



Video Conferencia Informativa

8 Febrero 2018

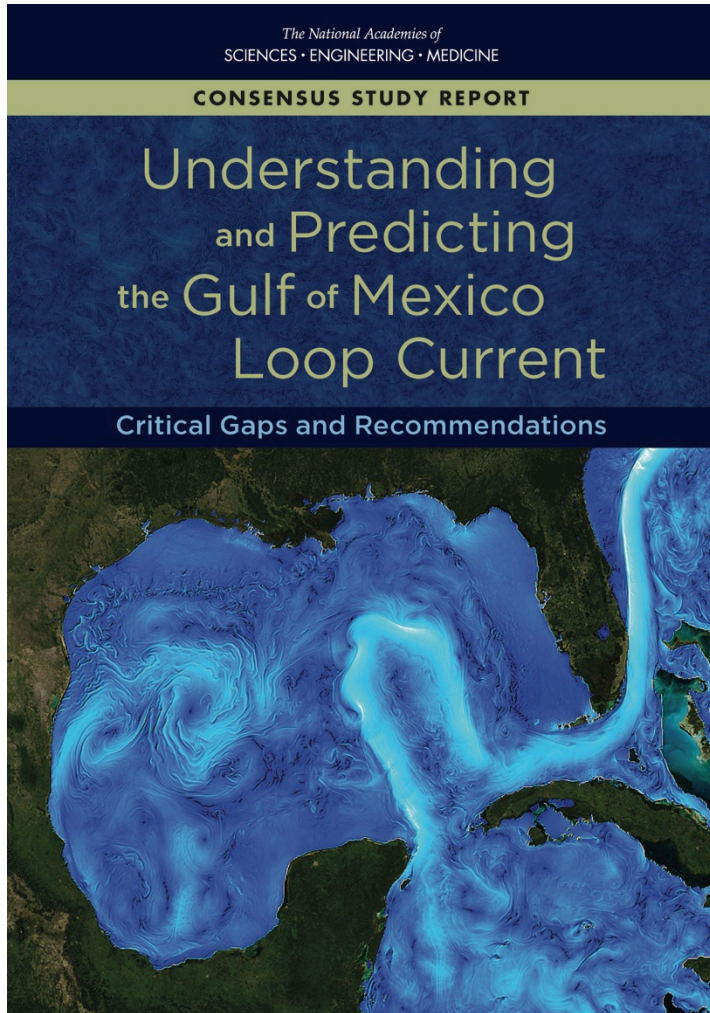


Video Conferencia Informativa AGENDA

- Reporte del Estudio “*Entendimiento y Predicción de la Corriente de Lazo del Golfo de México*” del Programa de Investigación del Golfo de México de la Academia de Ciencias Ingeniería y Medicina (GRP NASEM).
- Convocatoria de corto plazo (14 de **febrero de 2018**).
- Actualizar convenio del CIIMAR-GOMC.
- Fecha de la próxima reunión de CIIMAR-GOMC.



GULF RESEARCH PROGRAM



February 7, 2018

A discussion of the recently released report
and announcement of associated upcoming
funding opportunities

Key Takeaways

- Consensus study
- Better understand to better predict
- Decade-long, larger area, targeted processes, vertically integrated
- Total efforts of ~ \$125M recommended
- Collaboration is important
- International partners important
- Requests for Applications (RFAs) start in 2018
- Large comprehensive RFA is next step



The Gulf Research Program (GRP)

Who: Division of the NASEM (2013)

Mission: Catalyzing advances in science, practice, and capacity to generate long-term benefits for the Gulf of Mexico region and the Nation.

Why: Courts allocated some *Deepwater Horizon* penalty monies to “community benefit”

What: \$500 million to support grants, fellowships, and other activities

When: 30-year program (2013-2043)

How: Competitive funding opportunities; Guided by the GRP’s “Strategic Vision” (2014) and 20+ member Advisory Board.

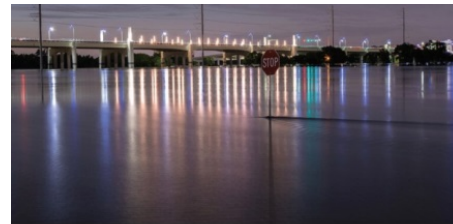
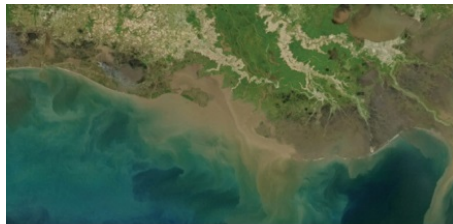
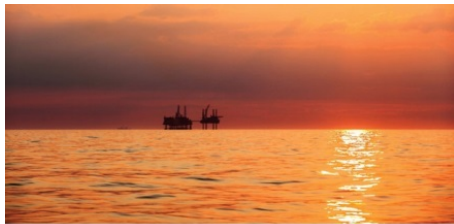
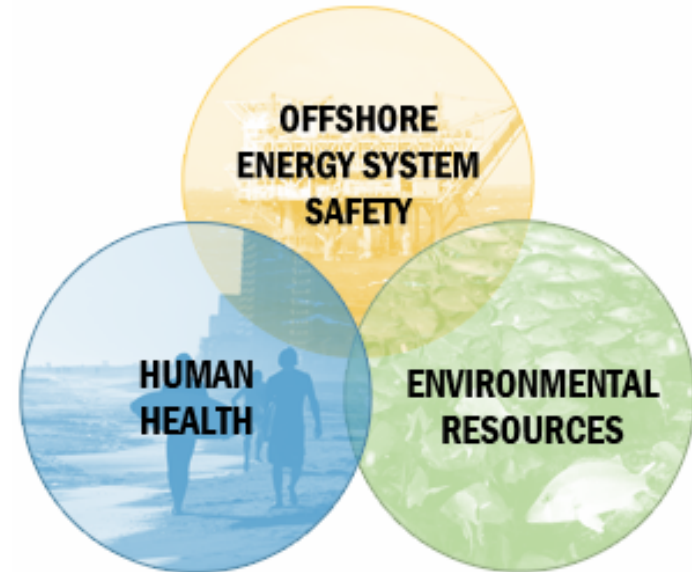


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The Gulf Research Program (GRP)

- Directed to operate in three areas:
 - Oil system safety
 - Human health
 - Environmental resources
- Directed to work via three mechanisms:
 - Research & Development
 - Education & Training
 - Environmental monitoring



Study Origin

- Meeting on advancing our understanding of the Deep Gulf, 2016 – LC top priority
- Advisory Board encouraged investment in ocean observations, specifically the deep Gulf
 - First step - Loop Current study
 - GRP will use study recommendations to develop funding opportunities – better understand LC....and better understand the Gulf



What is the Loop Current?



Importance

- O&G ops ... safe drilling and prudent planning
- Tropical cyclone intensification
- Spill fate
- Ecology and food chains
- Gulf Coast economy
- Understanding of the Gulf as a whole



Statement of Task

- Summarize the existing scientific understanding
- Determine critical information needs (i.e., observational, modeling and research priorities). Specify the measurements needed to improve models/forecasts ... facilitating safe oil and gas operations ... *et al.*
- Assess the capacity of current technologies
- **Describe critical components of a field campaign ... to fill gaps in observations, technology, modeling, theory and analyses**
- As possible, include estimated costs and identify collaboration needs



Committee on Advancing Understanding of Gulf of Mexico Loop Current Dynamics

PAUL G. GAFFNEY (*Chair*), Monmouth University

SHUYI S. CHEN, University of Washington

STEVEN F. DiMARCO, Texas A&M University

SCOTT GLENN, Rutgers University

RUOYING HE, North Carolina State University

JOSEPH KUEHL, University of Delaware

ROBERT LEBEN, Colorado Center for Astrodynamics Research

PIERRE F.J. LERMUSIAUX, Massachusetts Institute of Technology

RUTH L. PERRY, Shell Exploration & Production Company

DANIEL L. RUDNICK, Scripps Institution of Oceanography

NEHA SHARMA, Horizon Marine, Inc.

D. RANDOLPH WATTS, University of Rhode Island

ROBERT H. WEISBERG, University of South Florida

DANA R. YOERGER, Woods Hole Oceanographic Institution



Study Approach

- Formed the Committee
- Briefings: BOEM, Mexico, Navy, Technology, Modelers, O&G, etc.
- Meeting in plenary and by phone continually for 8 months
- Examined gaps and developed recommendations:
 - Observations
 - Technology
 - Analyses and Theory
 - Data Assimilation and Numerical Modeling
- Discuss experiences with management structures, RFPs and Costs
- Write report
- Internal and External review



Key Questions

1. What controls the penetration of the Loop Current into the Gulf of Mexico?
2. What controls the eddy shedding from the parent Loop Current?

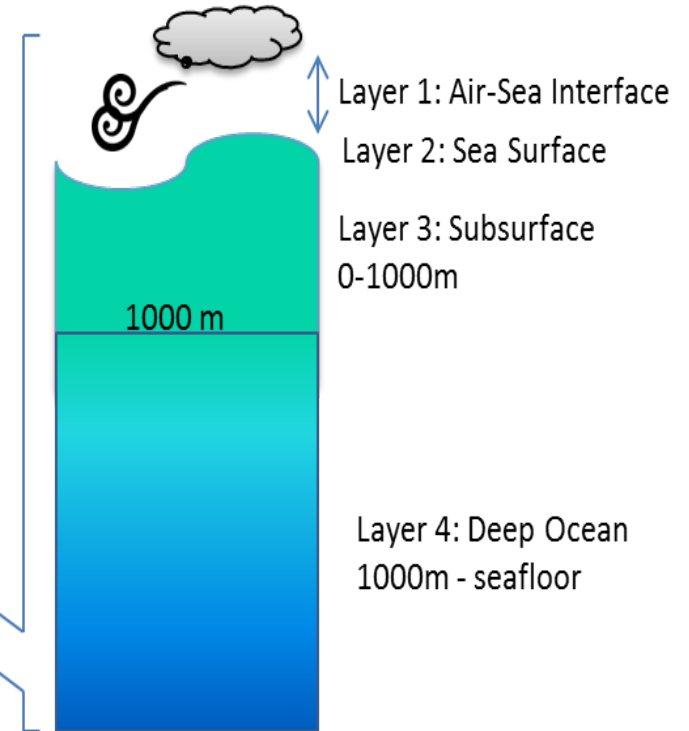
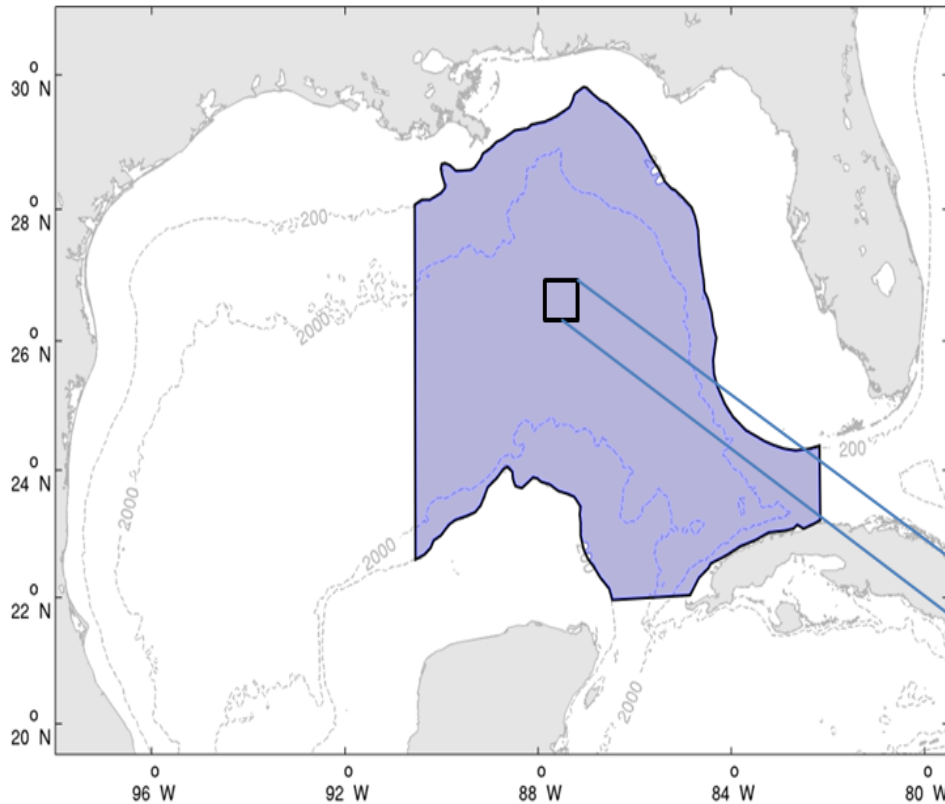


Gaps in Theory

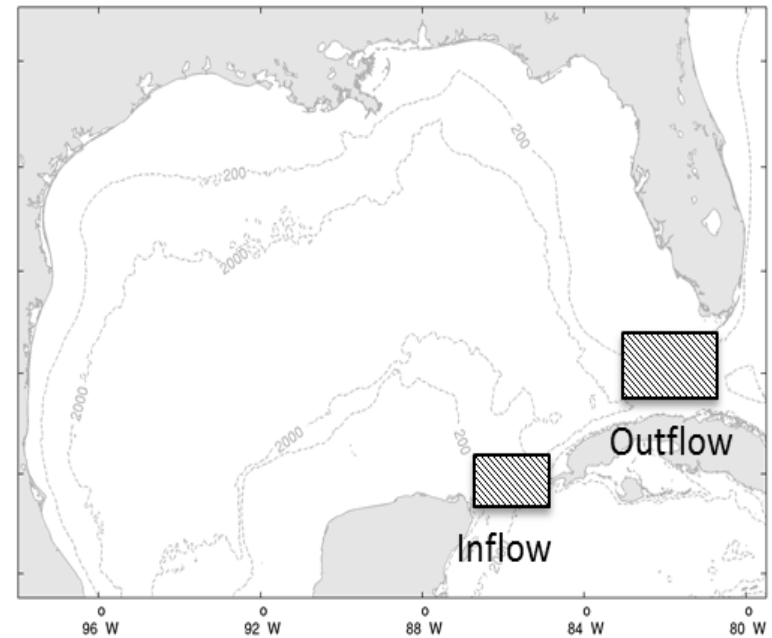
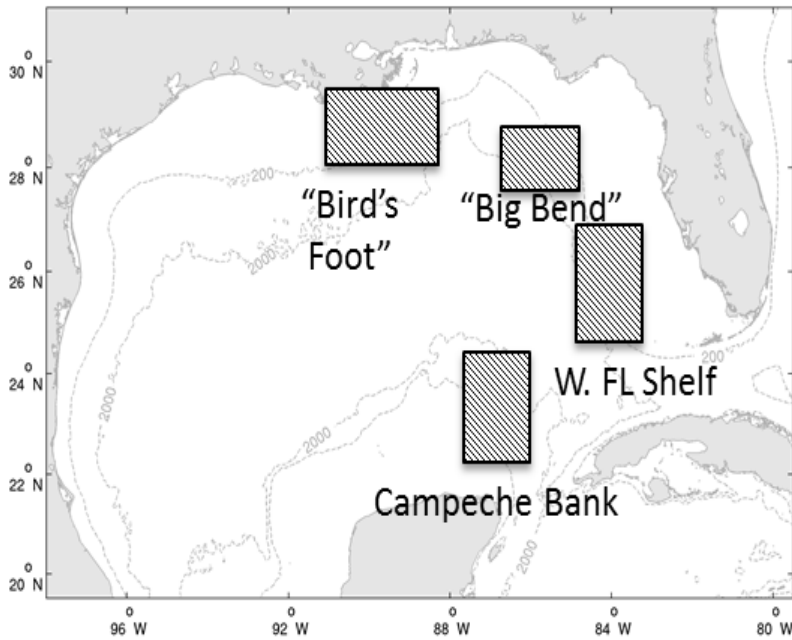
- How do the LCS' s layered ocean dynamics, from the bounding atmosphere to its bounding basin topography, interact with each other and how do they vary spatially and temporally?
- How do the inflows and outflows of the Gulf relate to changes of the LCS within the Gulf?
- What is the role of the shelf slopes in the Gulf on LCS dynamics?



Gaps in Observations



Gaps in Observations



Gaps in Modeling

- Current modeling systems do not include sufficient physics that describe:
 - Air–sea interaction at the near surface in the LCS active area
 - Interactions among the surface, subsurface layers, eddies, and waves
 - Inflow/outflow complexities
 - Interactions with bathymetry



Gaps in Technology

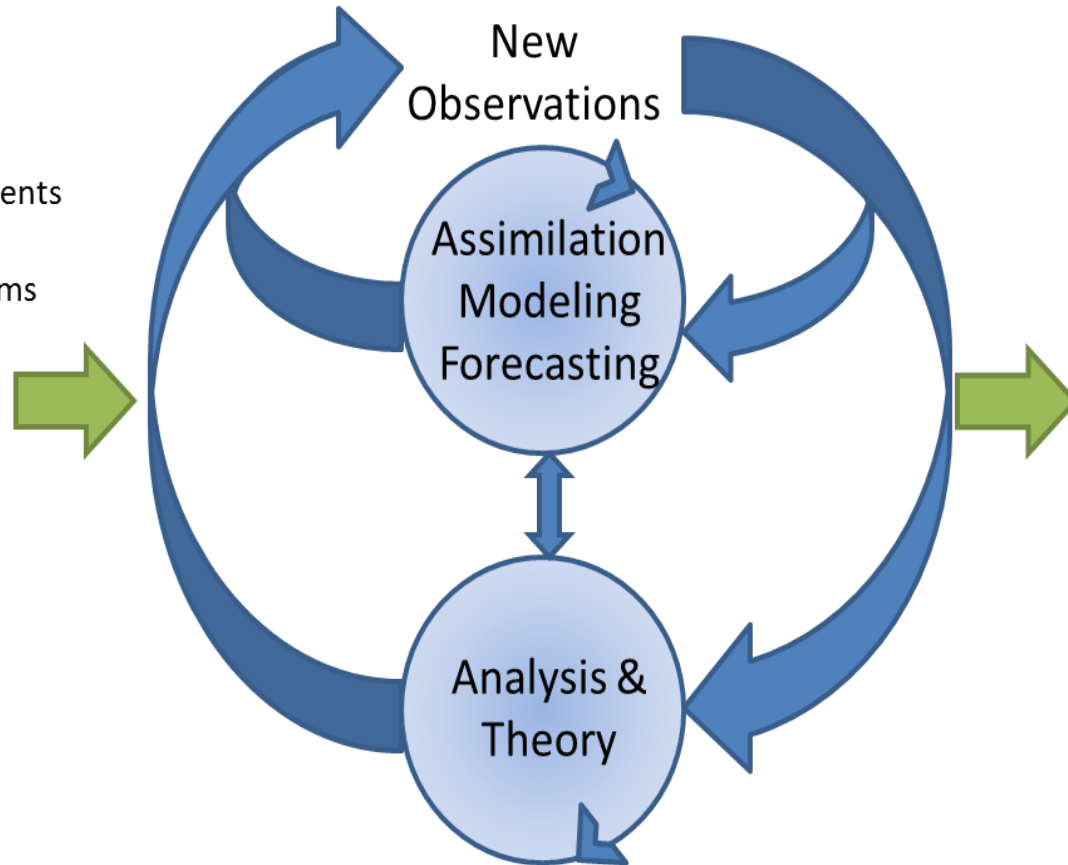
- More affordable
- More robust
- More reliable
- More real-time
- Reliable HF Radar data communications from rigs
- Deep communications data network



Recommendations



An Integrated Campaign



New Understanding

- LCS
- Gulf of Mexico

Predictive skill of LCS

Wealth of observations in Gulf of Mexico to answer new questions

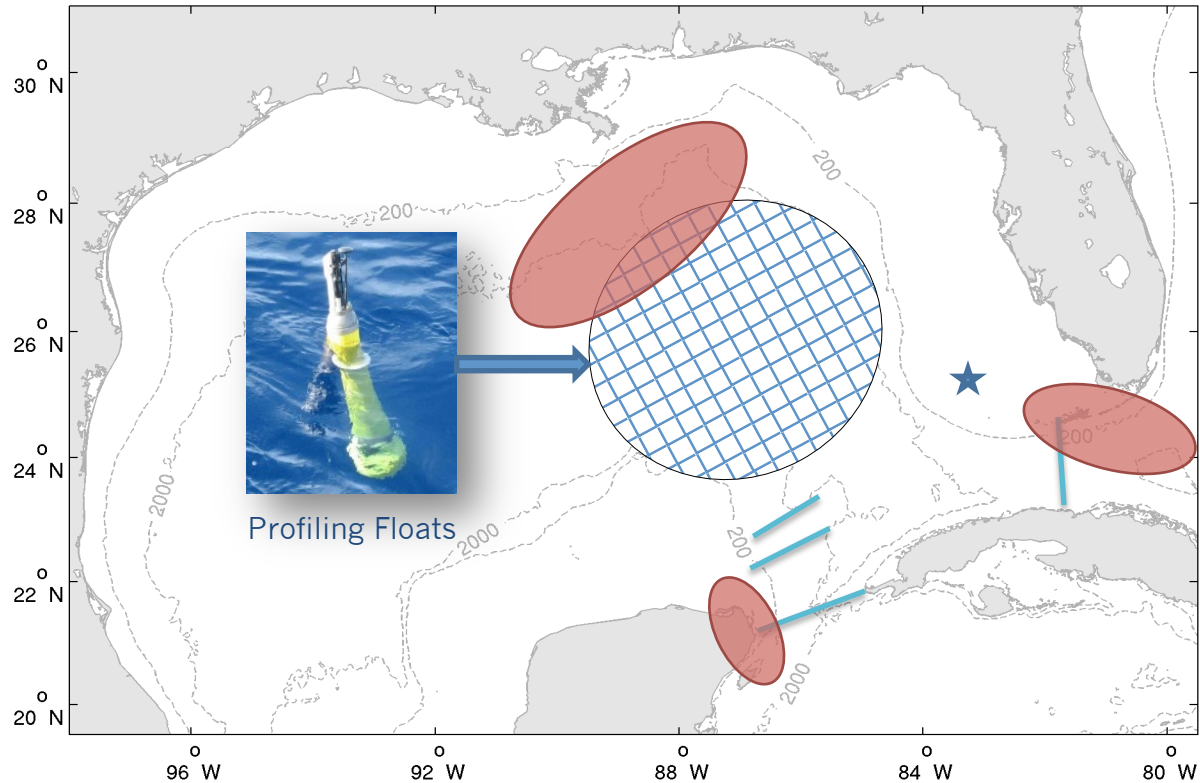
New observational infrastructure

- Technological Advancements
Previous Field Studies
Existing/Ongoing Programs
GRP Funds
Collaborations with:
- Mexico
 - Cuba
 - Federal Agencies
 - Private Industry
 - Academia

Near Term Recommendations / 2018 Solicitations



Near-term Observation Areas



Bottom-mounted pressure and current measurements – Active area



HF Radar



Real-time Single Mooring



Mooring Arrays

Near-term Recommendations

- Campeche Bank, Florida Straits and Yucatan channel archived mooring data
 - Commit to supporting continued ops
- HF Radars ... in/outflow, southwest FL shelf and rigs
- Initial CPIES-like network (20-25 instruments)
- Real time mooring (SW Florida Shelf)
- Profilers
 - (long term recommendation; start early)
- Compile existing Gulf oceanographic data
- Deep data communications network study
- Current models performance comparison



Major Campaign Solicitations and Selections

Goal: 2019



Campaign Observational Scheme

Mobile Assets



Drifters



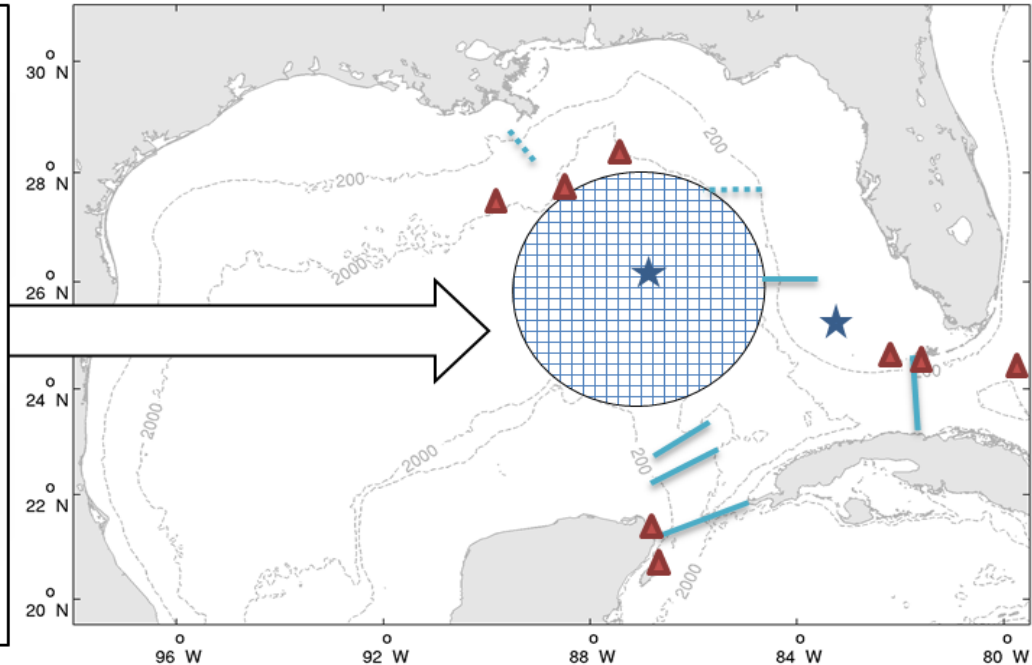
Satellites








Profiling Floats



Glider Fleet



Fixed Assets

 Bottom-mounted current & pressure measurements	 HF Radar	 Mooring Arrays
	 Real-time Single Moorings	 Optional Mooring Arrays



Features of Campaign Solicitation (Observations)

- Support continued moorings, HF Radar operations, and science collaborations with Mexican colleagues
- Deep Mooring Central-East Gulf
- Install linear mooring arrays on US shelf
- Drifters when LCS is active
- Vertical profilers (additional 20) in LCS active area
- Gliders (~20)
- Flesh out network of pressure and current-measuring sensors (60km spacing)



Features of Campaign Solicitation (Other)

- Analyses, Data Assimilation and Numerical Modeling
- Technology
 - Improve robustness all along
 - Glider standards/certification
 - HF Radar communications from Oil Rigs
 - Deep acoustic data network feasibility
- Data Management
- Collaboration
- Management



Metrics of Success

Generally: improve understanding of the processes controlling LC penetration and eddy shedding

Specifically:

- Improve skill in predicting the LCS structure: days to week
- Improve skill in predicting the extension of the LC and LCE propagation: 1 month
- Improve skill in predicting an eddy shedding event: 3 months



Collaboration

- U.S. Federal Agencies
- Mexico and Cuba
- Oil and Gas
- Leveraging of observational infrastructure to advance other areas of GoM science.



Next Steps

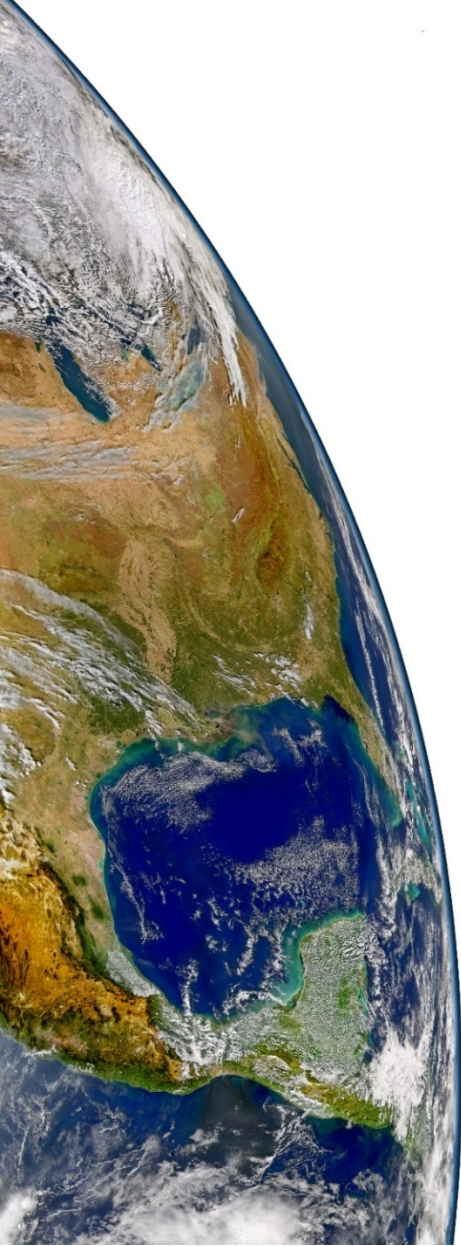
1. Near term: Address near-term recommendations by Issuing a Request for Applications (RFA) – details will be released on February 14.
2. Establish an advisory group to help develop future campaign solicitations
3. Large Campaign RFAs:
 - RFAs released in 2019, work begins in 2020.
 - Study Recommended: solicit and pick a lead person or entity for oversight/management
 - Study Recommended: RFA(s) to execute the campaign (observations, analyses, assimilation, modeling)
 - 5 years, with option to extend or re-solicit for 5 more



Report Disseminations

- GOMOSES Q&A at the GRP booth during the 3:30 break
- Oceans - Challenging the Loop - Town Hall Event on February 14, from 6-8pm
Oregon Ballroom, Rm 201





Contact Information

Study Director

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Gulf Research Program Grants

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Important Links

Report Link: www.nas.edu/loopcurrentreport

Email updates: <http://www.nas.edu/gulf/enews>



- **Conformación de Sociedad Civil**
 - Ampliar la cobertura regional y nacional
 - Brindar acceso y flexibilidad financiera
 - Promover mayor colaboración internacional
 - Facilitar acceso a recursos (nal, internal)
 - Cuota de participación anual por institución

- **Fecha de la próxima reunión de CIIMAR-GOMC.**
 - Finales de Abril en Matamoros, Tamaulipas
 - Firma convenio conformación de la SC y
 - Taller México EUA, “Los ecosistemas costeros y marinos de la región noroeste del Golfo de México”

- **Taller arranque Red Mexicana de Radares de Alta frecuencia**
 - Primer semana Mayo, UJAT, Villahermosa Tabasco