**Goal:** Implement a capability to provide extended range forecast (60 days) in the Gulf of Mexico and the uncertainty about that forecast in an operational environment.

**Purpose:** Loop Current Eddy shedding prediction, environmental inputs for safety/risk mitigation, rapid response to events, long term optimal planning for at-sea operations.

### Purpose:
- Loop Current Eddy shedding prediction, environmental inputs for safety/risk verification from real-time mesoscale altimetry from CCAR, 2013 analysis, 2-month forecast (June 16), corresponding each ensemble member.
- Right panels are for April 21, forecast variance of SSH calculated from 32 perturbed SSH (17 cm contour) for the analysis on March 10, 2013, Current eddy separation.
- Left panel from top to bottom: Risk of Occurrence of Strong Currents, Risk of Combined Error in the Forecast.

- Demonstration of 60-day forecast skill of the Loop Current eddy separation. Left panel from top to bottom: SSH (17 cm contour) for the analysis on March 10, 2013, the corresponding 1-week forecasts. The black lines are the 17 cm SSH contour for each of the 32 ensemble members. The red, green, and grey dashed contours are the control run, ensemble mean, and most likely mode estimate, respectively.

### Probability Maps of Surface Speed Exceeding 1.5 kt Threshold
- Risk: % of 32 ensemble members that exceed the threshold (1.5 kts in this case).

### Rank Histograms for all observations during July, 2016
- Rank-Histograms are used to assess the spread/uncertainty of ensemble forecasts. A flat distribution indicates the truth is indistinguishable from any ensemble member. It is a necessary but not sufficient for accurate ensemble forecasts. Peaks on left are for in situ observations, panels on right for "synthetic" observations generated from statistical relationships between SSHAnomaly and SST.

### Weekly SSH Analyses (ensemble spread with 17 cm SSH contour members)
- Weekly analysis ensemble spread (background color) of the SSH in cm starting 19 April 2015 analysis through 27 Sept. 2015. The black lines are the 17 cm SSH contour for each of the 32 ensemble members. The red, green, and grey dashed contours are the control run, ensemble mean, and most likely mode estimate, respectively. The Loop Current Eddy shedding events are indicated.

### Weekly SSH Analysis/Forecast starting 05/17/15
- Mean SSH ensemble analyses and 1-week forecast (out to 4 weeks). Following the diagonal from the upper left hand corner to the bottom right hand corner matches the best analysis for that day with the 1, 2, 3, and 4 week forecast, respectively.

### Weekly SSH Analysis/Forecast starting 06/21/15
- Mean SSH ensemble analyses and 2-month forecast (out to 4 weeks). Following the diagonal from the upper left hand corner to the bottom right hand corner matches the best analysis for that day with the 1, 2, 3, and 4 week forecast, respectively.

### Temperature Anomaly Correlations
- Anomaly correlation of surface, 100 m, and 250 m salinity with the corresponding best analysis (truth) for 2010, 2011 and 2013. The black curves correspond to the anomaly correlation computed around the loop current region (88.8796, 22.2619), using 42, 35, 47 60-day forecasts for 2010, 2011 and 2013 respectively. The red curves show the anomaly correlation assuming a forecast of no change (persistence). The anomaly correlation is calculated based on the long-term analysis mean. An anomaly correlation of 0.6 or greater (indicated by the location of the black arrow) is considered to indicate forecast skill.