Wetlands are an important carbon (C) sink that can have large vertical C fluxes through the emission and absorption of atmospheric gases (Bridgham et al., 2006). They play a vital role in climate change and sea level rise mitigation projects throughout the USA. Processes transporting and transforming C in pore waters affect this atmospheric gas exchange but must be more quantitatively constrained (Bogard et al., 2020). DIC can be used to track microbial activity in pore waters.

Here we measured DIC in Twitchell Island in the Sacramento-San Joaquin Delta over a 12-hour tidal cycle to better understand how tides affect pore water DIC.

Dissolved Inorganic Carbon (DIC) in Sacramento-San Joaquin Delta pore waters

Pore water samples were collected in 2hr intervals over a full tidal cycle in February and at 3hr intervals in July, at 3 different depths over 12 hr tidal cycle.

The samples were analyzed using a UIC Carbon Coulometer Analyzer at the Marine Analytical Lab at UCSC.

**Results**

Temperature is lower during the wet season and remains constant with depth; during the dry season, the temperature is warmer and constant at different depths (Figure 1). Salinity remains constant at three ppt during the wet season and ranges between 0.15- 0.21 ppt during the wet season.

Figure 2 shows that the pH dropped between 10 and 20 cm significantly during the dry season and steadily increase from 20 cm depth to 50 cm depth. As seen in Figure 3, during the wet season, DIC decreases with depth. Whereas during the dry season, DIC increases with depth.

Dissolved organic carbon (DOC) shows to be greater during the dry season than during the wet season (Figure 4).

**Finding**

Acidification varies with depth and time and depends on water-soil interaction, microbial activity, and water chemistry.

Dissolved Organic Carbon (DOC) is more present during the warm season. Due to:

- Growing season. More growing plants are going into the soil.
- Microbes are more active at higher temperatures.

DIC is produced from the microbial regeneration of organic matter (the product of decaying carbon). Since there is more organic matter at depth, more DIC is produced at depth when microbes are active in the warm season. In the winter, it is primarily responding to changes in pH.

**Conclusions**

Wetlands are dynamic systems changing seasonally and with depth in thesemetanary columns in response to sentimental (temperature and seasonality) and microbial activity. This has implications for carbon sequestration and ecosystem services.

**Future Works**

Expand the sample collection to better show spatial and temporal variations in pore water DIC.

**Related Literature**


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