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## Delta-X: In-situ Water Surface Elevation, MRD, Louisiana, USA, 2021

### Get Data

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Dataset Version: 1

### Summary

This dataset contains water surface elevations collected from boat surveys performed on August 24 and September 22-25, 2021, across the Atchafalaya and Terrebonne basins in the Mississippi River Delta (MRD) floodplain, during the Delta-X Fall 2021 deployment. To perform the surveys, a Global Navigation Satellite System (GNSS) antenna (Septentrio receiver) was mounted on the side of the boat on a pole directly above the depth sounder. This GNSS antenna recorded observations of elevation continuously at 1 Hz on all field days. These data were post-processed using precise point positioning (PPP) and converted to water surface elevation by subtracting the height of the antenna above the water surface when it was mounted on the boat to provide an estimate of water surface elevation. The data are limited to times when the boat was moving slowly enough such that its speed didn't affect the height of the antenna above the water. The data are provided in comma-separated values (CSV) format.

There are five data files in comma-separated values (.csv) format with this dataset.



Figure 1. Map of boat survey areas during the Fall 2021 Delta-X campaign.

### Citation

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## 1. Dataset Overview

This dataset contains water surface elevations collected from boat surveys performed on August 24 and September 22-25, 2021, across the Atchafalaya and Terrebonne basins in the Mississippi River Delta (MRD) floodplain, during the Delta-X Fall 2021 deployment. To perform the surveys, a Global Navigation Satellite System (GNSS) antenna was mounted on the side of the boat on a pole directly above the depth sounder. This GNSS antenna recorded observations of elevation continuously at 1 Hz on all field days. These data were post-processed using precise point positioning (PPP) and converted to water surface elevation by subtracting the height of the antenna above the water surface when it was mounted on the boat to provide an estimate of water surface elevation. The data are limited to times when the boat was moving slowly enough such that its speed didn't affect the height of the antenna above the water. The data are provided in comma-separated values (CSV) format.

**Project:** [Delta-X](#)

The Delta-X mission is a 5-year NASA Earth Venture Suborbital-3 mission to study the Mississippi River Delta in the United States, which is growing and sinking in different areas. River deltas and their wetlands are drowning as a result of sea level rise and reduced sediment inputs. The Delta-X mission will determine which parts will survive and continue to grow, and which parts will be lost. Delta-X begins with airborne and in situ data acquisition and carries through data analysis, model integration, and validation to predict the extent and spatial patterns of future deltaic land loss or gain.

### Related Datasets

Denbina, M.W., M. Simard, and E. Rodriguez. 2023. Delta-X: AirSWOT L3 Water Surface Elevations, MRD, Louisiana, 2021. ORNL DAAC, Oak Ridge, Tennessee, USA. <https://doi.org/10.3334/ORNLDAAC/2133>

Denbina, M.W., M. Simard, E. Rodriguez, X. Wu, and C. Michailovsky. 2021. Pre-Delta-X: L2 AirSWOT Water Surface Elevations, Atchafalaya Basin, LA, USA, 2016. ORNL DAAC, Oak Ridge, Tennessee, USA. <https://doi.org/10.3334/ORNLDAAC/1818>

### Acknowledgments

This work was supported by the NASA Earth Venture Suborbital-3 (EVS-3) program, grant number NNH17ZDA001N-EVS3 and JPL Research and Technology Development.

## 2. Data Characteristics

**Spatial Coverage:** Atchafalaya and Terrebonne Basins, Mississippi River Delta (MRD) floodplain, southern coast of Louisiana, USA

**Spatial Resolution:** Points

**Temporal Coverage:** 2021-08-24 to 2021-09-25

**Temporal Resolution:** 1 second

**Site Boundaries:** Latitude and longitude are given in decimal degrees

Site	Westernmost Longitude	Easternmost Longitude	Northernmost Latitude	Southernmost Latitude
Atchafalaya and Terrebonne Basins	-91.43114	-90.71573	29.62994	29.16911

### Data file information

There are five data files in comma-separated values (.csv) format with this dataset.

**Table 1.** Data files and descriptions

File name	Description
YYYYMMDD_WSE_Boat_Survey.csv	Elevation data from boat surveys (five files) where YYYYMMDD is 20210824 or 20210922 to 20210925

**Table 2.** Variables in the data files

Variable	Units of measurement	Description
basin	-	"Atchafalaya" or "Terrebonne"
date	YYYYMMDD	Date of recording
time	HH:MM:SS	UTC time of recording
longitude	degrees_east	Longitude of GNSS antenna in decimal degrees
latitude	degrees_north	Latitude of GNSS antenna in decimal degrees
water_surface_elevation	m	Water surface elevation relative to NAVD88 (corrected for height of GNSS antenna above water)

## 3. Application and Derivation

These data served to calibrate and validate remote sensing observations and hydrodynamic models.

## 4. Quality Assessment

These data are limited to times when the boat was moving slowly enough such that its speed didn't affect the height of the antenna above the water.

The Septentrio PolaRx5 is a high precision, low noise receiver capable of returning 3-5mm precision in static measurements under ideal conditions.

## 5. Data Acquisition, Materials, and Methods

### GNSS Boat Surveys

A GNSS antenna was mounted on the side of the boat used by the University of North Carolina (UNC) team on a pole directly above the depth sounder. This GNSS antenna recorded observations of elevation continuously at 1Hz on all field days. These data were post-processed using precise point positioning (PPP) and converted to water surface elevation by subtracting the height of the antenna above the water surface when it was mounted on the boat to provide an estimate of water surface elevation. These data are limited to times when the boat was moving slowly enough such that its speed did not affect the height of the antenna above the water.

## 6. Data Access

These data are available through the Oak Ridge National Laboratory (ORNL) Distributed Active Archive Center (DAAC).

[Delta-X: In-situ Water Surface Elevation, MRD, Louisiana, USA, 2021](#)

Contact for Data Center Access Information:

- E-mail: [uso@daac.ornl.gov](mailto:uso@daac.ornl.gov)
- Telephone: +1 (865) 241-3952

## 7. References

Denbina, M.W., M. Simard, and E. Rodriguez. 2023. Delta-X: AirSWOT L3 Water Surface Elevations, MRD, Louisiana, 2021. ORNL DAAC, Oak Ridge, Tennessee, USA. <https://doi.org/10.3334/ORNLDAAC/2133>

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