



Synopsis

- Current research has used remote sensing products to study oceanic relationships and processes, but is mixed on the relationship between salinity and chlorophyll-a.
- The study aims to better understand the relationship between chlorophyll-a and salinity at coastal watersheds around the US using remote sensing products.

Research Objectives

- Purpose: Investigate the relationship between chlorophyll-a, sea surface salinity, and El Niño-Southern Oscillation (ENSO).
- Temporal relationship: The relationship changes monthly by season or yearly by ENSO strength.
- Data Visualization: Create an ArcGIS StoryMaps to summarize the study and importance of research using satellite imagery.

Commercialization and/or Societal Impact Opportunities

- **Application:** Fill gaps in remote sensing academia.
- **Key Value:** Educate students about use of NASA remote sensing data.

Research Approach

- NASA Satellite Imagery: OISSS in PO.DAAC & MODIS OB.DAAC
- Observe Relationship at Different Latitudes: Mississippi River, San Joaquin River, Columbia River.
- Temporal: Analyze monthly-averages of salinity and chlorophyll-a range from 2012-2022.
- ArcGIS Pro Tools: Analysis and mapping tools.
- Excel: Analyze and create graphs of descriptive statistics.

Results

- Inconclusive temporal averages alludes to the possibility that the two variables do not correlate or may correlate spatially rather than temporally.
- Sea surface salinity and chlorophyll-a inhabit an incredibly dynamic environment which can make analyzing their relationship difficult.
- Further research into how other oceanic processes may affect the sea surface salinity and chlorophyll-a.

Team Names & Collaborators

ARCS Students:

Andrea Flores, BS Environmental Science; Swany Cuc, BS Geographic Information Science; Yashira Alamanza, BS Computer Science

ARCS Faculty:

Dr. Mario Giraldo, Professor in GIS and Remote Sensing applications to ecological analysis

Jet Propulsion Laboratory/California Institute of Technology Faculty:

Dr. Joe Roberts, Software engineering leader specializing in the development of GIS and data visualization at JPL; Dr. Latha Baskaran, Geospatial scientist at JPL; Dr. Jorge Vazquez, Project Scientist at JPL

Citations

1. NASA Ocean Biology Processing Group. (2022). TERRA MODIS Level-3 Mapped Chlorophyll, version R2018.8, NASA Ocean Biology Distributed Active Archive Center. doi: <https://doi.org/10.5067/TERRA/MODIS/L3M/CHL/2022>. Accessed on 2024/06.

2. Earth and Space Research (ESR). 2023. Multi-Mission Optimally Interpolated Sea Surface Salinity Global Monthly Dataset Ver. 2.0. PO.DAAC, CA, USA. Dataset accessed [2024-06] at <https://doi.org/10.5067/SMP20-4UMCS>.

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