SV3 1hr Averaged Dataset for 2021 & 2023

This dataset is merged from three different sensors from SV3, including CO2 sensor: ProOceanusCo2Pro, Temperature & Salinity sensor: SBGPCTD, and Ph sensor: SeabirdSeaFET.

All the testing measurements (which I can confirm are not proper data) are removed based on the GPS records. There are no records being removed during the entire measurement since the “outliers” appeared over a period of time instead of as a spike. It is hard to confirm whether these “outliers” are real outliers or represent existing truth in the Gulf of Mexico.

Except for the 2023 ProOceanusCo2Pro measurement, all variables are hourly averaged from 00:00 to 59:59 of each hour, saving at the top of every hour:

A black text with a number of symbols

Description automatically generated with medium confidence

For ProOceanusCo2Pro measurement: Due to a pump issue, the flush is not strong enough for the system, and the ProOceanusCo2Pro measurement stabilizes to a value at the end of each hourly measurement cycle. These final values are approaching the true value but may still have some offset. As the 2023 ProOceanusCo2Pro sensors run in a restricted routine, only the data between 40:00 and 42:00 of each hour is averaged and saved. The ProOceanusCo2Pro measurement during 2021 should be flagged, as it does not have a restricted routine and shows larger offsets compared to the 2023 measurements.

For the full dataset measured by each sensor, please use the NetCDF files.

1. **lat** (Latitude) from ProOceanusCo2Pro:

• **Description**: The geographical coordinate specifying the north-south position on the Earth’s surface. It is measured in degrees, where positive values represent locations north of the equator and negative values represent locations south of the equator.

2. **lon** (Longitude) from ProOceanusCo2Pro:

• **Description**: The geographical coordinate specifying the east-west position on the Earth’s surface. It is measured in degrees, where positive values represent locations east of the Prime Meridian and negative values represent locations west of the Prime Meridian.

3. **CO2** (Carbon Dioxide Concentration) from ProOceanusCo2Pro:

• **Description**: The concentration of carbon dioxide in the atmosphere or water, measured in parts per million (ppm).

4. **Humi** (Humidity) from ProOceanusCo2Pro:

• **Description**: The amount of water vapor present in the air or a specific environment, measured in millibar (mbar).

5. **Millisec** (Millisecond Timestamp) from SBGPCTD:

• **Description**: A time measurement indicating the number of milliseconds elapsed since a certain reference point.

6. **Cond** (Conductivity) from SBGPCTD:

• **Description**: The ability of water to conduct electrical current, which is influenced by the concentration of dissolved salts (ions) in the water. It is measured in Siemens per meter (S/m).

7. **Temp** (Temperature) from SBGPCTD:

• **Description**: The measure of thermal energy in the environment, recorded in degrees Celsius (°C).

8. **Pres** (Pressure) from SBGPCTD:

• **Description**: The force exerted by the atmosphere or water on a surface area, measured in decibar (dbar), representing the depth of the measurement.

9. **Salt** (Salinity) from SBGPCTD:

• **Description**: The concentration of dissolved salts in water.

10. **PHInt** (Internal pH) from SeabirdSeaFET:

• **Description**: The pH level measured internally, possibly within a specific part of an instrument or system, indicating the acidity or alkalinity of a solution. pH is measured on a scale from 0 to 14, where 7 is neutral, values below 7 are acidic, and values above 7 are alkaline.

11. **PHExt** (External pH) from SeabirdSeaFET:

• **Description**: The pH level measured externally, usually in the surrounding environment or outside of a specific instrument. It provides insights into the acidity or alkalinity of natural waters or other media in environmental studies.