Acquisition of capabilities for studying and monitoring acidification in coastal systems in Uruguay

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OA Week 2023

Ocean Acidification Week 2023

Topics

- Ocean acidification in Uruguay
- Acquisition of the capabilities to measure the carbonate system
- Uruguayan coastal systems that are being monitored
- Preliminary results

Ocean acidification in Uruguay

- 2021: Se conforma grupo de trabajo integrada por distintas instituciones (DINARA, SOHMA, UdelaR) en el marco de la participación de Uruguay en la red REMARCO

- Participación Curso Regional de capacitación y entrenamiento sobre medición del sistema de carbonatos para la evaluación del indicador de acidez media (ODS 14.3.1)

Acquisition of the capabilities to measure the carbonate system

- 2021- actual: Referente componente acidificación en la red REMARCO
- 2022-2023: P2P program: TOF, GOA-ON (Mentee: Valentina Amaral (UdelaR, Mentor: Cesar Bernal, INVEMAR)
- 2023-2025: Proyecto FCE, ANII, greenhouse gases (PI: Dra. Valentina Amaral)

Monitoring:

- Convenio de cooperación técnica entre el Ministerio de Ambiente-DINACEA y Udelar- CURE, OSE, IDR y el MGAP – DINARA para el monitoreo estacional de la calidad del agua de las lagunas costeras (PI: Dra. Lorena Rodríguez, UdelaR).

- Sistema de monitoreo oceanográfico en la costa atlántica uruguaya. El mismo incluye varias líneas de investigación desarrolladas por investigadores de la Universidad de la República (CURE y Facultad de Ciencias, PI: Dres. Ángel Segura y Gabriela Vélez)

Acquisition of the capabilities to measure the carbonate system

Total Alkalinity: Titration in open cell with determination by Gran (GOA-ON, 2018) - (Dickson et al. 2007).

Tritinio plus Metrohm
CRM Dickson
Uncertanty < 5 µM
REMARCO spreadsheet and modified protocol for Tritinio Plus

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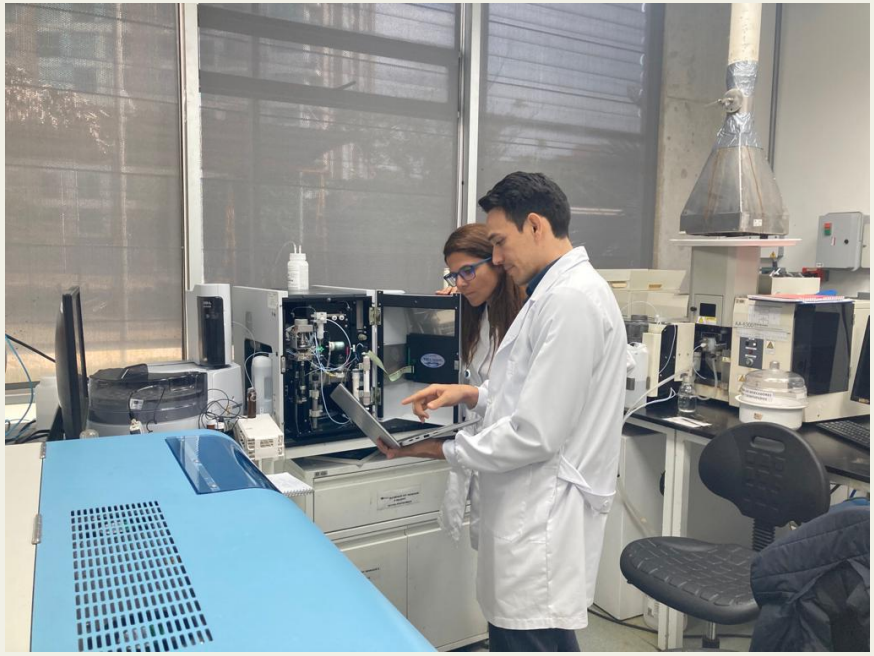
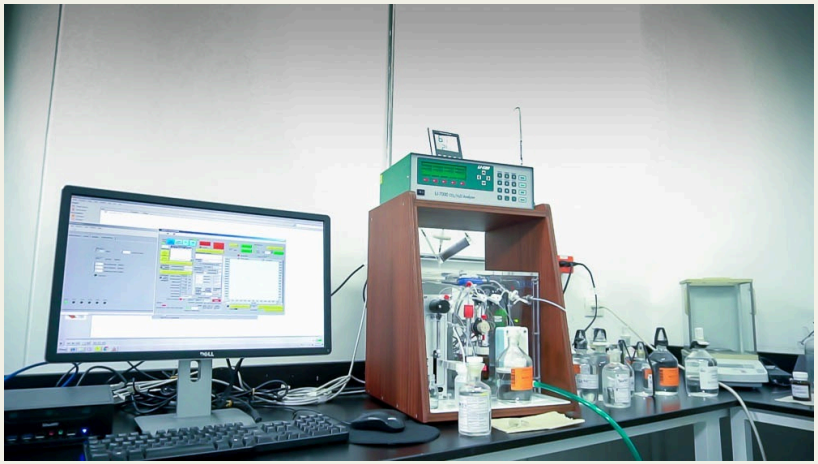
Acquisition of the capabilities to measure the carbonate system

Dissolved inorganic carbon



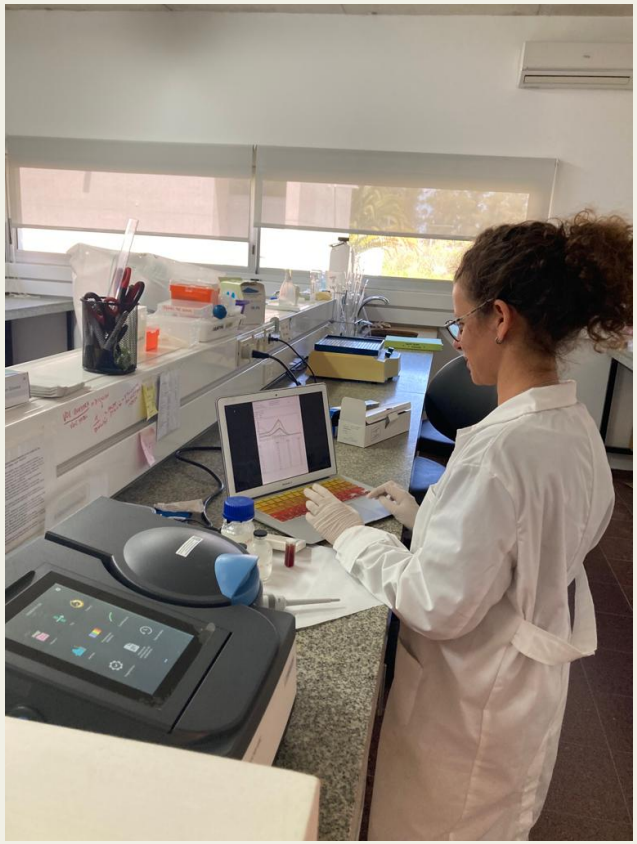
Internship at INVEMAR, Colombia, Santa Marta



Marianda Company AIRICA system (Bernal, et al., 2021) https://remarco.org/manual-ao/

Adjustment CRM Dickson, u= 3.0 µmol kg^{-1}

Spectrophotometric pH

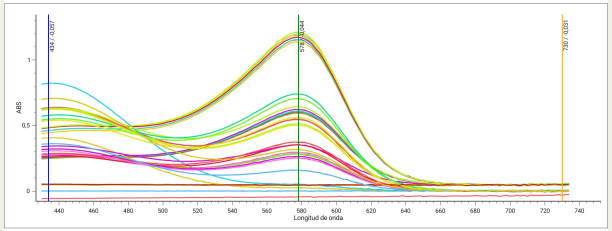


Barrido_05_09_2023_14:37:08 1 / 4

05-sept.-2023 04:22 p. m.
N.º serie del instrumento: 9A5Y268010
Nombre del método: Barrido 05-sept.-2023_pH
Modelo instrumento: GENESYS 150
Método creado: 05-sept.-2023 02:33 p. m.
Versión de paquete de software: 2.6
Firma:
Método actualizado: 05-sept.-2023 02:34 p. m.

Barrido:parámetros de método

Intervalo de longitudes de	430 - 734 nm
Intervalo	2,0 nm
Velocidad	Rápida



Ejemplo	ABS(434)	ABS(578)	ABS(730)
TRIS_32_bco 1	-0,057	-0,044	-0,031
TRIS_32_bco 2	0,048	0,044	0,046
TRIS_32_mcp1 1	0,248	0,606	0,049
TRIS_32_mcp2 1	0,444	1,138	0,050
TRIS_32_bco 1	0,052	0,047	0,055
TRIS_32_bco 2	0,052	0,047	0,045
TRIS_32_mcp1 1	0,251	0,594	0,051
TRIS_32_mcp1 2	0,252	0,593	0,048
TRIS_32_mcp2 1	0,461	1,155	0,047
TRIS_32_mcp2 2	0,461	1,154	0,045
TRIS_32_bco 1	0,047	0,043	0,049
TRIS_32_mcp1 1	0,255	0,599	0,045
TRIS_32_mcp1 2	0,256	0,599	0,050
TRIS_32_mcp1 3	0,257	0,599	0,047

evaluating effect of filtration

m- cresol (Sigma Aldrich), performed all the corrections (purity, etc)
TRIS from Dickson lab
Differences < 0.007
u(ph) < 0.002 (REMARCO spreadsheet)
Spectrophotometer Genesys UV-Vis

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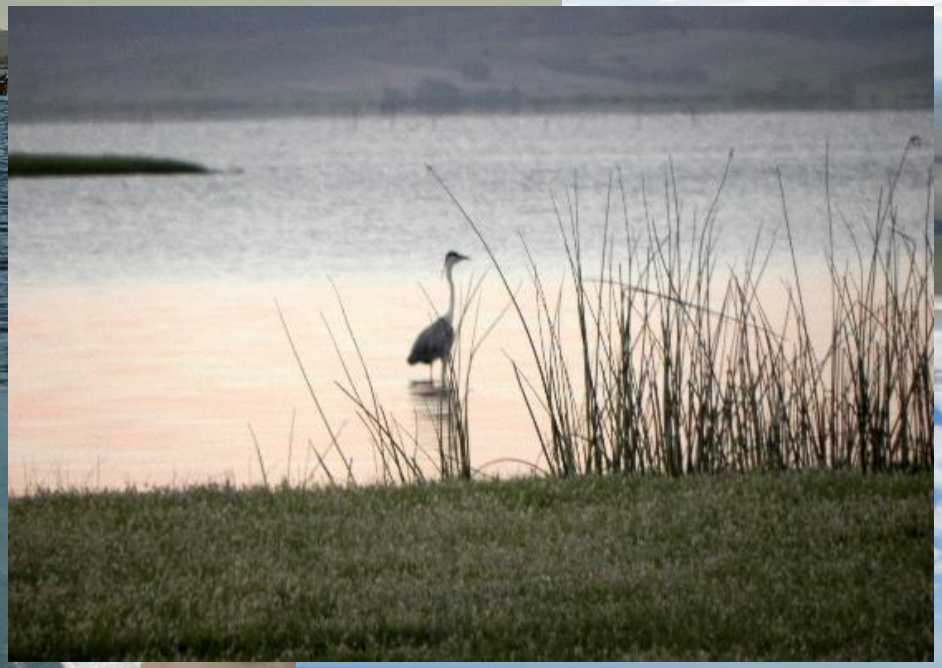
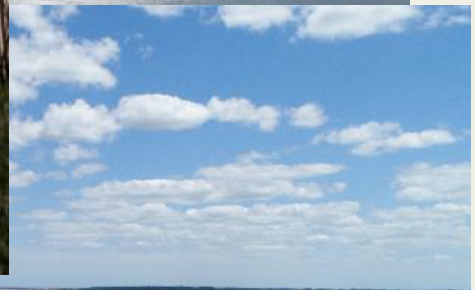
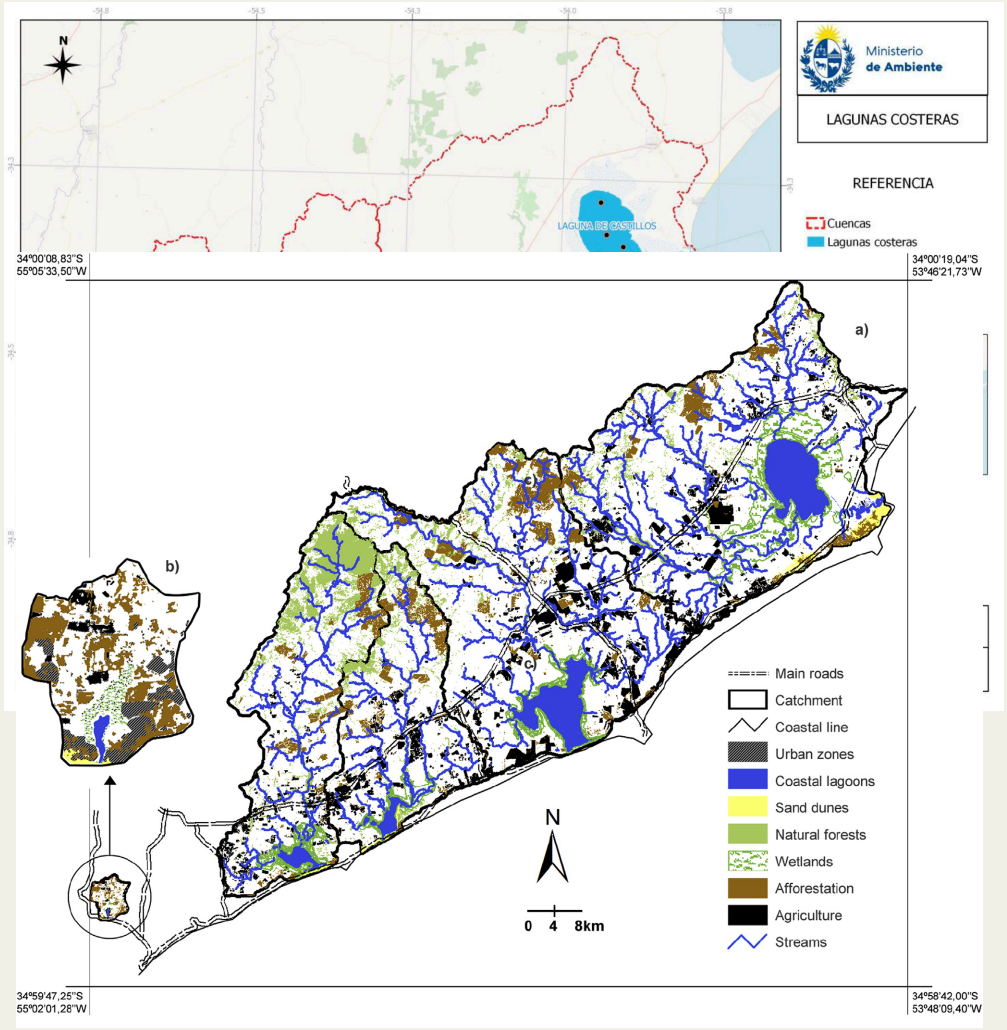
tal lagoons

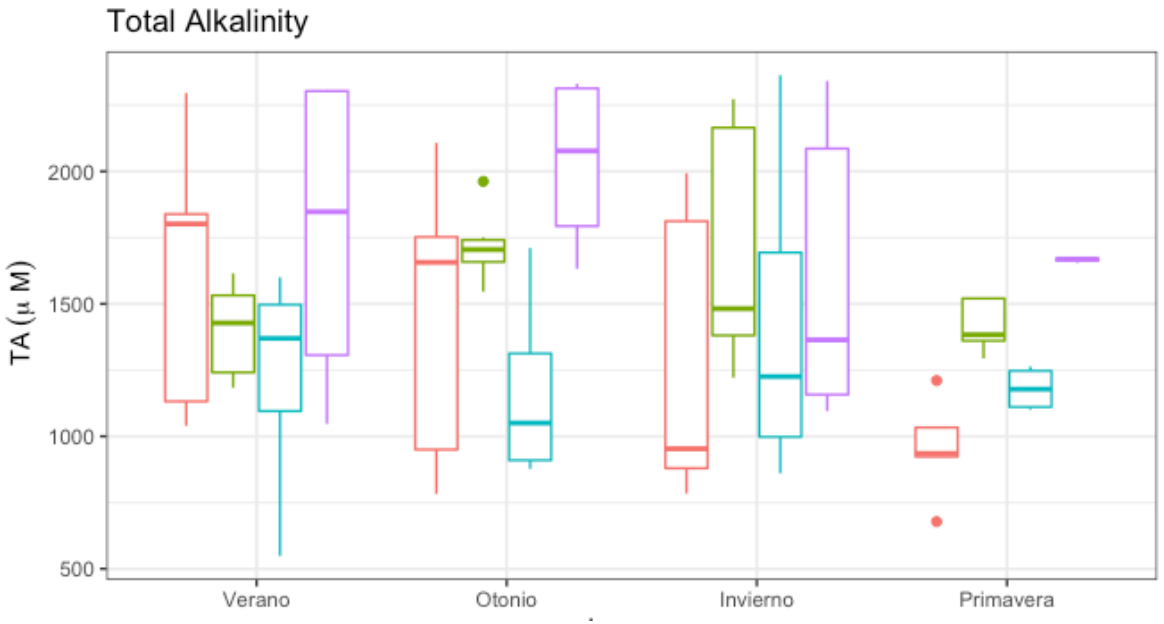




Preliminary results: coastal lagoons



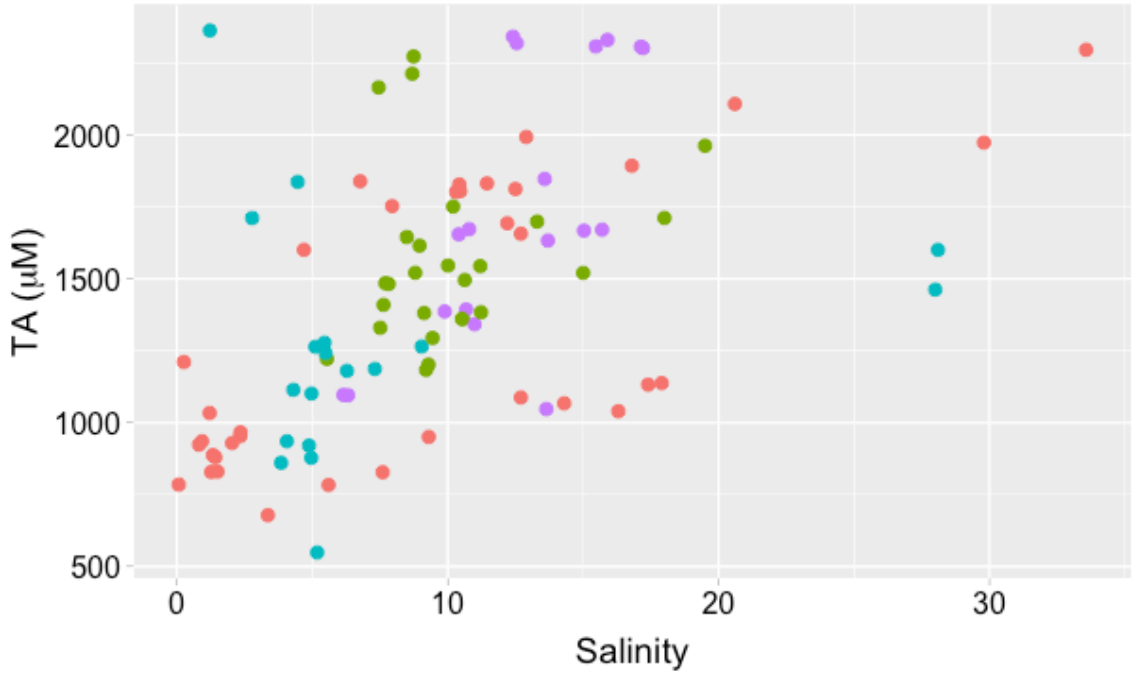
- Atlantic coast of Uruguay
- Periodically connect with the ocean
- Salinity gradients (~ 0-35)
- RAMSAR sites, a Biosphere Reserve and are high priority areas for biodiversity conservation in Uruguay.
- Ecosystem services
- Eutrophication is among the most important threats to these lagoons.
- initial phases mainly due to land use changes



Ranged from 548.5 to 2362.7 µM

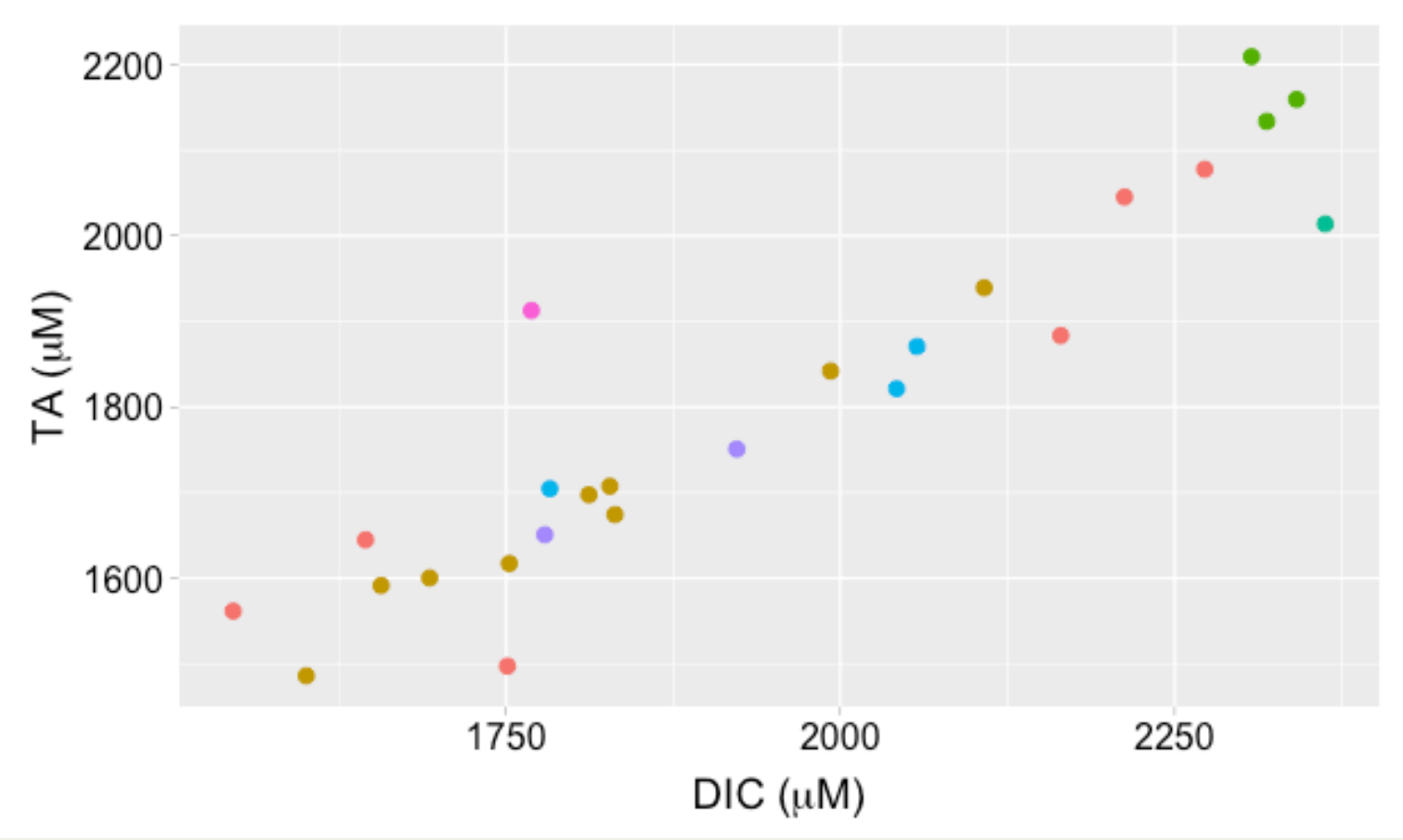
Not seasonally differences ($p > 0.05$)

Highly variable between lagoons ($p < 0.05$)



TA positive related with S ($R^2 = 0.3$, $p < 0.001$)

DIC also showed highly variables values and was positive related with TA (R^2 = 0.85, $p < 0.001$)



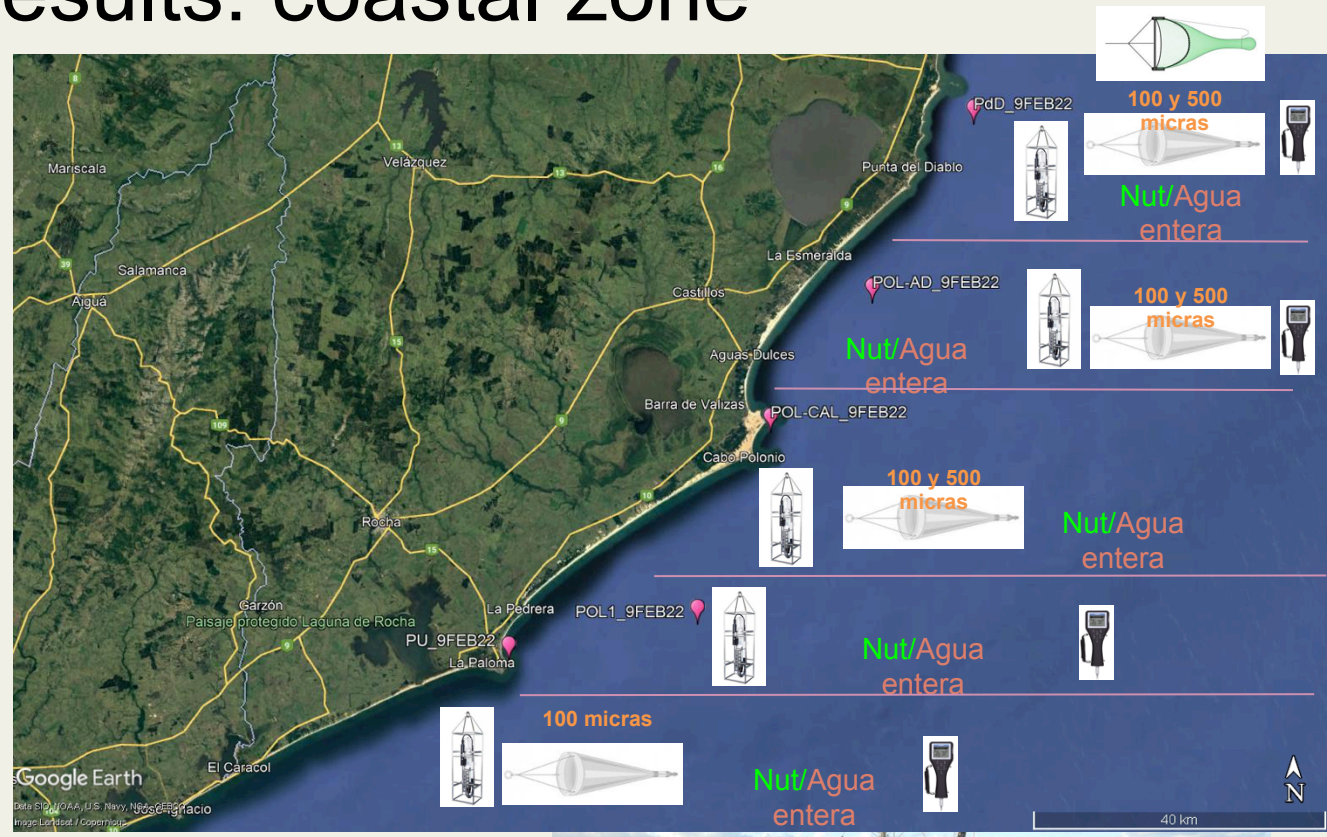
*DIC from two cruises: May and August 2023. Measured at INVEMAR

Preliminary results: coastal zone

Monitoreo multidisciplinario del ecosistema costero-marino Atlántico (Responsables Dres Ángel Segura y Gabriela Vélez)

3 stations monthly /8 stations seasonally

Preliminary results: coastal zone



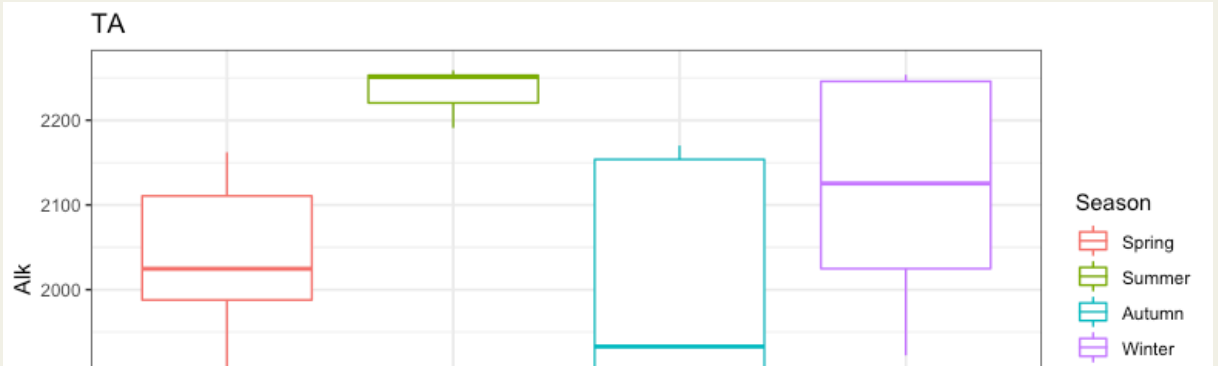
TA and DIC*, 2022 and 2023*
7 cruises

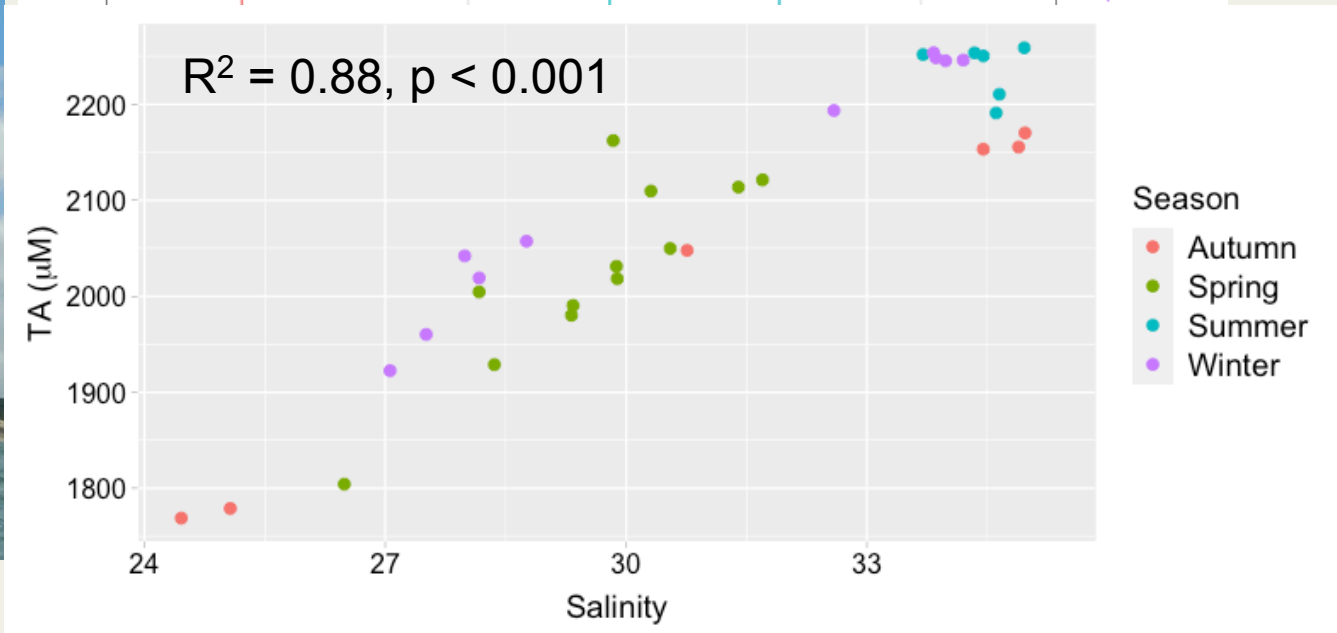
Photo, map: Gabriela Vélez

Preliminary results: coastal zone

Photo, map: Gabriela Vélez

Salinity 21- 35, pH 7.90- 8.99 (CTD)
TA ranged 1768.8 and 2258.8, seasonal variability ($p < 0.05$)





First report of SDG 14.3.1 from Uruguayan coastal systems

SDG 14.3.1 data portal

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Uruguayan coastal systems

TITLE	USER	CREATED
Uruguayan coastal systems	Valentina Amaral Acosta	28 September 2

Edit dataset

Versions

CREATED	MODIFIED	PUBLISHED
28 September 2023, 15:16	6 October 2023, 12:43	6 October 2023,

New version

SDG 14.3.1 data portal

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Uruguayan coastal systems published

CREATED	MODIFIED	PUBLISHED	VERSION
28 September 2023, 15:16	6 October 2023, 12:43	6 October 2023, 12:43	1

Metadata file | Data files | Inspect data | Station map

Ocean acidification at schools

Acknowledgments

- Equipo de monitoreo lagunas costeras y costa atlántica (Universidad de la Republica, Uruguay)
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- GOA-ON, TOF, P2P Program

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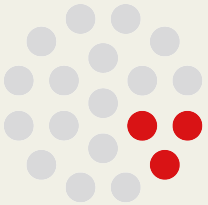

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