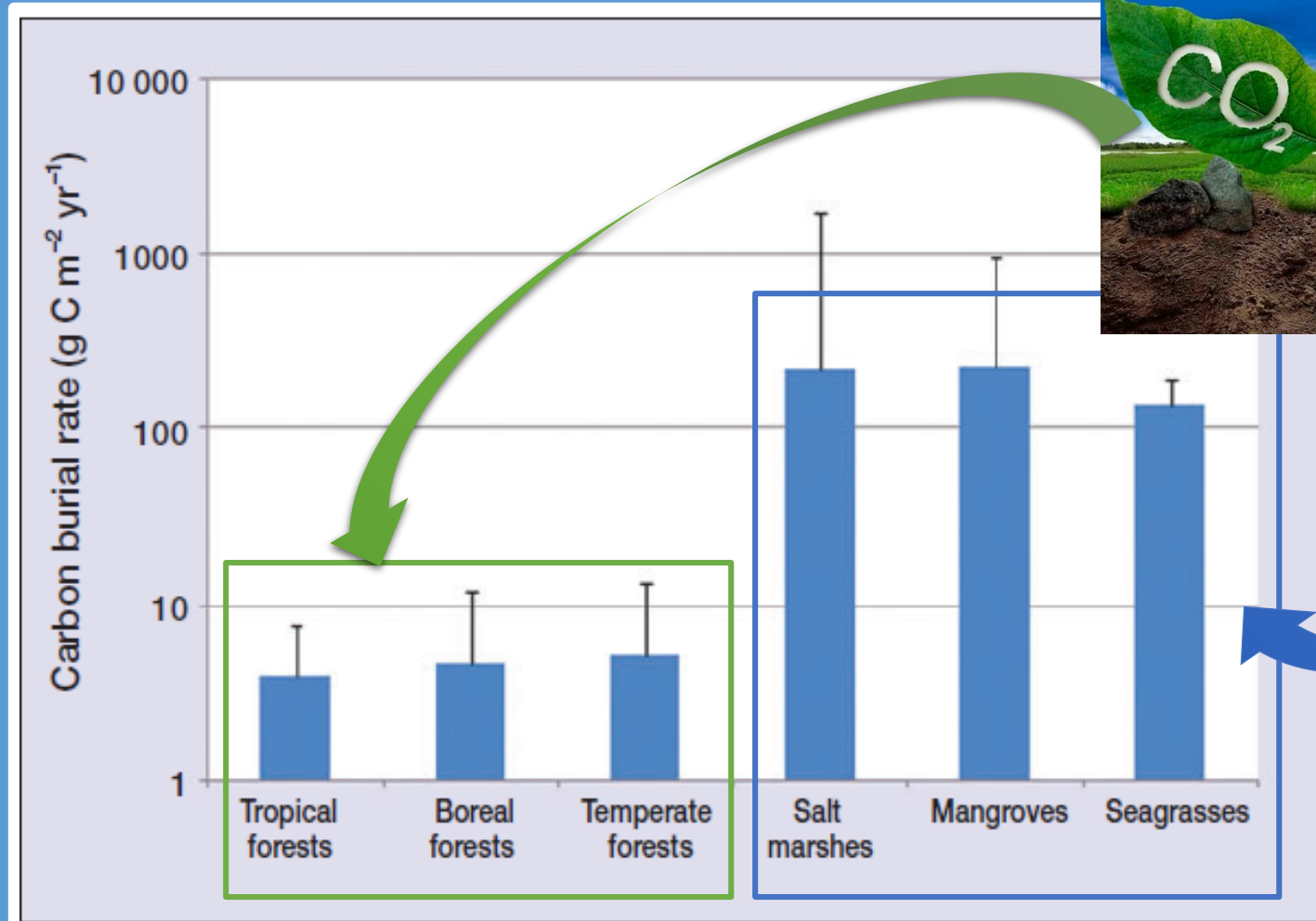


Sistemas
deposicionales

Reservorios de Carbono



CO₂ – Almacenamiento de Carbono en sistemas naturales



DEFINICIÓN

Es el carbono que se encuentra almacenado en troncos, ramas, raíces, hojas y sedimentos de los sistemas marino-costeros.

An underwater photograph of a seagrass meadow. The water is clear and blue, with sunlight filtering through. The seagrass consists of numerous tall, thin blades that sway gently. The roots of the plants are visible in the sandy seabed. The overall scene is peaceful and natural.

Carbono azul y ecosistemas costeros

Tipos de ecosistemas de Carbono Azul



Humedales salinos

Praderas marinas

Manglares

Eliminan de la atmósfera + cantidad + velocidad

Servicios ecosistémicos

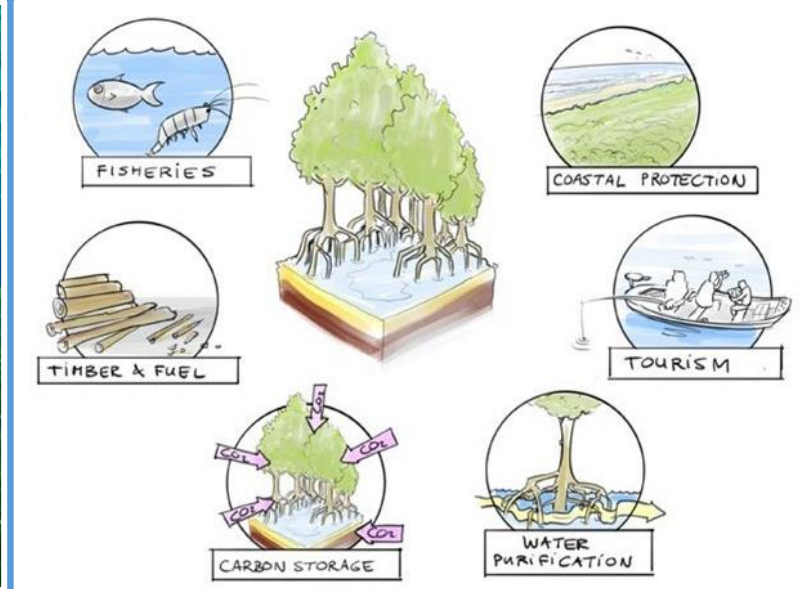
Son recursos o procesos de los ecosistemas naturales (bienes y servicios) que benefician a los seres humanos.



Servicios ecosistémicos

Reciclaje de nutrientes

Zona de refugio y alimentación



Retención de contaminantes

Sedimentación

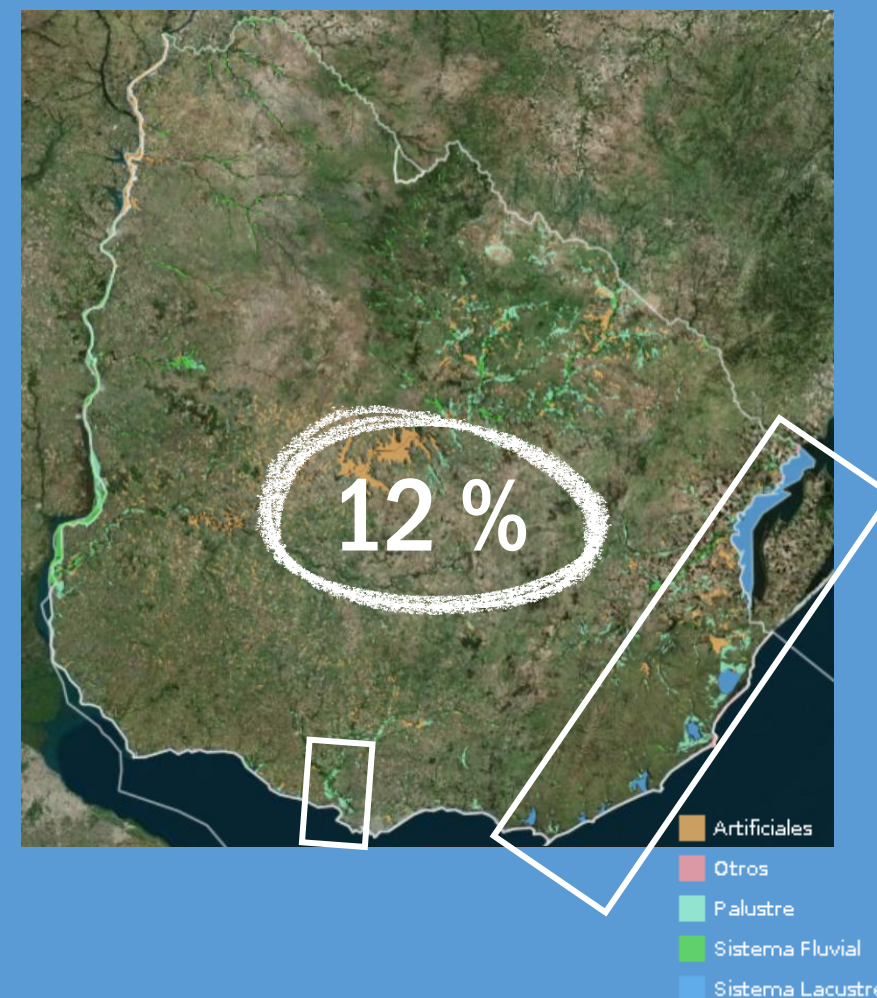
CARBONO AZUL ??

Distribución

Global Distribution of Blue Carbon Ecosystems

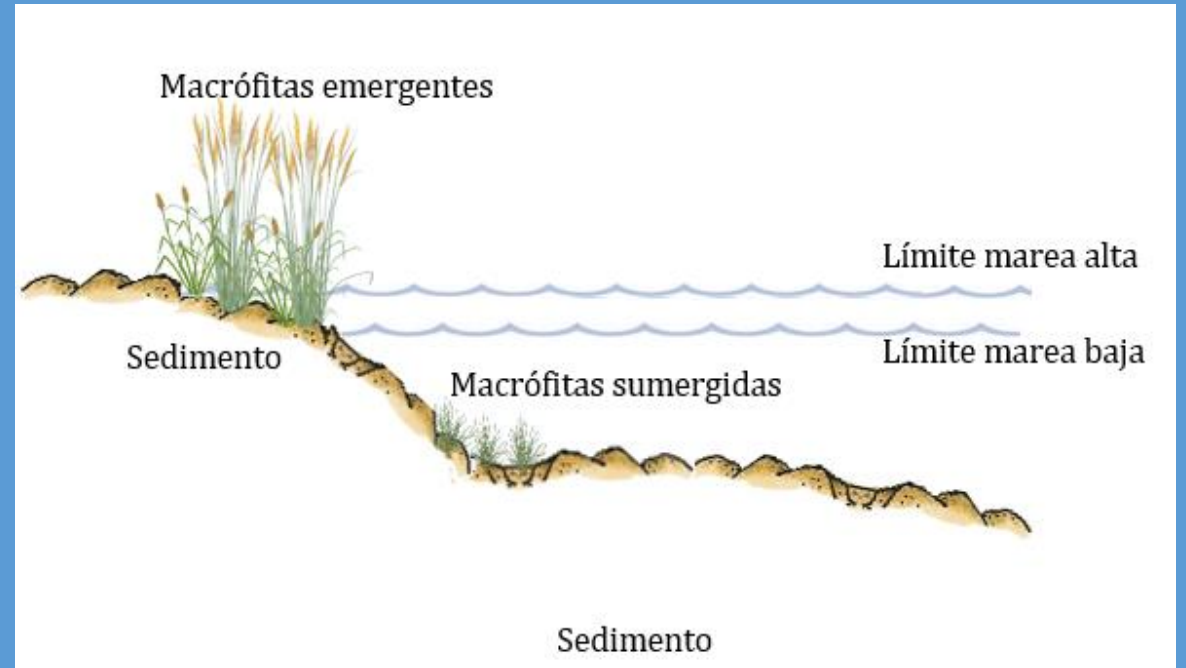


Se estima que se perdieron aproximadamente un 67 % de los manglares mundiales, un 35 % de los humedales salinos, y un 29 % de praderas marinas.



Tipos de ecosistemas de Carbono Azul

Humedales salinos



Tipos de ecosistemas de Carbono Azul

Praderas marinas

Orden: Alismatales

4 familias (60 especies):

- Zosteraceae
- Cymodoceaceae
- Posidoniaceae
- Hydrocharitaceae

- Ruppiaceae
- Zannichelliaceae

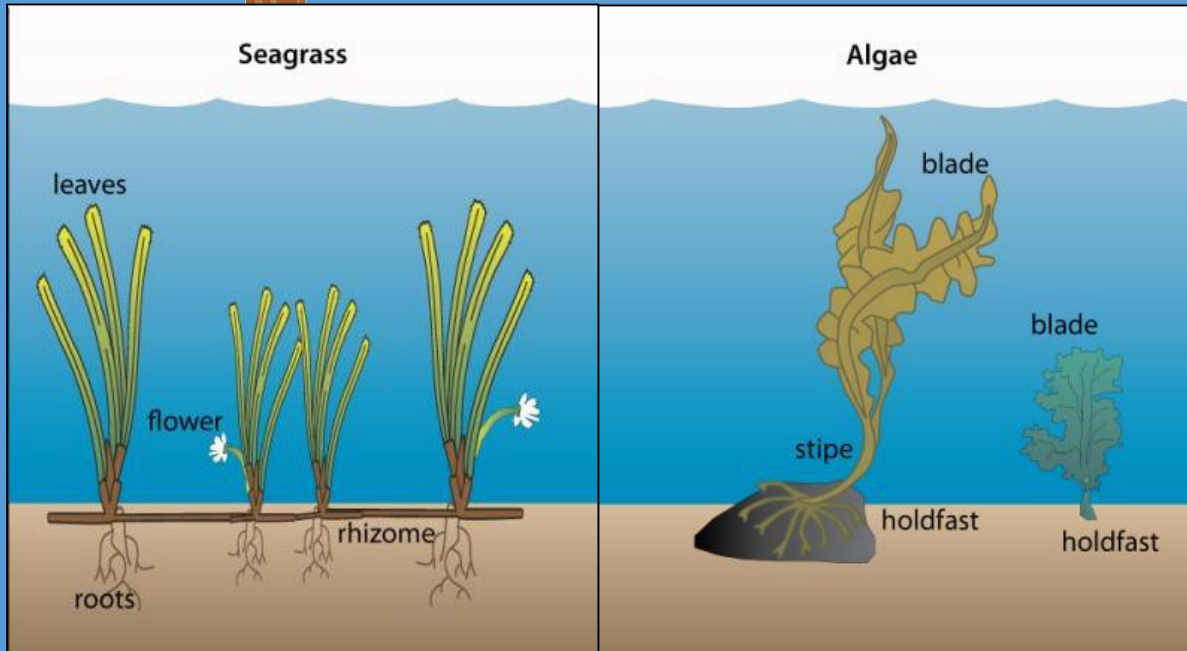


Tipos de ecosistemas de Carbono Azul

**NO SON
ALGAS**

Ocupan 0.1 % del fondo del océano
≈ 11% del carbono azul enterrado

1m² = 83 g C año
6200 Km auto



Tipos de ecosistemas de Carbono Azul

Manglares



El mangle es la especie arbórea predominante

Raíces adventicias

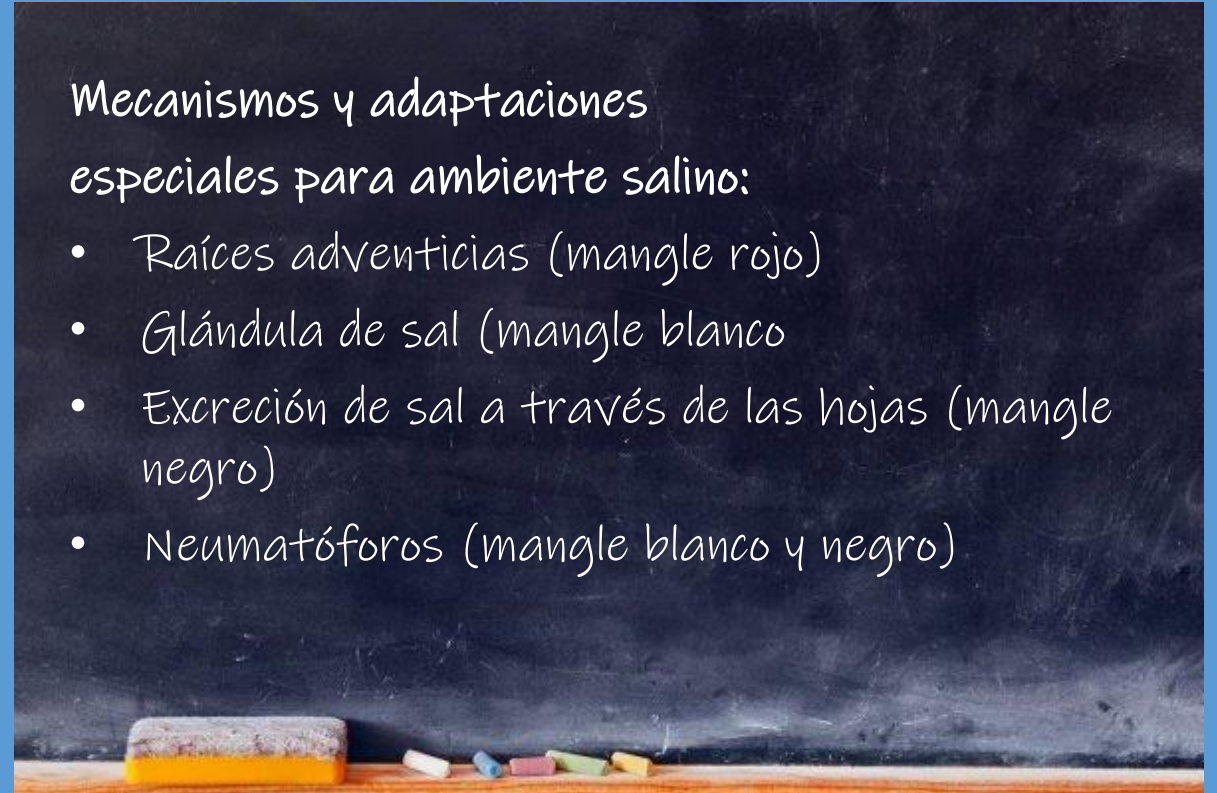
Tipos de ecosistemas de Carbono Azul



Neumatóforos

Mecanismos y adaptaciones especiales para ambiente salino:

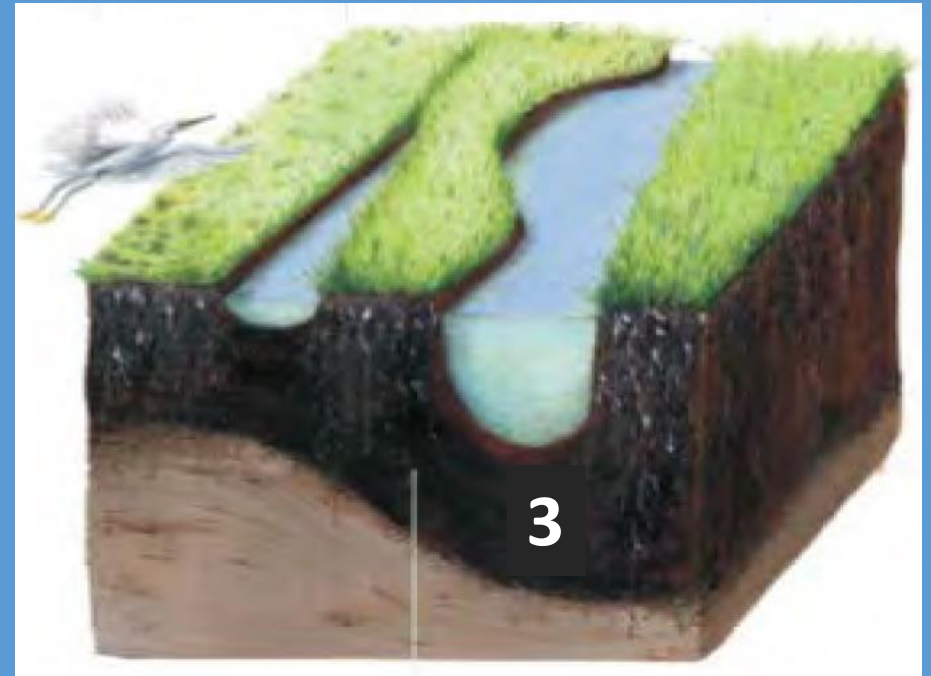
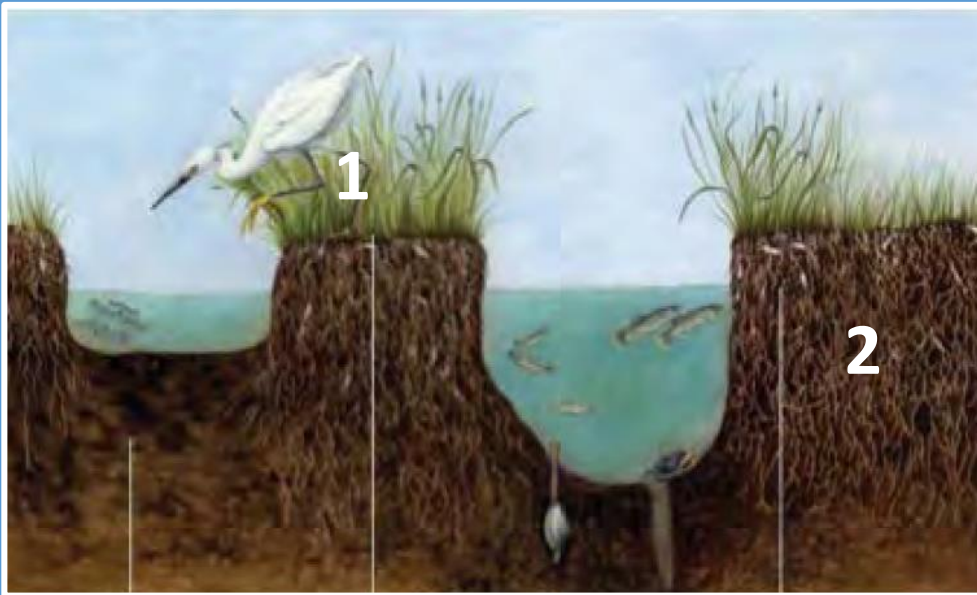
- Raíces adventicias (mangle rojo)
- Glándula de sal (mangle blanco)
- Excreción de sal a través de las hojas (mangle negro)
- Neumatóforos (mangle blanco y negro)



Reservorios de Carbono

En general, en estos sistemas se reconocen tres reservorios de C :

- 1) Biomasa aérea (arbustos, pastos, etc..)
- 2) Biomasa subterránea (raíces y rizomas)
- 3) Carbono del suelo / sedimentos



Reservorios de Carbono

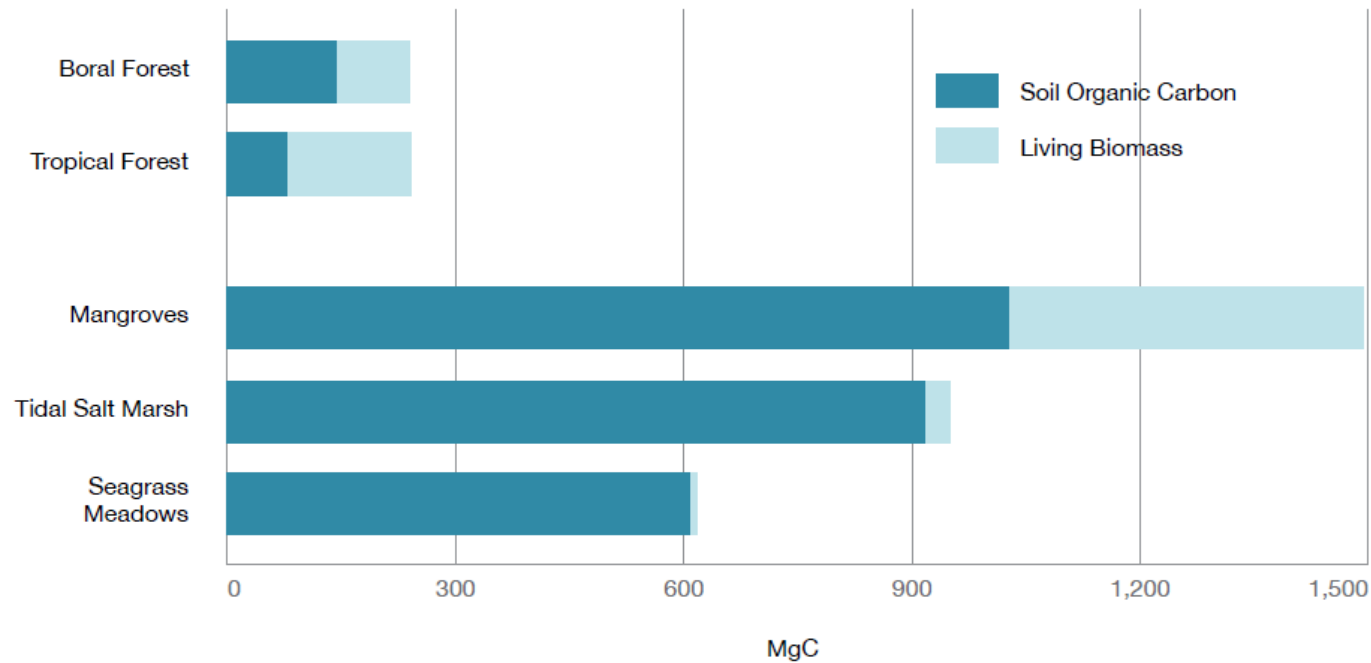


Figure 3.1 Mean carbon storage in the above- and belowground biomass in coastal vegetative ecosystems vs. terrestrial forest (Pan *et al.* 2011; Fourqurean *et al.* 2012a; Pendleton *et al.* 2012)

Howard *et al.*, 2014

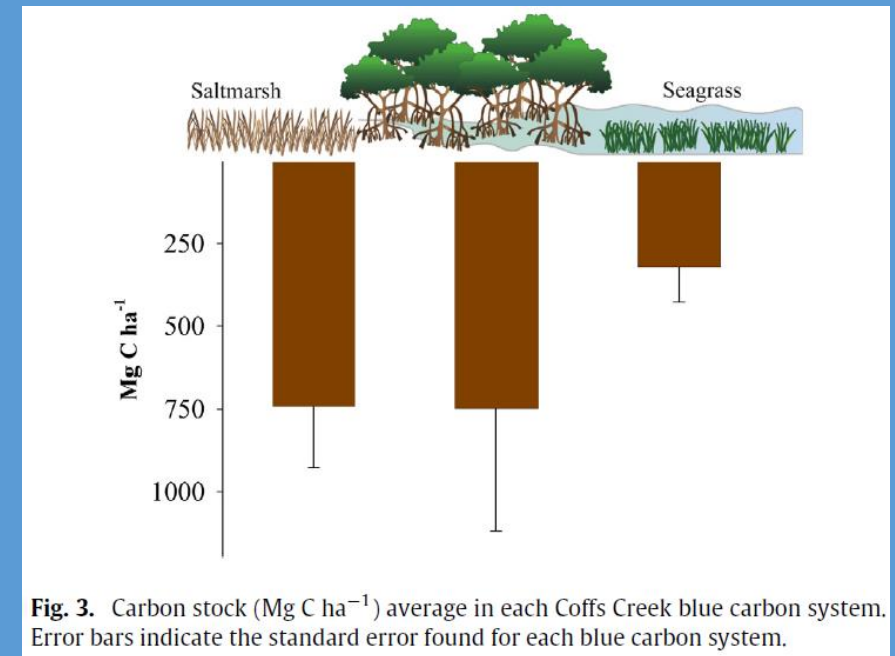


Fig. 3. Carbon stock (Mg C ha⁻¹) average in each Coffs Creek blue carbon system. Error bars indicate the standard error found for each blue carbon system.

Brown *et al.*, 2016

The background of the image is a close-up photograph of green grass, with blades of grass in various shades of green and yellow-green, creating a textured, natural background. A thin white border is visible around the entire image.

¿Cómo se cuantifica?

Cuantificación

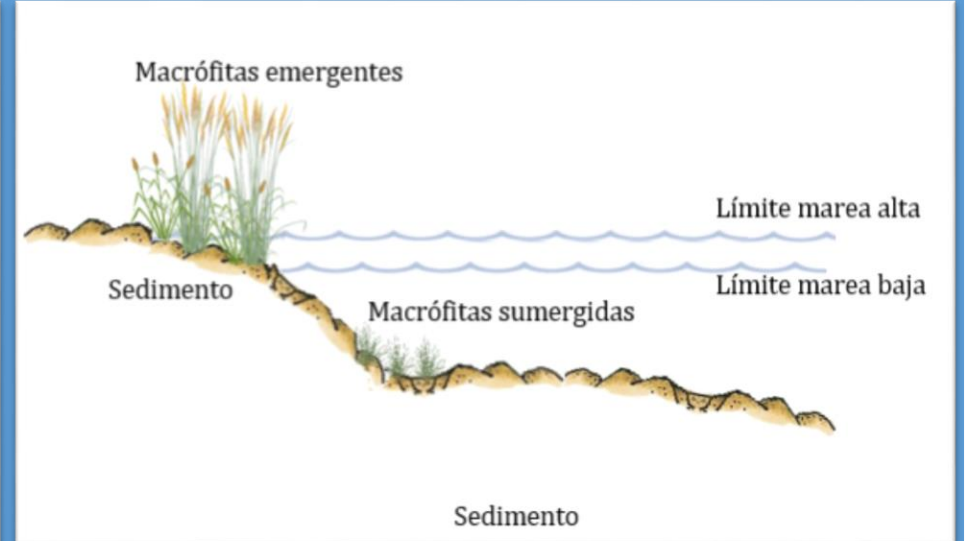


Unión Internacional
para la Conservación
de la Naturaleza

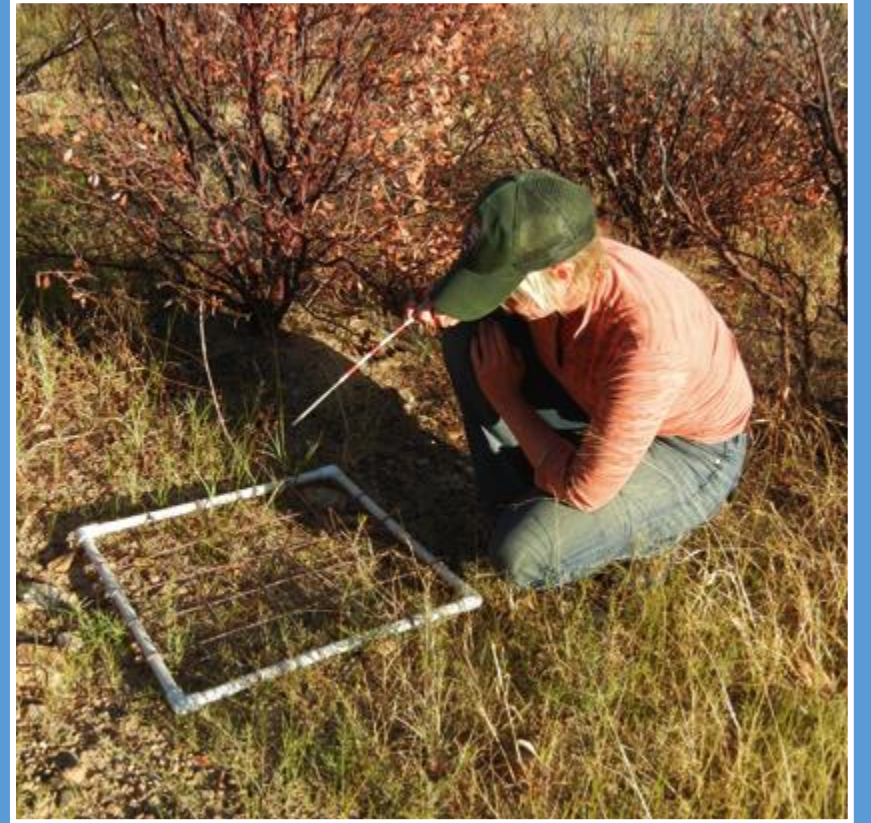


<https://www.thebluecarboninitiative.org/manual-espanol>

Cuantificación – Diseño de muestreo



En el campo - Colecta de muestras



Cuantificación – Variables a analizar

- 1) Profundidad del suelo
- 2) Densidad aparente en seco (DBD)
- 3) Contenido de carbono o materia orgánica



Cuantificación - Variables a analizar



Profundidad



Densidad - DBD

g/m^3

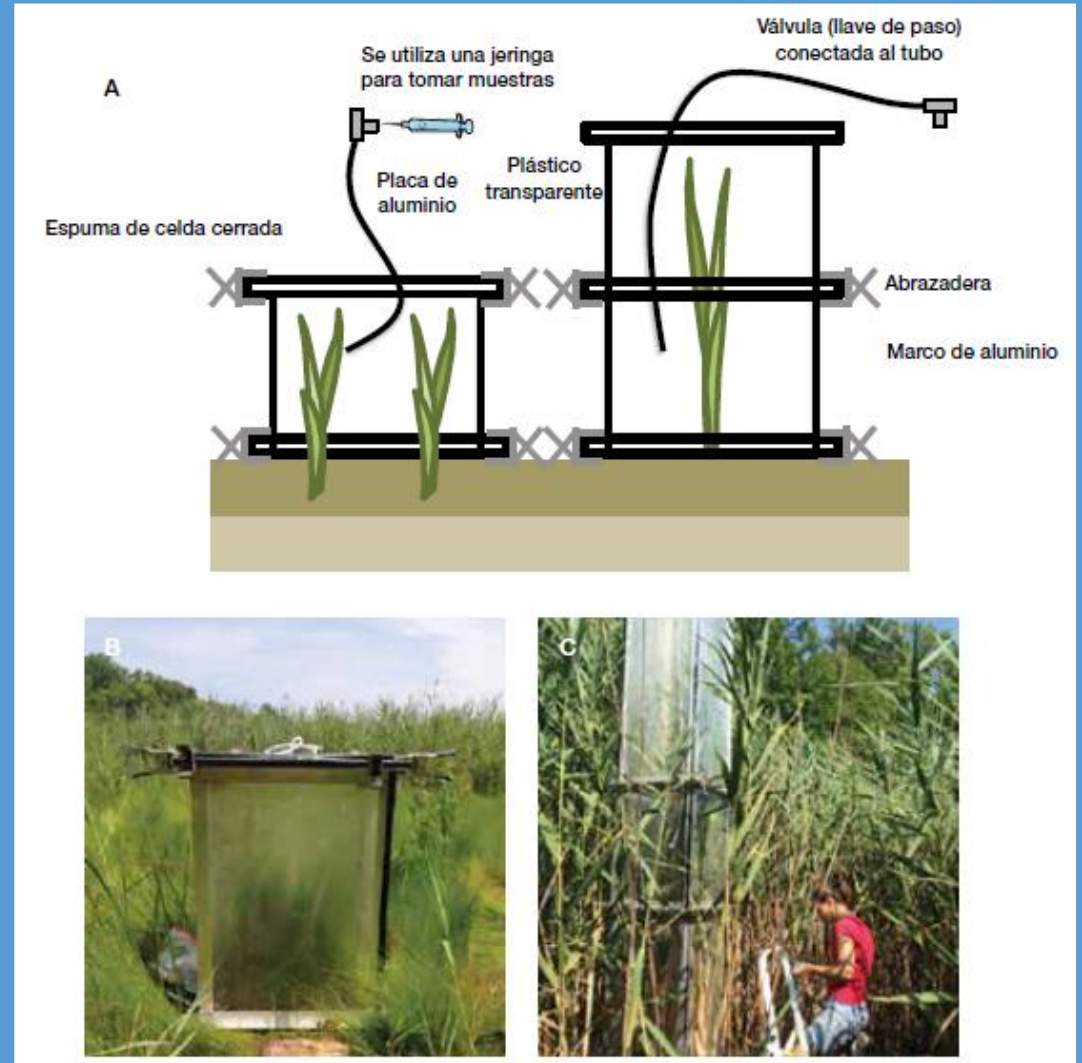


MOT - LOI

Emisiones

3 métodos

1. Diferencia de stock
2. Pérdida o ganancia
3. Método de flujo



A photograph of a mangrove forest. The water is clear and turquoise, reflecting the sky and the green foliage of the trees. The mangrove roots are visible in the water. The sky is blue with some white clouds. The text "¿Qué estudios hay?" is overlaid on the image in a white, cursive font with a black outline.

¿Qué estudios hay?

A photograph of a dense field of green grasses, possibly a meadow or a field of tall grasses, with a white border. The grasses are in various stages of growth, with some showing yellowish-brown tips. The background is a solid, bright blue color.

PERSPECTIVAS

A photograph of a mangrove forest with a body of water in the foreground. The sky is blue with scattered white clouds. The mangrove trees have dense green foliage and prominent, tangled, light-colored roots extending into the water. The water is calm, reflecting the sky and the trees. The entire image is framed by a thin white border.

iGracias!
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