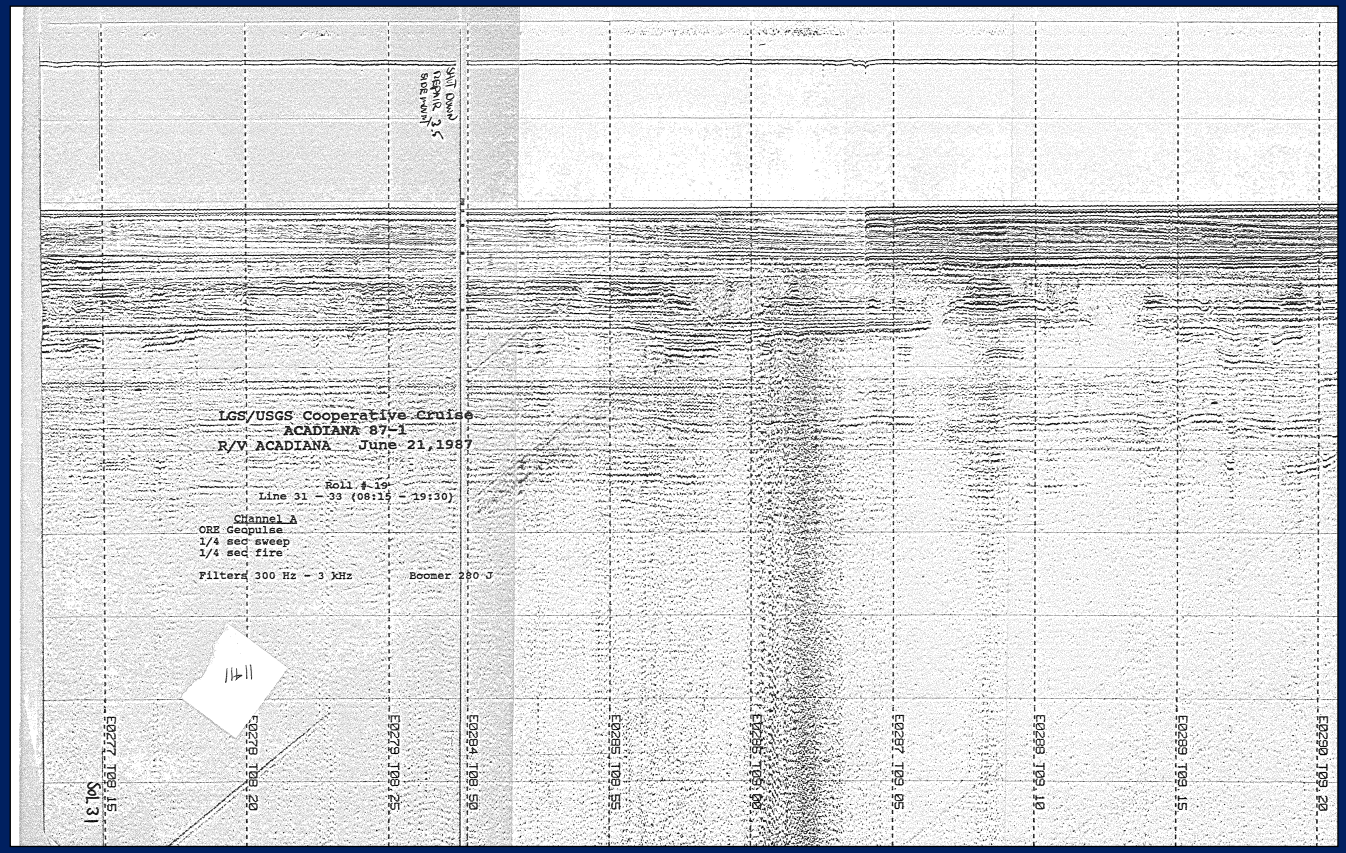
Gulf of Mexico Outer Continental Shelf Analog Seismic Data Conversion and Preservation

James Flocks

U.S. Geological Survey St. Petersburg Coastal and Marine Science Center

Geology of Coastal Margins Team

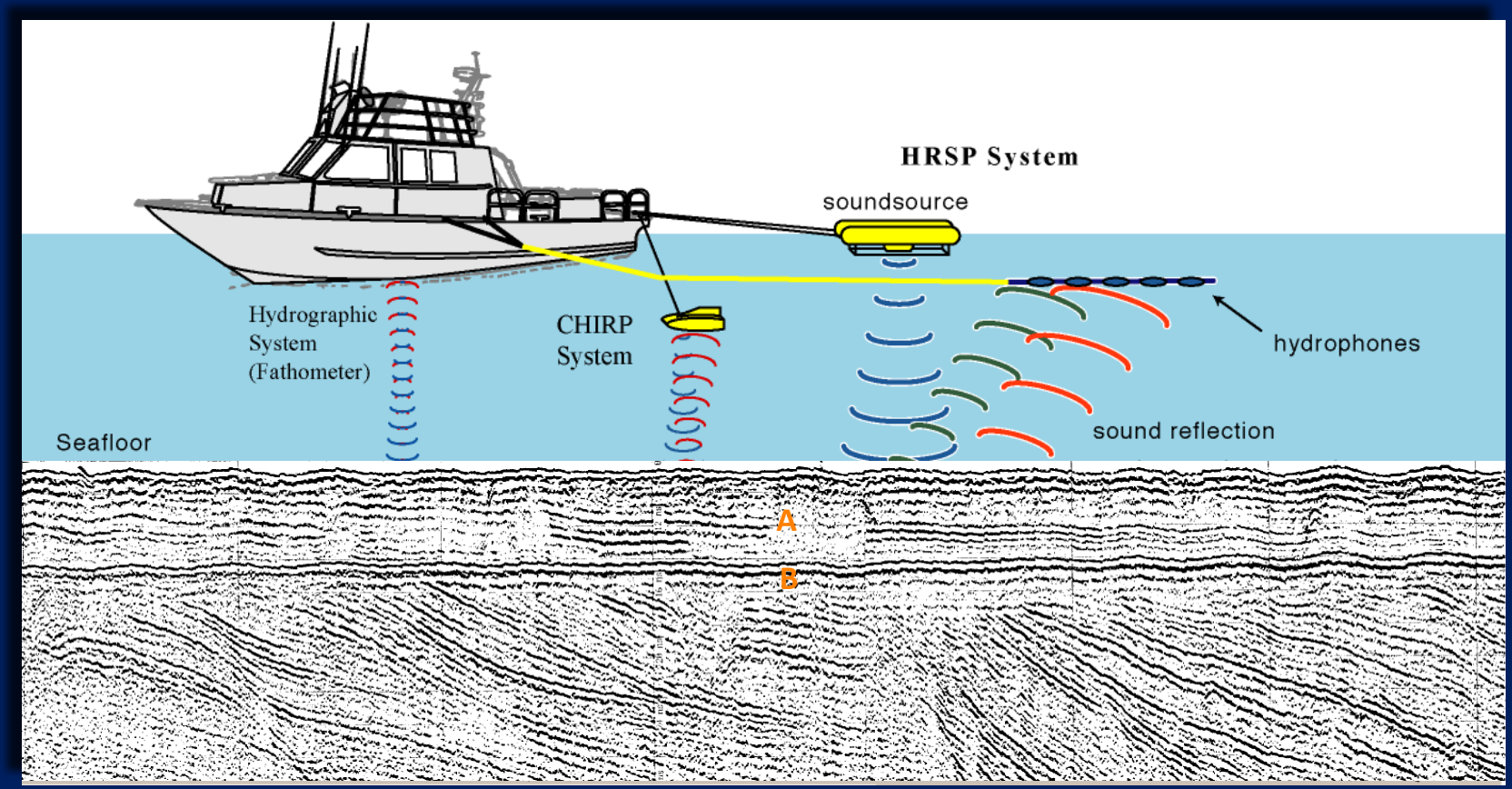
Seismic profile from a
1987 R/V Acadiana Survey, GOM

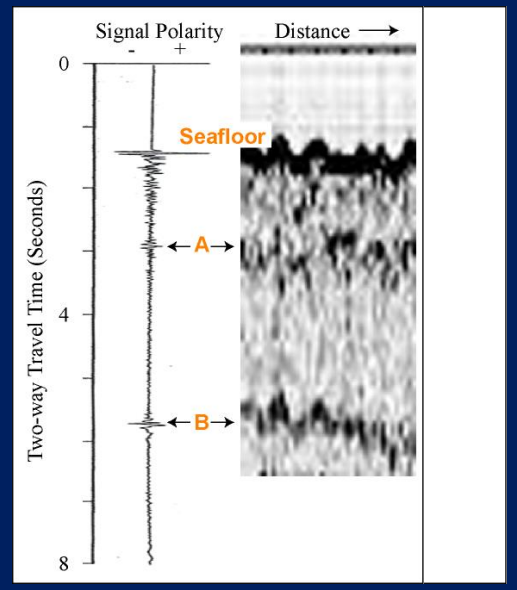


National Geological and Geophysical Data Preservation Program

High Resolution Seismic Profiling

1970s – 1990s (Boomer, Sparker, Air Gun)





Analog data holdings

(Federal agencies, state geological surveys, academic institutions)

Analog data holdings

Paper rolls,

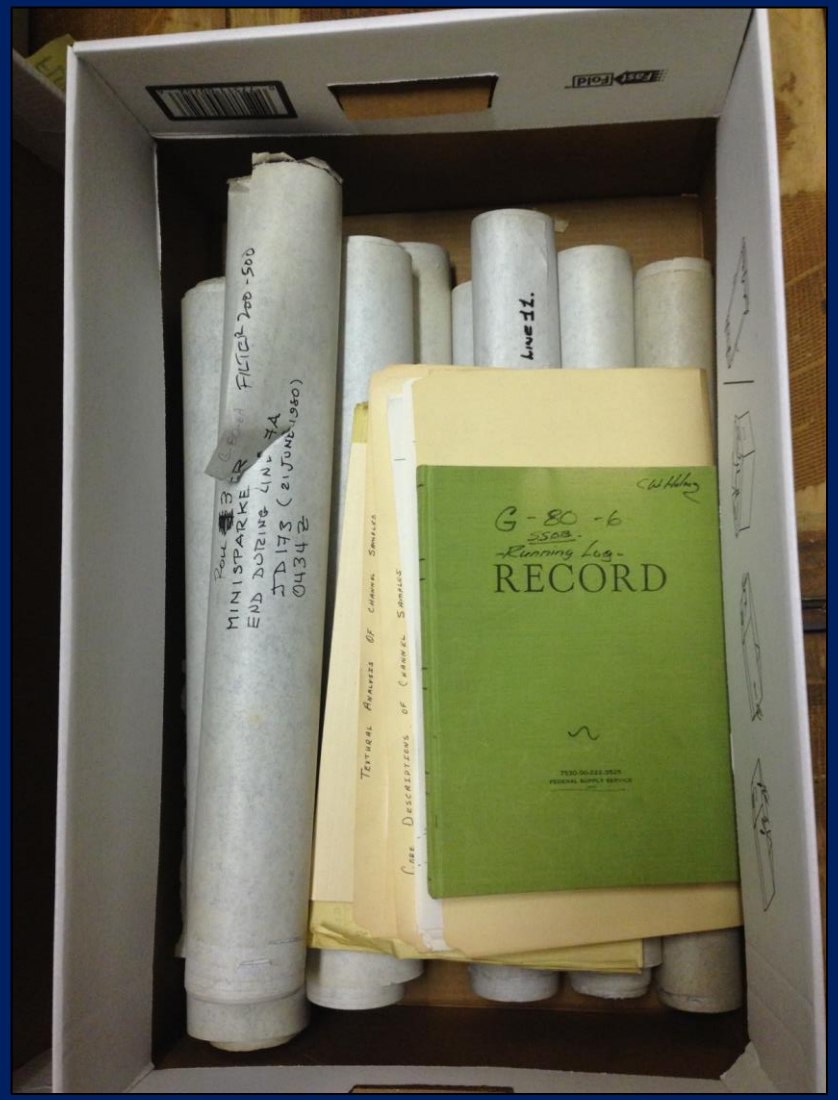
vellums, fanfolds.

Cruise logs

(maybe),

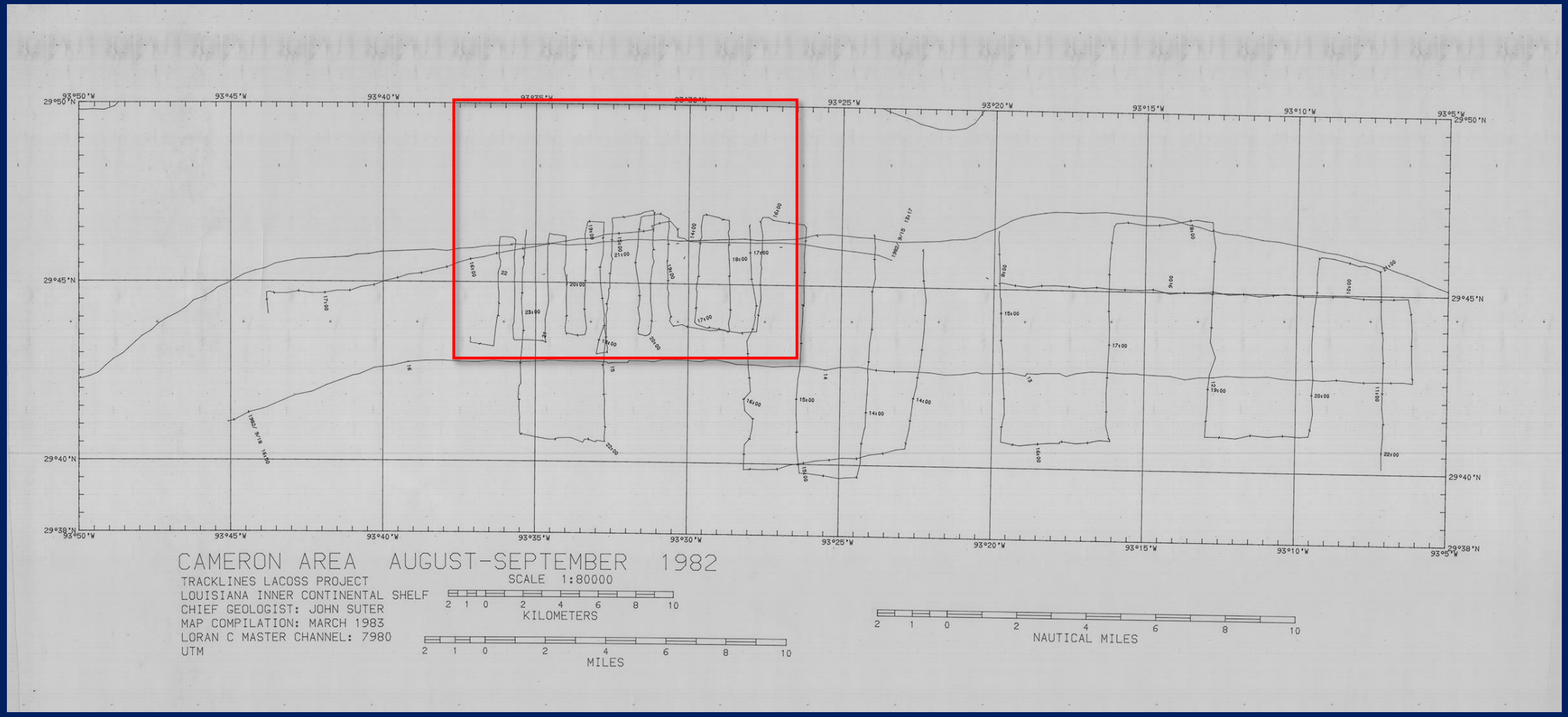
Navigation files

(maybe)



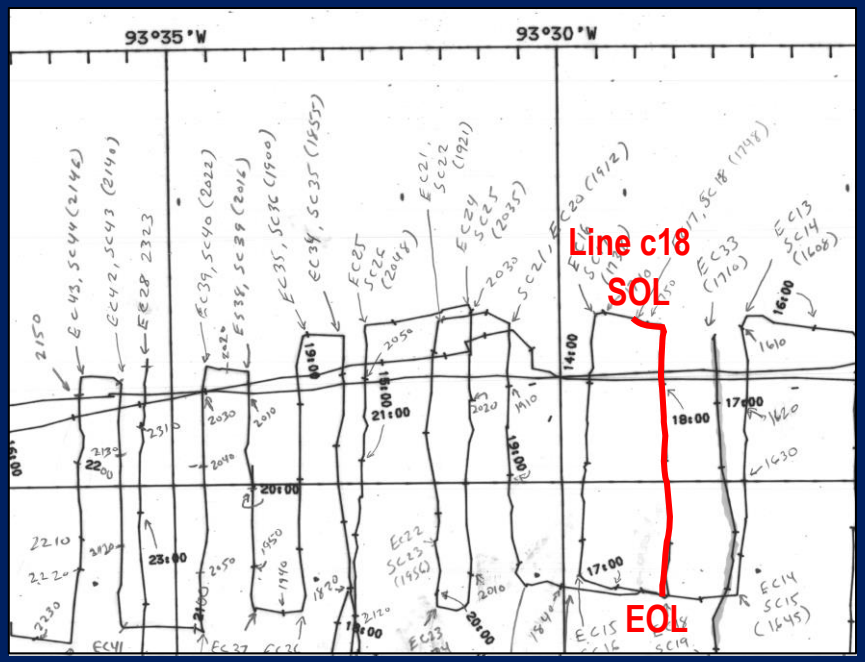
Trackline maps

Recovering navigation from trackline maps



1982 Lacoss project survey, offshore Cameron La, GOM

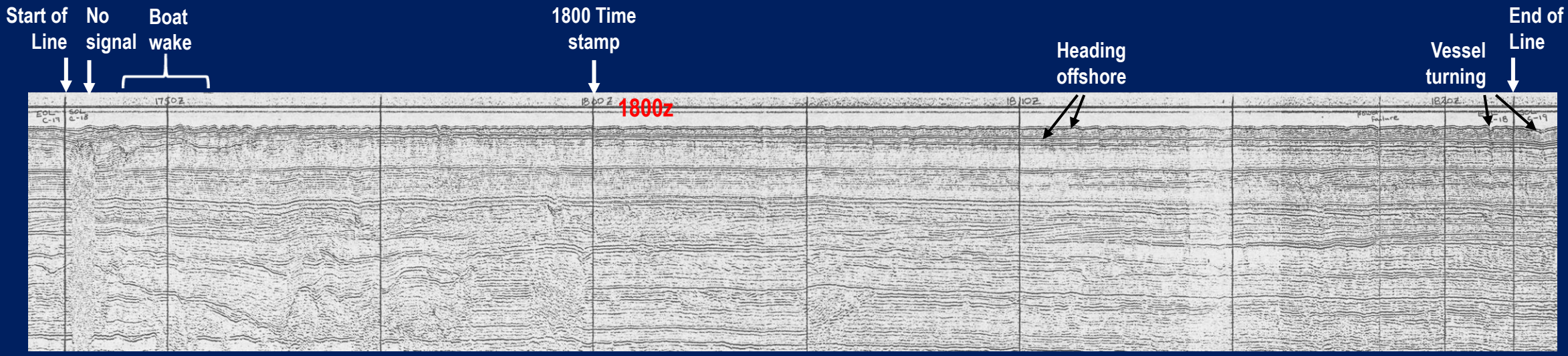
Recovering navigation from trackline maps



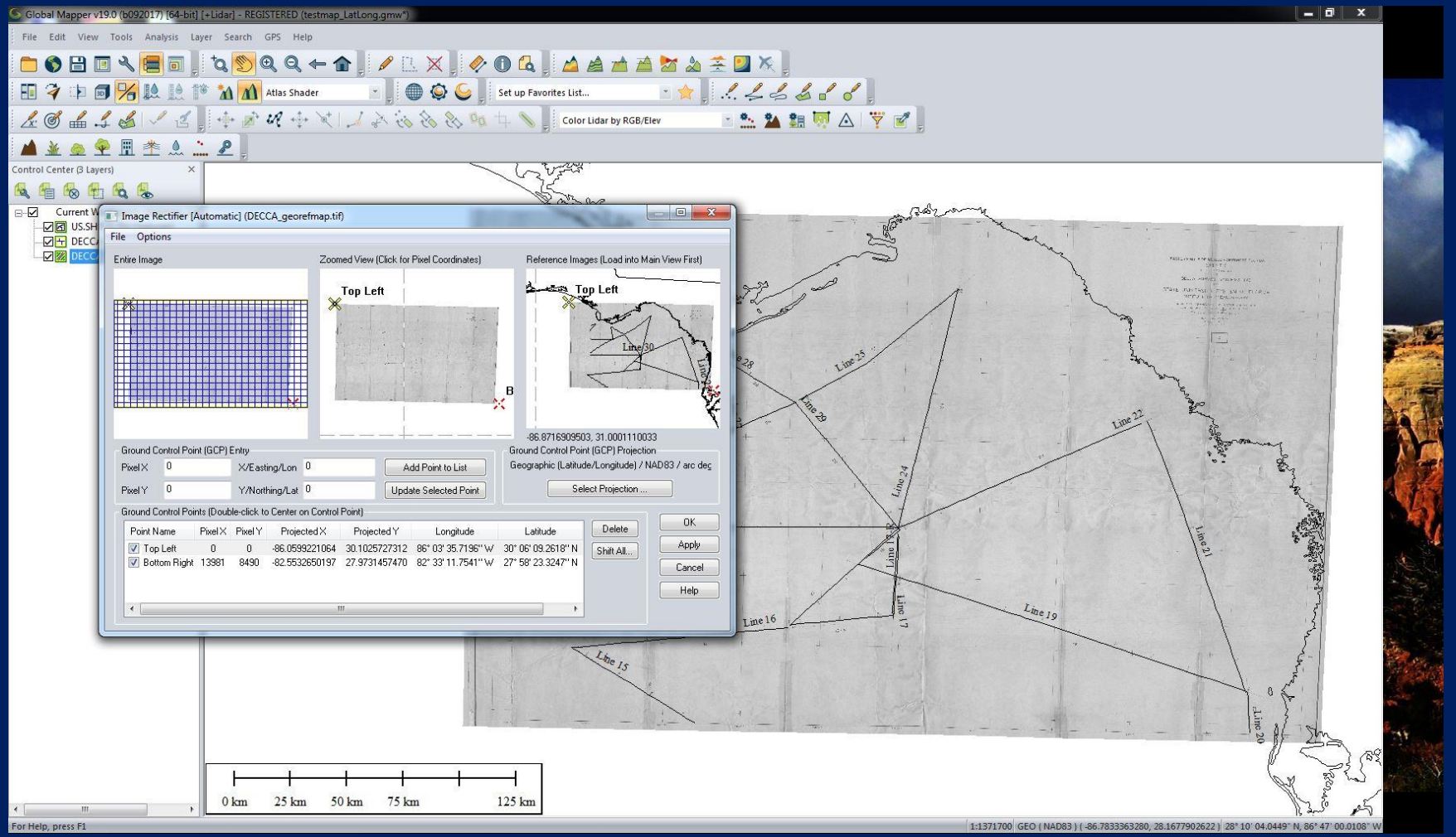
New information included

In archive for reproducibility

Lacoss 83-3, c 18



Recovering navigation from trackline maps



USGS Digital Archives/Metadata

USGS CMG ACAD89-1 Metadata

http://walrus.wr.usgs.gov/infobank/a/a189la/html/a-1-89-la.meta.html

USGS Home
Contact USGS
Search USGS

Coastal & Marine Geo

USGS CMG A

Home | Atlas

Activities: by
Activity First Letter: A
Metadata & Data: Me
Formal Metadata: Fre
Google Earth: Dow
Google Maps: nav

Metadata

ID
Also Known As
Organization
Project
Chief Scientist
Platform

Done

USGS Home
Contact USGS
Search USGS

CMGP Field Activity Information Search

USGS Coastal and Marine Geology Program

USGS > Coastal and Marine Geology Program > Coastal and Marine Geoscience Data System

Field Activity Information Search

This form will search for field activity and data information collected by the Coastal and Marine Sci
combination approach to determine the results. Search results must match all of the selections made.
sidescan activities will appear. If you select 'sonar/sidescan' and starting year of '2005' then only the s
will appear. The results will appear below the search box and in the map display. Click on the pins in th
select 'clear' the form resets all selections and you can start over.

Search Form

Search for Data Type:

- Biological Field Study (Transect Study, Experiment)
- Electro-Magnetic (Resistivity, GPR, Magnetics)
- Environmental Data (Meteorology, CTD, temperature)
- Geochemical Field Study (SHARQ, MICA)
- Imagery (Photo, Video)
- Location/Elevation (Profiles, Navigation, Benchmarks, LIDAR)
- Mathematical modeling
- Sampling
- Seismics (Chirp, boomer, Multichannel)
  - Air Gun / Water Gun
  - Boomer
  - Bubble Gun
  - Multichannel
  - Ocean Bottom Seismometer
  - Sonobuoy
  - Sparker
  - Sub Bottom Profiler
- Sonar (Bathymetry, Sidescan)
- Time Series (Moorings)
- Visual Identification (Species ID, Ground Truthing)
- Other

Select as many as needed.

Search data by type

+ Time span (years): from 1970 to 1990
If only one year is desired, then enter it in the start year and leave the end year blank.

+ Location: Gulf of Mexico
+ Person:
+ Center:
+ Organization:
+ Project:
+ Platform:
+ Field Activity ID: (FAN, AKA, etc) Enter field activity number

Search | Clear

Results Map

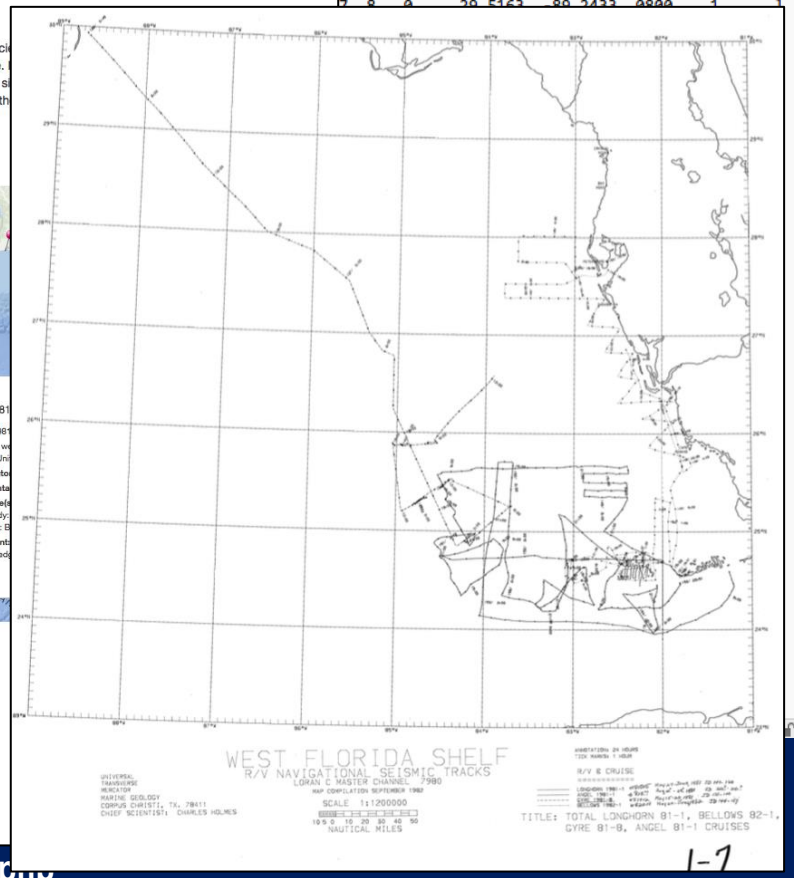
Houston
México City
FAN 1981

https://cmgds.marine.usgs.gov/data_search.php

A87-2_d

/Volumes/LaCie/Documents/Backup_Data/4.../ACAD/A87-2_d

```
1  ! id  ih  rm.  rlt.----  rln.----  adta  -lne--  fixt
2
3  !Leg I
6  23  0.    30.069   -88.9405  2300    1       1
6  23  55.   30.0202  -88.9553  2355    1       1
7  5   36.   29.648   -89.1003  0536    1       1
7  6   0.    29.629   -89.1247  0600    1       1
7  7   27.   29.5735  -89.2433  0727    1       1
```

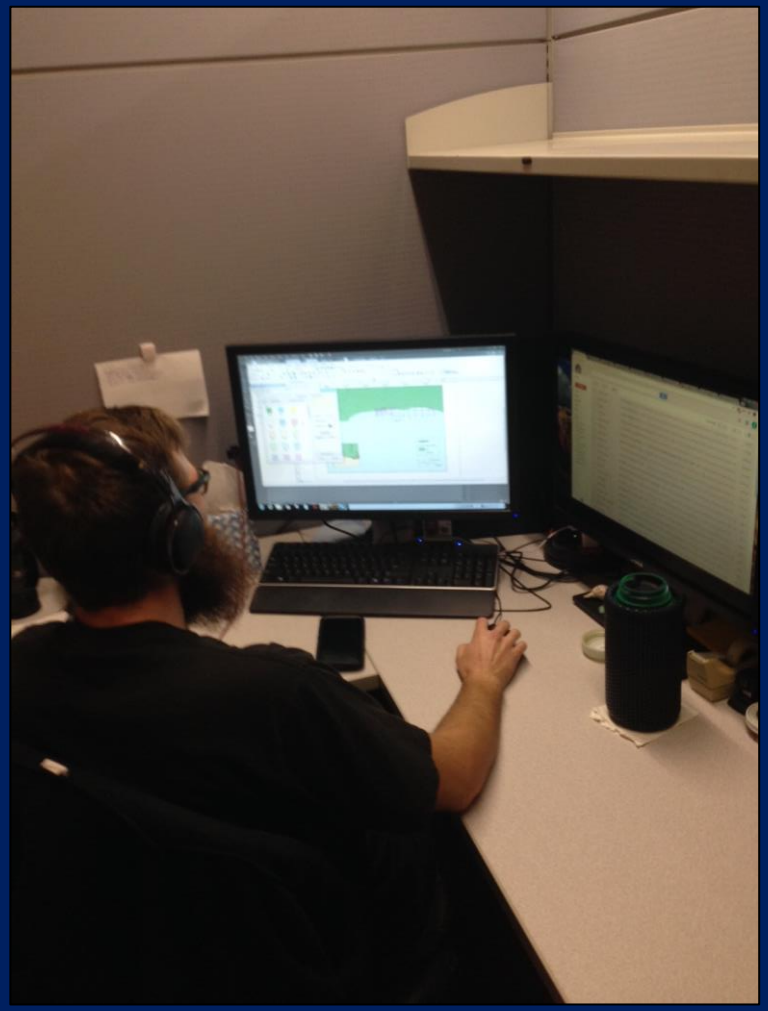


#84
#81012

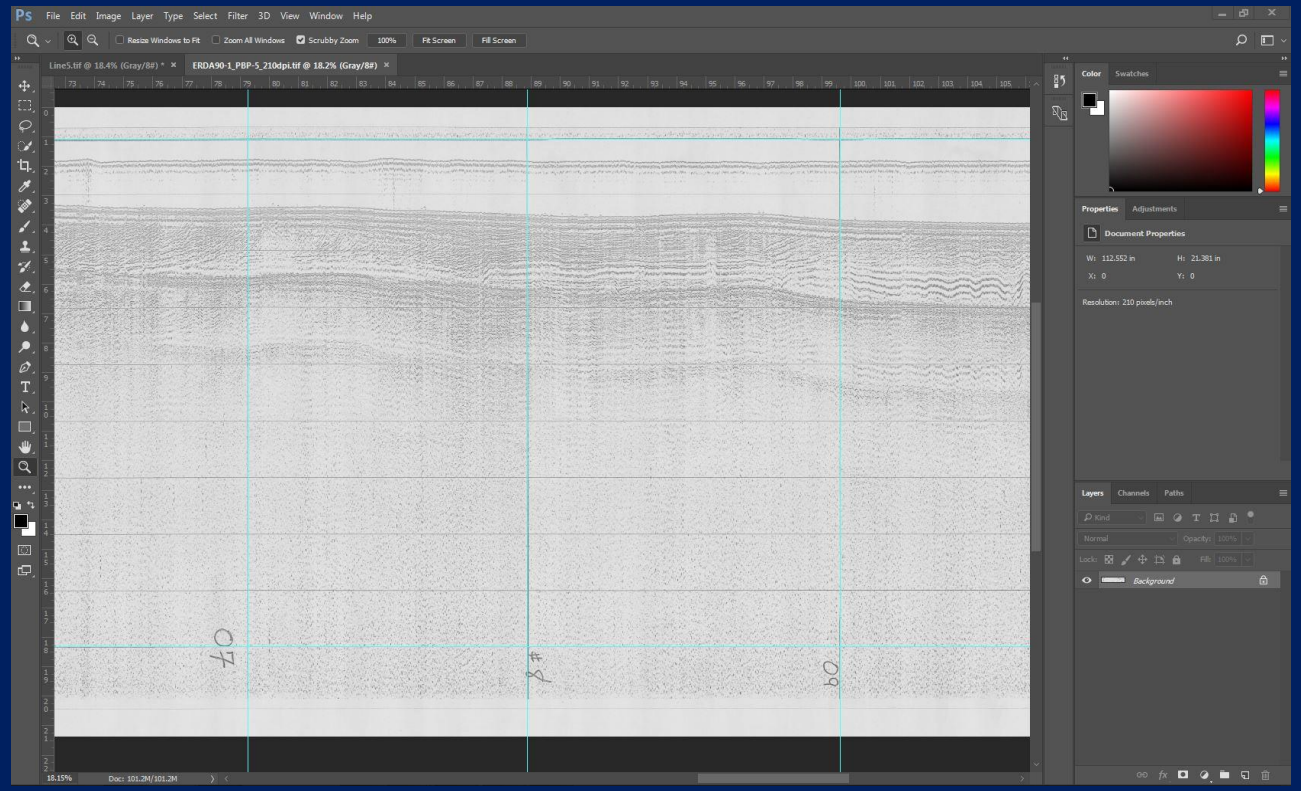
Cruise Report

1. Ship Name: R/V Gyre
2. Cruise No/Leg: 81-G-8
3. Parent Project: West Florida Shelf
4. Funding Agency: S.I.R.
5. Funding Amount: $41,000
6. Contract Number: ------
7. Contract Start/End: ------
8. Area of Operation: West Florida Shelf
9. Date: May 15 - May 20, 1981
10. Chief Scientist: Charles W. Holmes
11. Scientific Staff: Larry Doyle U. of So. Florida
    Paul Schoeder USGS
    Greg Bnolls U. of So. Florida
    Rick Wall U. of So. Florida
    Steve Walker U. of So. Florida
    Charles Stelting USGS
    Margie M. Mitchell USGS
    Angie Varga USGS
    Madelynn Krobot USGS
    Elizabeth Gum USGS
    James McFarlen USGS
    Barry Erwin USGS
    Richard Elsie Captain
12. Purpose of Cruise: To sample viacore and dredge targets determined by seismic information obtained during G80-6A.
13. Navigation: Loran C
14. Equipment Employed: 3.5 kHz Subbottom Profiler
    Piston Core
    Van Veen Grab
    Rock Dredge
15. Tabulation of Information: 5 - days at sea
    540 - 3.5 kHz profiles
    6 - rock dredges
    5 - grab
    3 - Piston cores retrieved

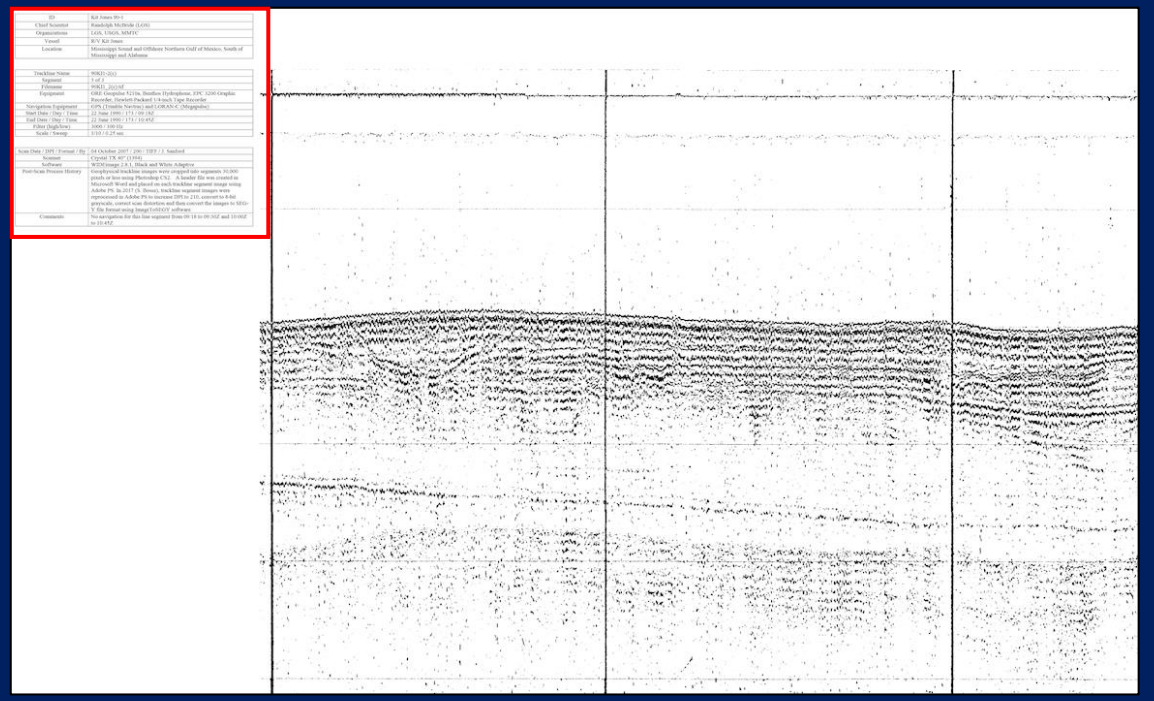
Digitizing data & GIS development



Creating digital images of analog data (distortion correction)



Profiles saved as 300 dpi TIF images



Generate new metadata for analog datasets

Header information appended to digital files

ID	Acadiana 87-1
Chief Scientist	John R. Suter
Organizations	LGS, DU, USGS, LUMCON
Vessel	R/V Acadiana
Location	Chandeleur Islands, Mississippi Barriers, onshore and offshore

Trackline Name	1(b)
Segment	2 of 3
Filename	A87-2_1b
Equipment	ORE Geopulse. Benthos 10 element Hydrophone, EPC 3200 Recorder, ORE 5210 Receiver, ORE 5420A Power Supply, ORE 3.5 kHz Subbottom Profiler with ORE Transmitter
Navigation Equipment	Northstar 6000 LORAN with Texas Instruments Silent 700 EPC Delay box
Start Date / Day / Time	16 June 1987 / 167 / 04:05Z
End Date / Day / Time	16 June 1987 / 167 / 07:45Z
Filter (high/low)	3000 / 500 Hz
Scale / Fire / Sweep (Subbottom Profiler)	1/5 / .25 sec / .25 sec
Scale / Fire / Sweep (ORE Geopulse)	

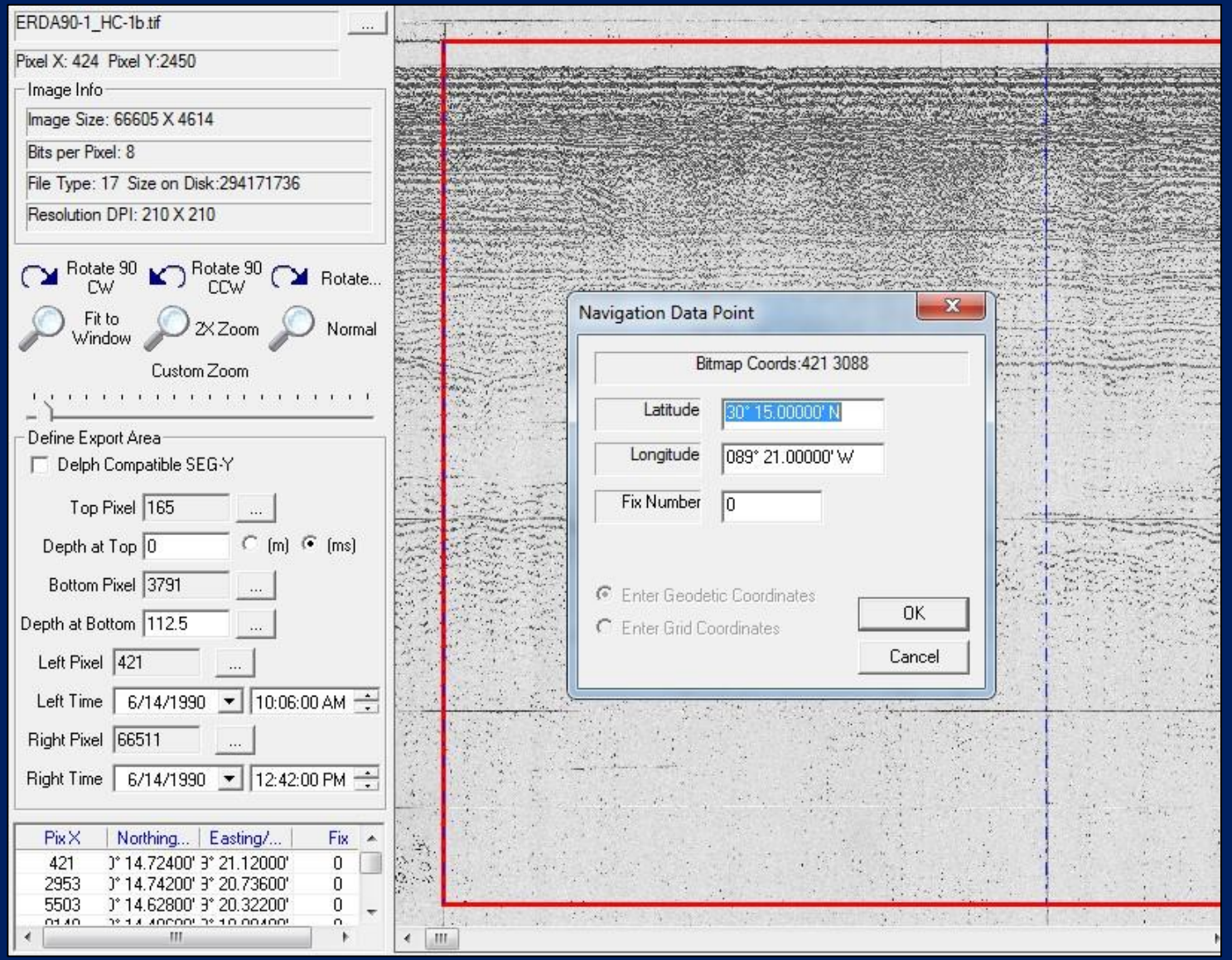
Scan Date / DPI / Format / By	01 August 2016 / 210 / 8-bit grey-scale TIFF / S. Bosse
Scanner	Contex SD 3600
Software	NEXTimage 4.3
Post-Scan Process History	A header was created using Microsoft Word, was then converted to .pdf file format and then attached to each line segment via Adobe Photoshop
Comments	

FGDC-compliant Metadata add to archive

Identification_Information:
  Citation:
    Citation_Information:
      Originator: Stephen T. Bosse
      Originator: James G. Flocks
      Originator: Arnell S. Forde
      Publication_Date: 20170622
      Title: Archive of digitized analog boomer seismic reflection data collected during U.S. Geological Survey cruise Acadiana 87-2 in the northern Gulf of Mexico, June 1987
      Geospatial_Data_Presentation_Form: Multimedia presentation
      Series_Information:
        . . .
        . . .
        . . .
  Spatial_Domain:
    Bounding_Coordinates:
      West_Bounding_Coordinate: -89.324
      East_Bounding_Coordinate: -88.116
      North_Bounding_Coordinate: 30.2467
      South_Bounding_Coordinate: 29.1042
  Keywords:
        . . .
        . . .
        . . .
Contact_Voice_Telephone: (727) 502-8000
      Contact_Electronic_Mail_Address: sbosse@usgs.gov
  Metadata_Standard_Name: Content Standard for Digital Geospatial Metadata
  Metadata_Standard_Version: FGDC-STD-001-1998

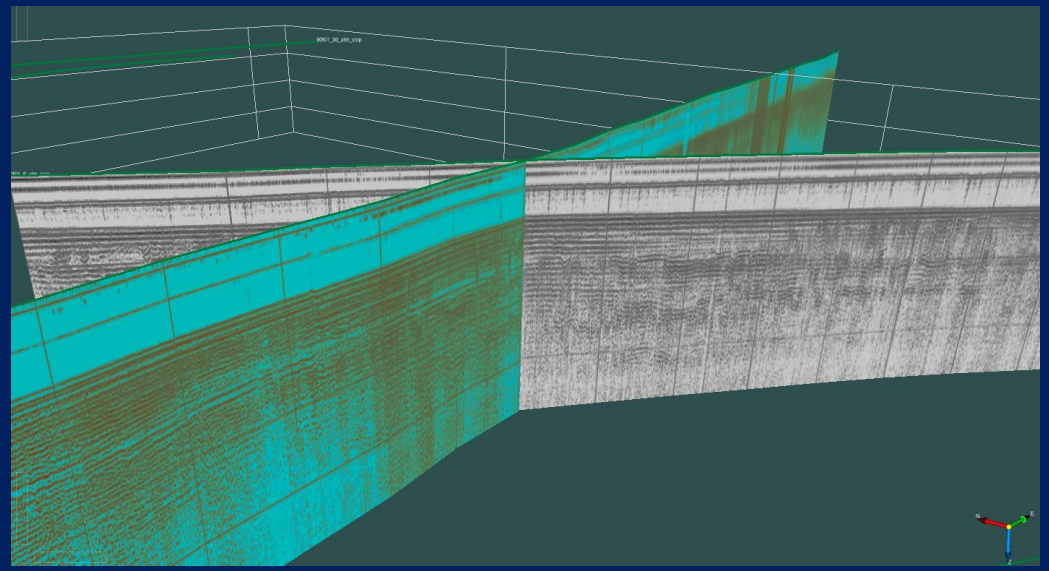
Converting image profiles to Seg-y format

(industry standard format for seismic data)

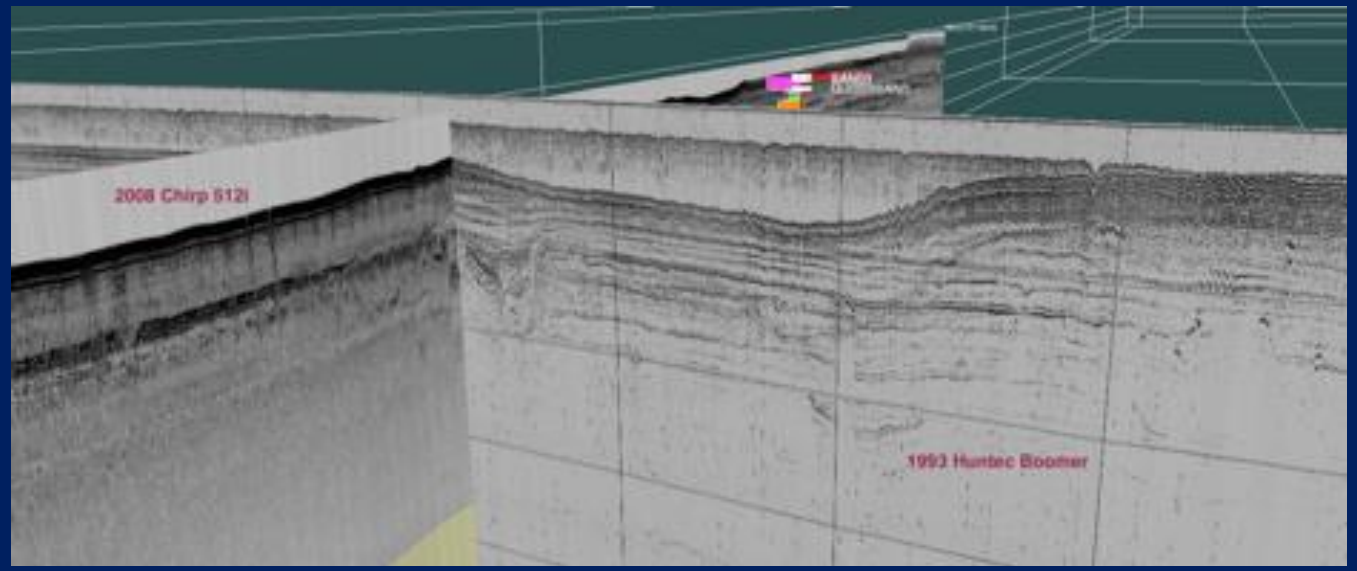


Converting image profiles to Seg-y format

Data integration



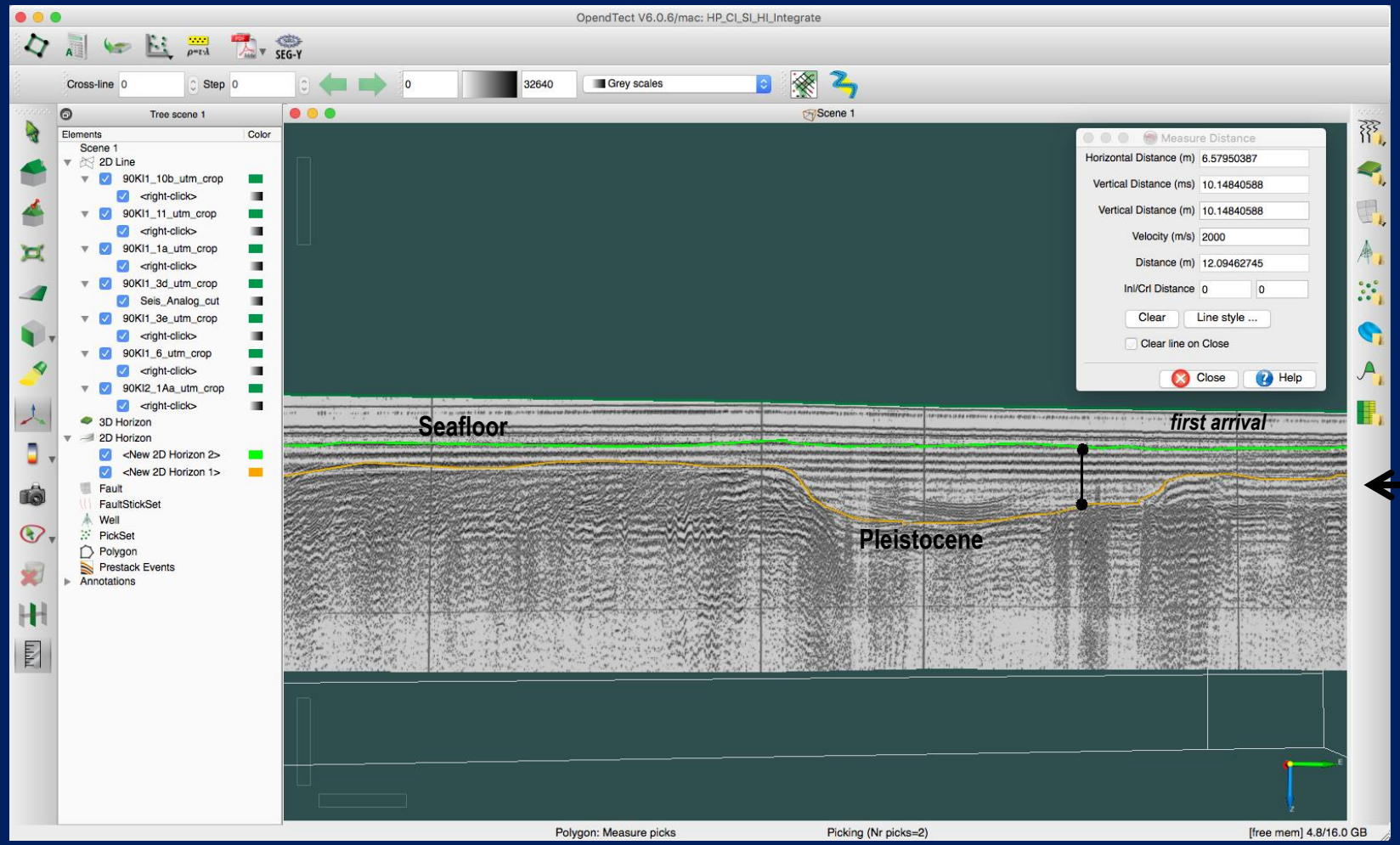
1990 Kit Jones Survey, GOM



1993 Carancahua Survey, GOM

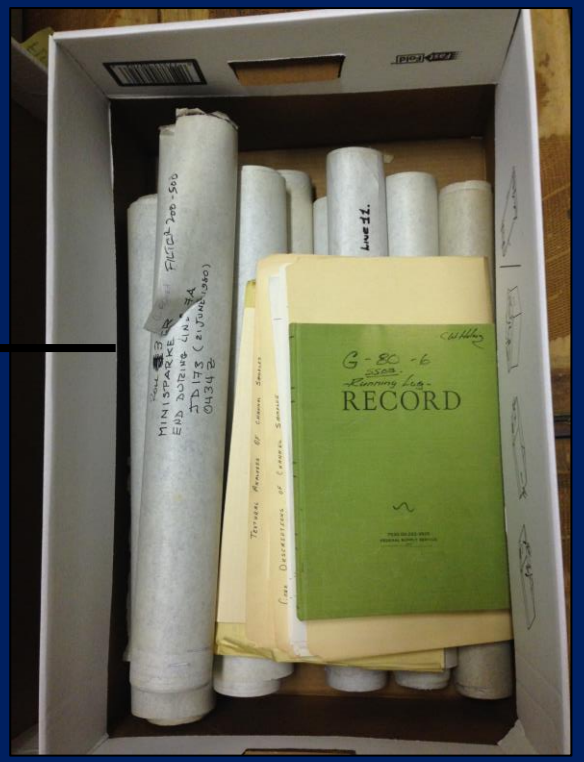
Converting image profiles to Seg-y format

Data integration



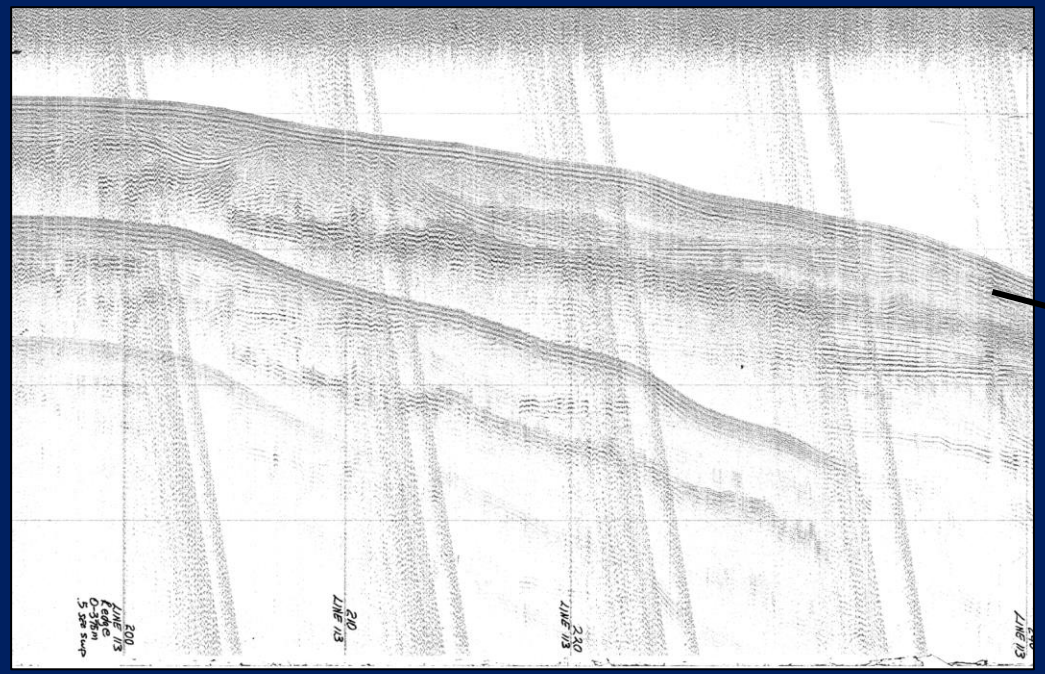
1990 Kit Jones survey, GOM

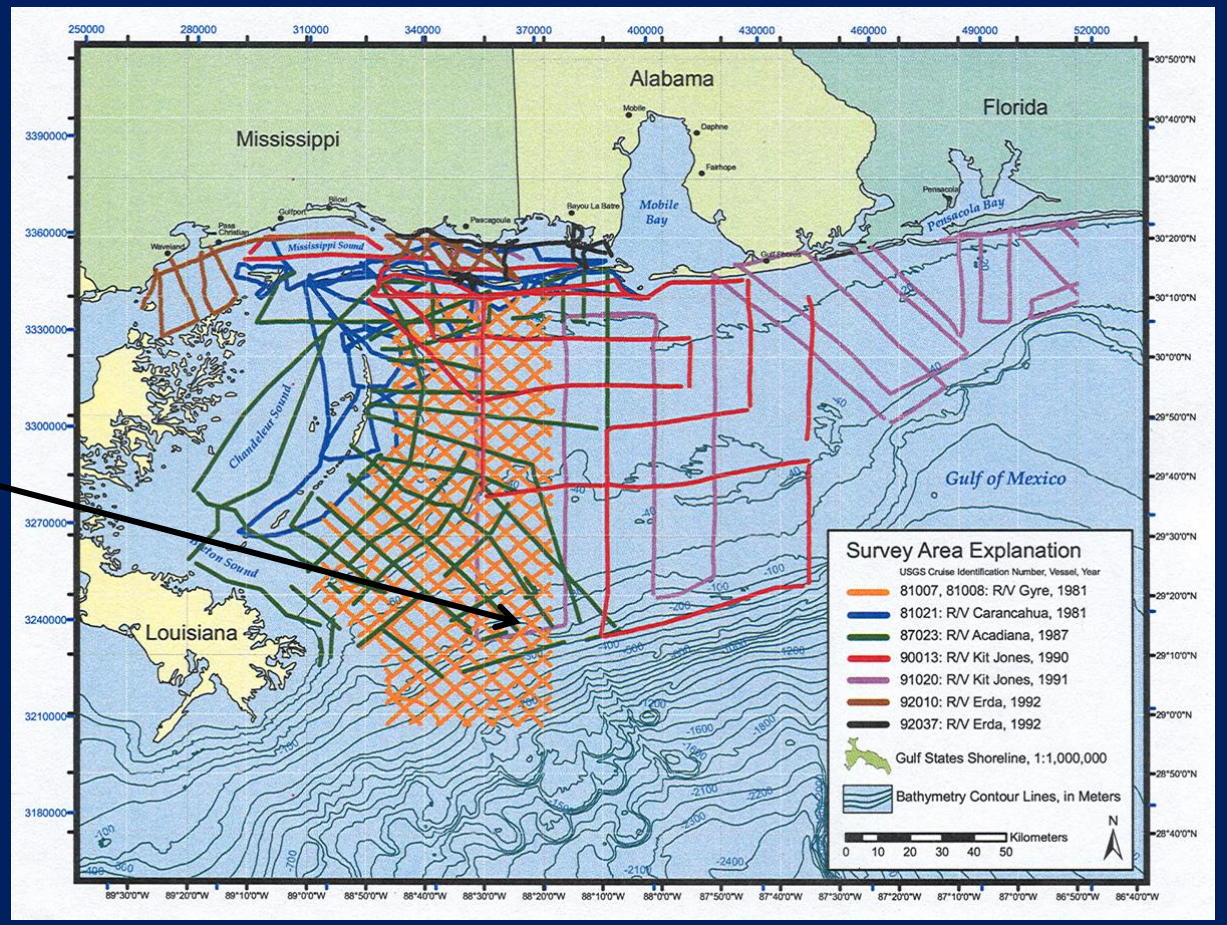
Geologic data recovered, preserved and re-introduced



Recovered analog seismic data

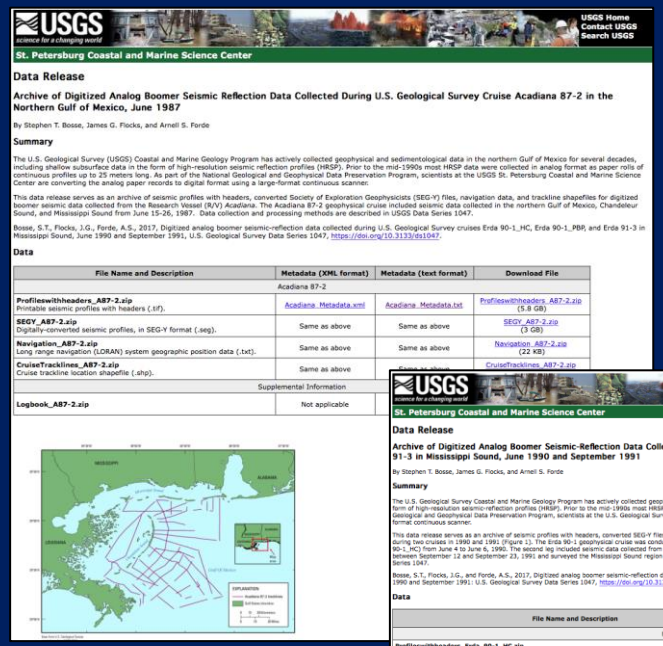
1981 Gyre survey, GOM



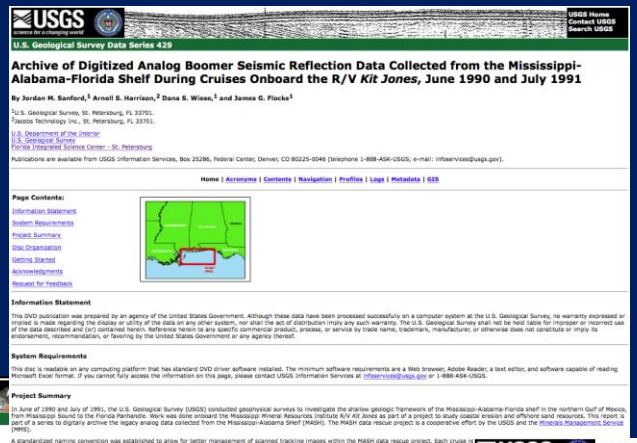


Recovered data archive & publication

https://coastal.er.usgs.gov/data-release/doi-F7F47MC2/



https://pubs.usgs.gov/ds/429/



https://pubs.usgs.gov/ds/428/

https://coastal.er.usgs.gov/data-release/doi-F7BV7DRT/

https://pubs.usgs.gov/ds/370/

Where to:

- **Currently assessing status of GOM analog seismic data stored at the USGS Woods Hole field office:**

FAN (AKA)	Alternate ID	PI(s)	Location	Start Date	End Date
1975-013-FA	Party 77	Louis E. Garrison	upper continental slope, Texas to Florida, Gulf of Mexico, Unite	7/28/75	12/20/75
1980-014-FA	80-G-6A	Charles W. Holmes	West Florida Shelf, Florida, Alabama, Gulf of Mexico, United St	6/14/80	7/5/80
1989-008-FA	DEB-89-1; DEBB 89-1	Harley J. Knebel	Mobile Bay, Mississippi Sound, Alabama, Mississippi, United S	5/2/89	5/4/89
1985-034-FA	85 Leg 3A; FRNL 85-3A	David Twichell	eastern Gulf of Mexico, United States, North America, North At	10/2/85	10/22/85
1982-039-FA	LACOSS II 12/82	John West	Louisiana Shelf, Isles Dernieres, Grand Isle, Louisiana, United S	12/5/82	12/17/82
1982-042-FA	LACOSS I	John West	western Louisiana Continental Shelf, Louisiana, United States,	8/27/82	9/18/82
1983-010-FA	702-84 (83-1)	Ronald C. Circe, Lawrence Poppe	West Florida Escarpment and slope, Mississippi Canyon Reef,	10/16/83	11/5/83
2000-005-FA	IB O-5-00-GM	Kathryn Scanlon Catanach	Northeastern Gulf of Mexico, United States, North America, No	2/15/00	3/2/00

If anyone has/knows of existing GOM OCS analog seismic datasets in need of recovery let me know

- Continue Archive of data in St. Petersburg field office

- In collaboration with BOEM, USM – Division of Marine Science, &
UT - School of Geosciences to Develop Seismic GOM OCS geologic database

- Integrate other geologic datasets (e.g. core logs) into restoration process