

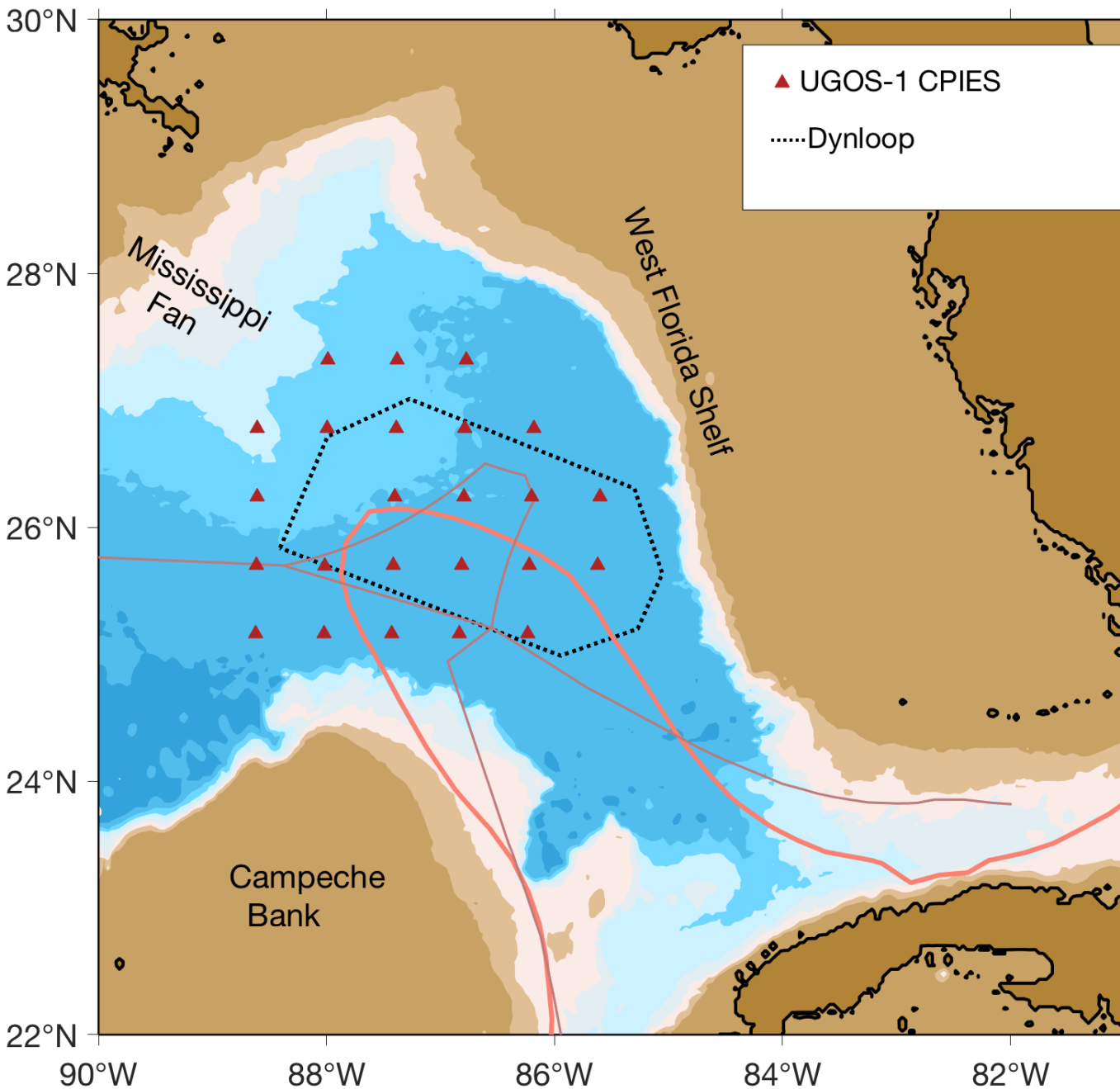
Understanding Gulf Ocean Systems, topic 2

Pressure and Current Meters

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Goals:

- increase the understanding of LC separation process
- inform LC forecasting efforts

Design:

- lateral spacing resolves the mesoscale
- extended coverage
 - southward to capture LC as it moves off Campeche Bank
 - northwestward to observe interaction of the LC with Mississippi Fan

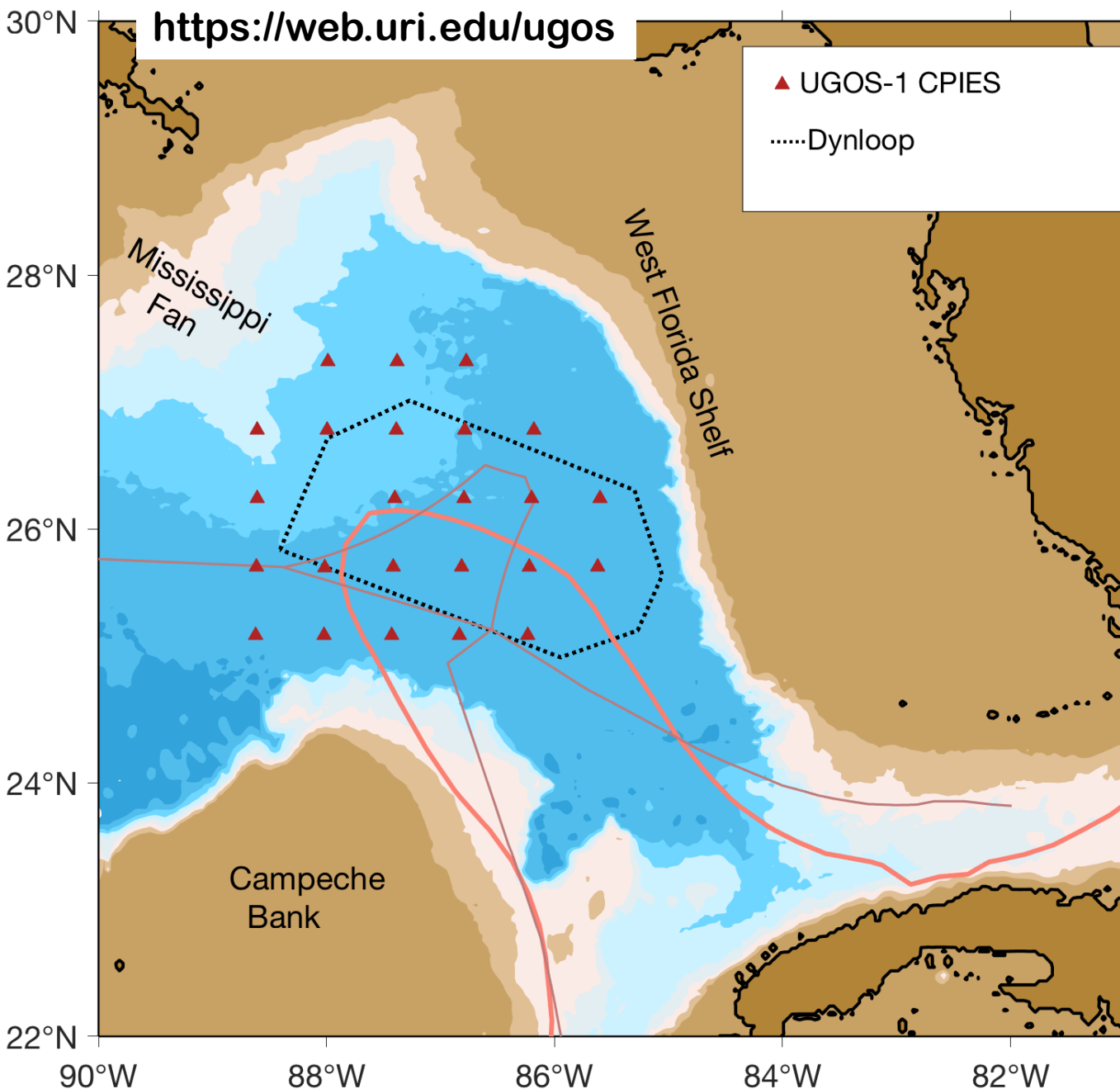
Outstanding Questions

- What are the trigger mechanisms that lead to separation?
 - Pre-existing eddies? Inflow perturbations?
- What is the influence of topography on separation?
 - Mississippi Fan, Campeche Bank, W. Florida slope
- What are the pathways and ultimate fate of deep energy?
 - TRWs to Sigsbee Escarpment, “invisible” strong currents
- Why do state-of-the-art free models struggle to reproduce the magnitude of deep currents?
 - see Steve Morey’s poster, remote influence of deep eddies

Outstanding Questions

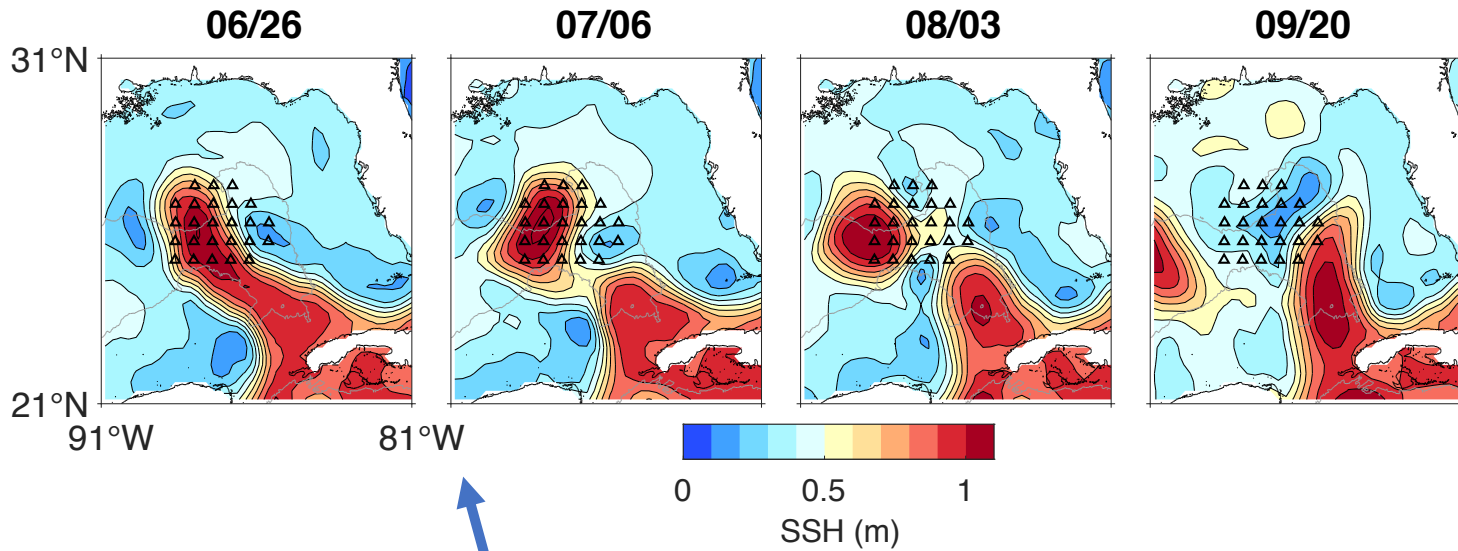
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Need deep current observations to answer any of these questions.

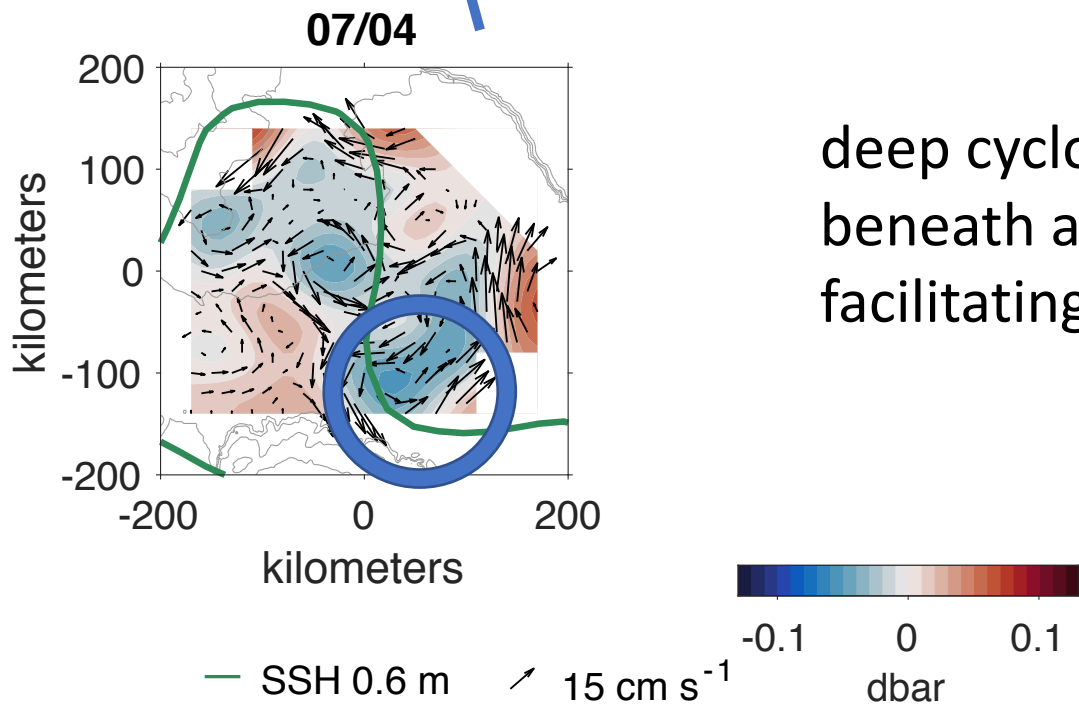


Milestones:

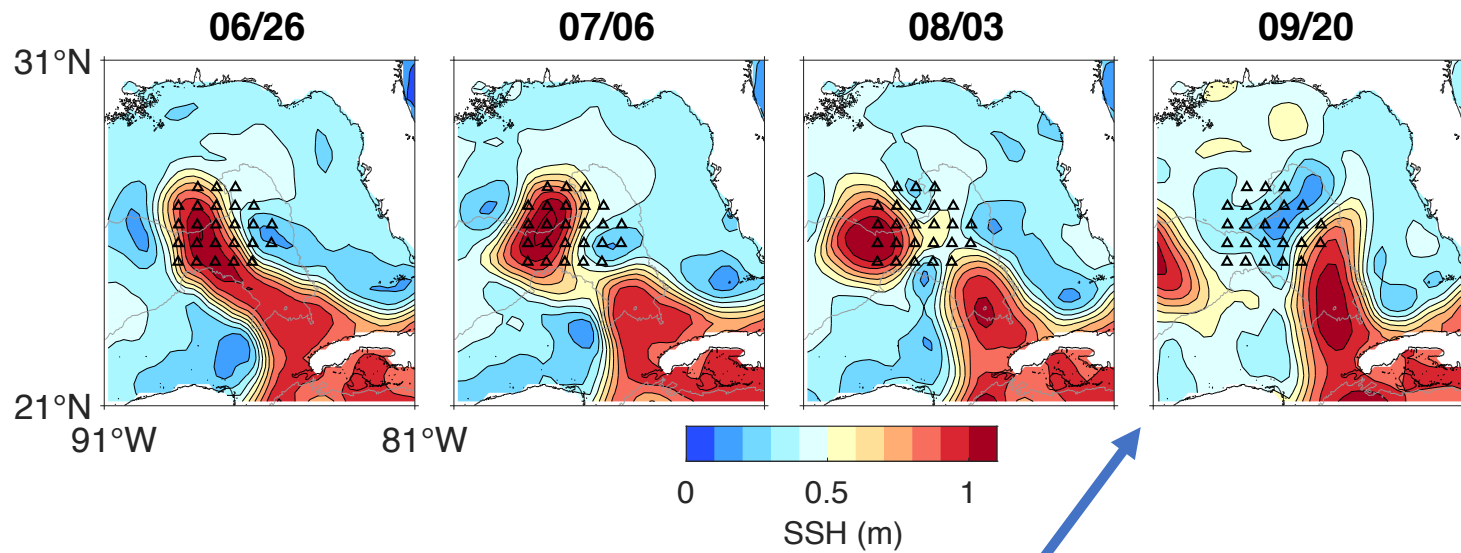
- June 2019
 - 24 CPIES deployed
 - 12 profiling floats deployed
 - R/V Pelican captain and crew recovered 'Stones' mooring
 - 30 deep CTD casts
- September 2019
 - Data retrieved via acoustic telemetry from 24 CPIES
 - 12 profiling floats deployed
 - 99 'Ocean of Things' drifters deployed.
 - 30 deep CTD casts.



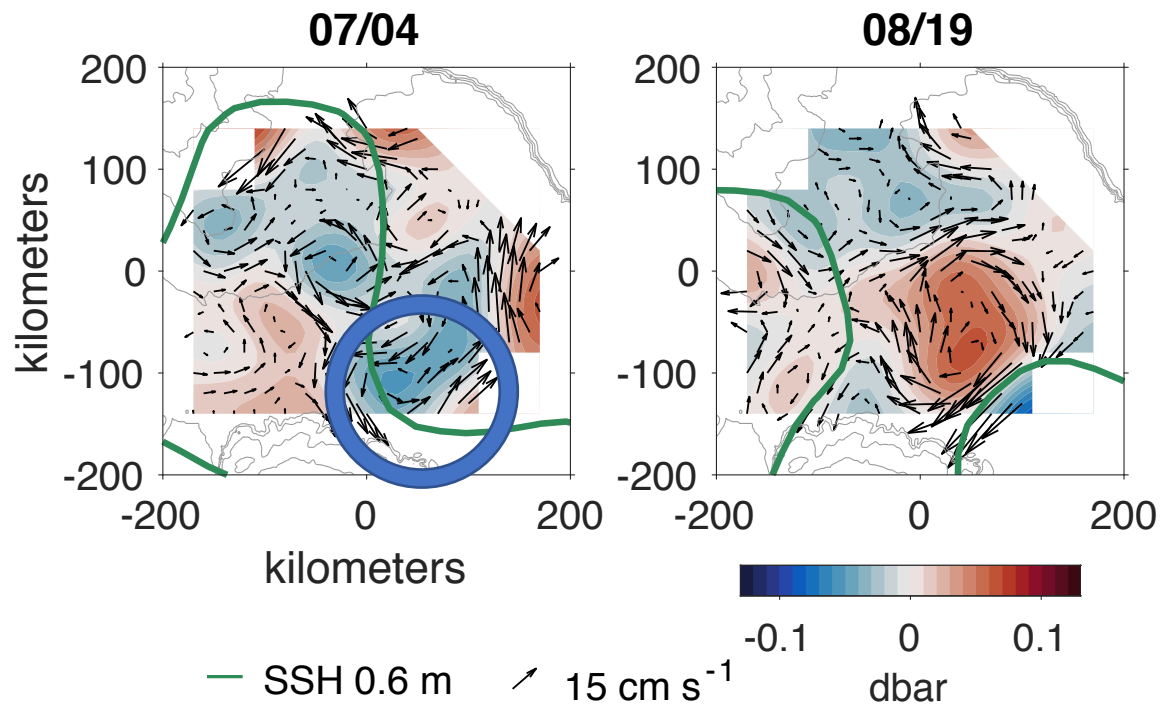
- High quality data set
- Loop Current eddy formed within a few weeks of deployment.



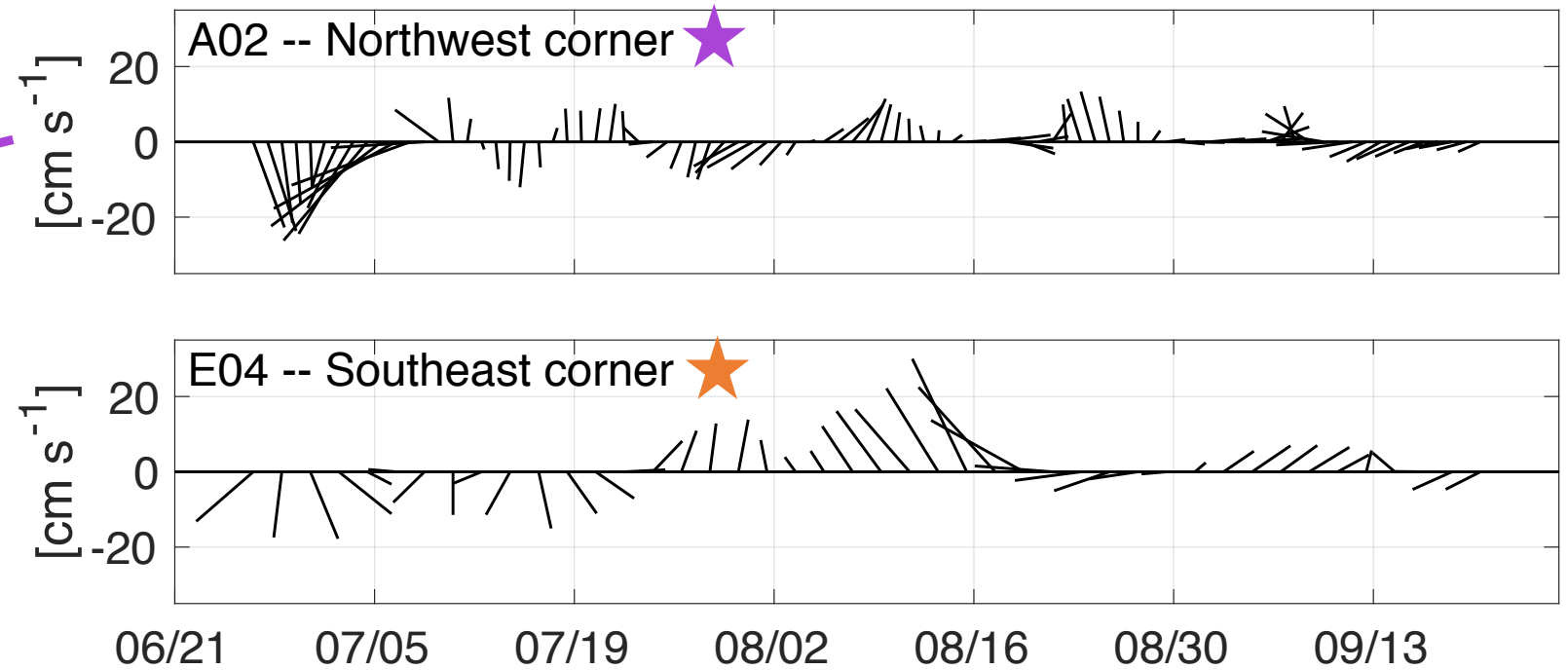
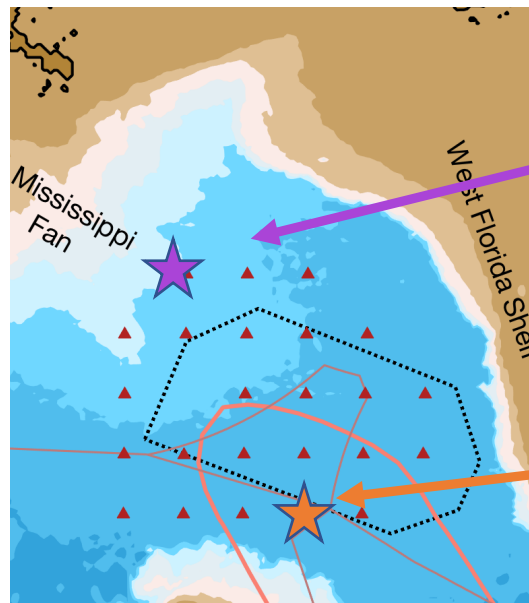
deep cyclone (C) intensifying beneath a LC trough and facilitating the eddy pinch-off



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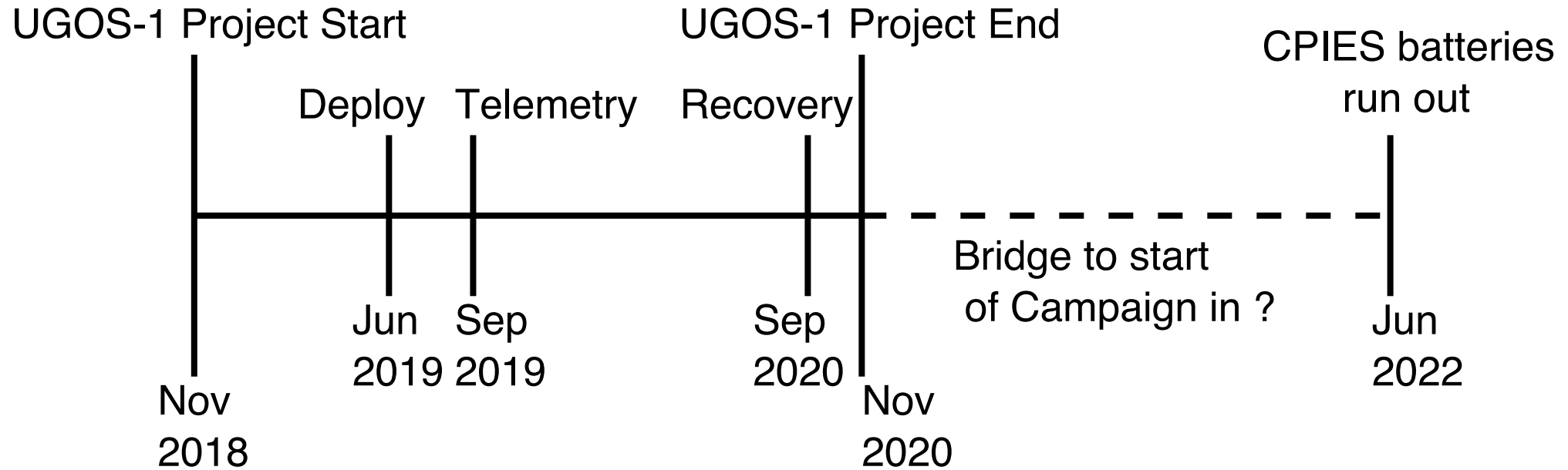
as the LC advances northward, a deep anticyclone develops in response to thermocline squashing.



Time scales of variability differ along the LC path.

At both sites, deep current speeds in excess of 30 cm s^{-1} are observed.

Next Steps:



Recovery planned for September 2020. Array could be extended to June 2022

Improved understanding and predictability requires:

- Network of upper/deep measurements at mesoscale resolution
- Innovative solutions to near-real time data delivery of deep obs.

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