DETERMINING WHAT TIME STEP TO USE IN THE GULF OF MEXICO LOOP CURRENT ANALYSIS

Jessica Stevens

BACKGROUND INFORMATION

The Gulf of Mexico has what's called a Loop Current.

Our interest is in the behavior of the Loop Current and it's implications

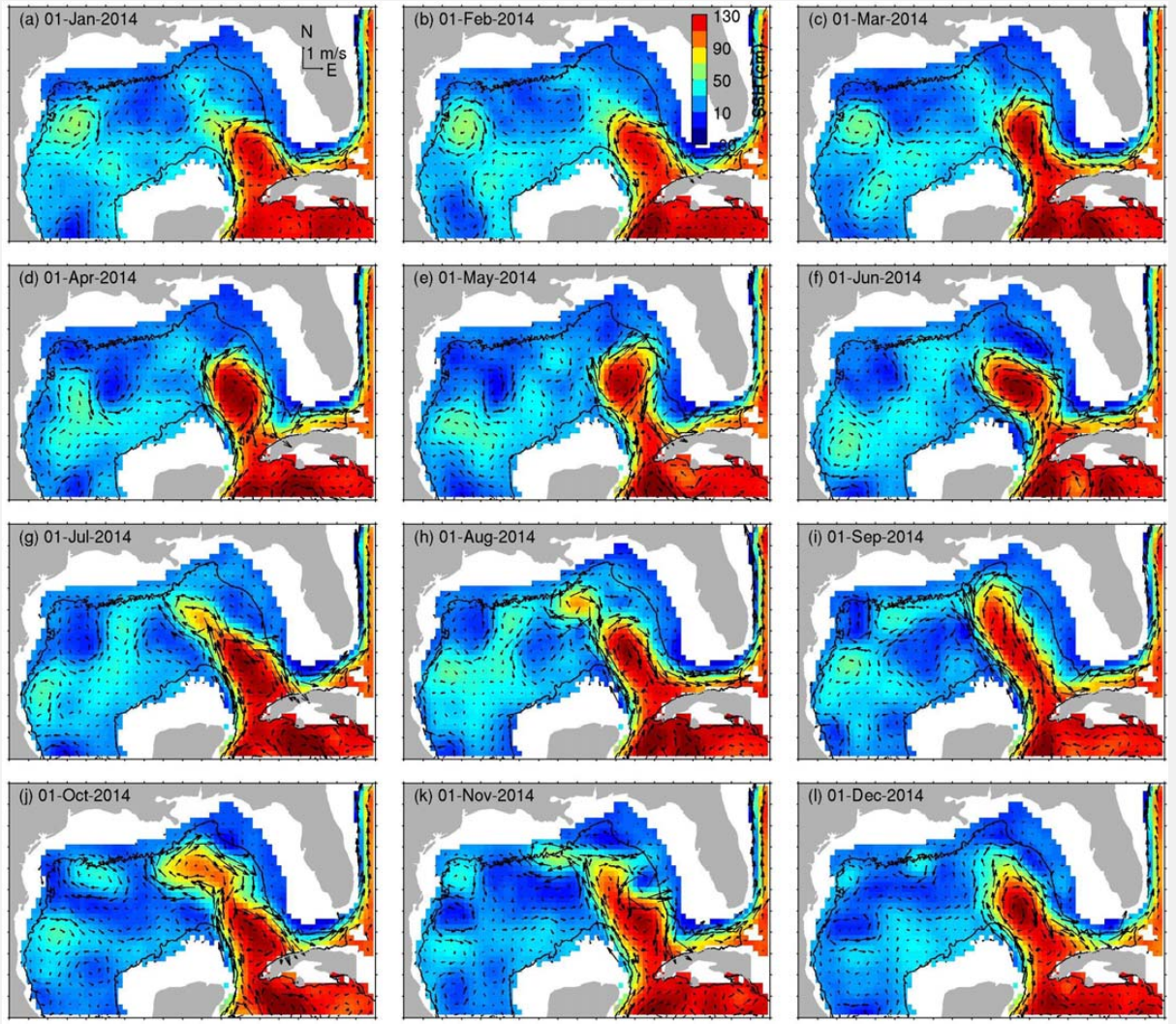


Figure 10. Snapshots of the sea surface height and surface geostrophic velocity vectors in the Gulf of Mexico on the first day of each month for 2014. The black line is the 1,000 m isobath.

Image from Weisberg et al

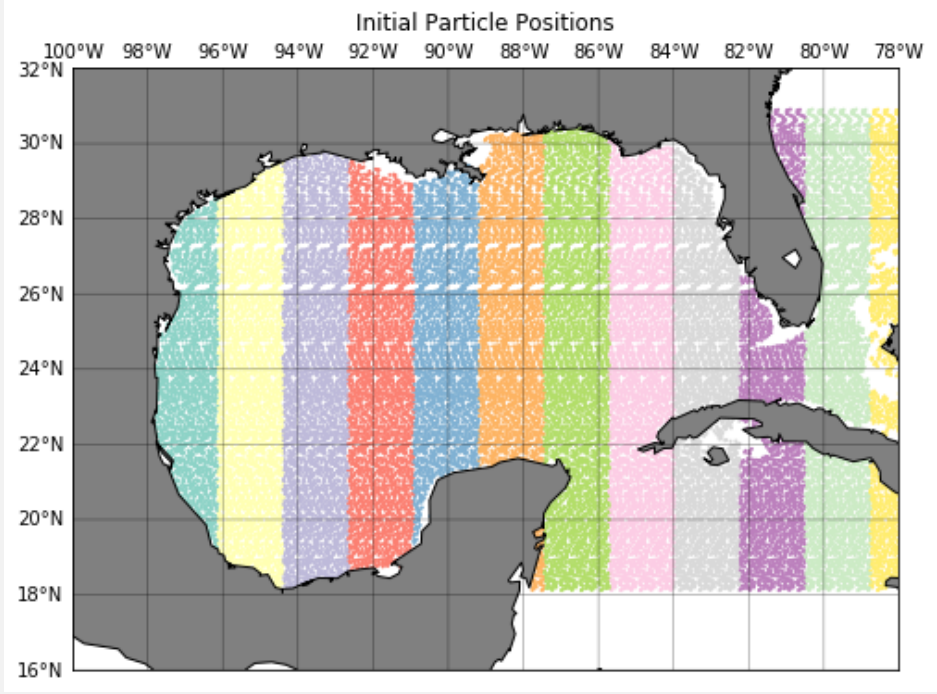
METHOD

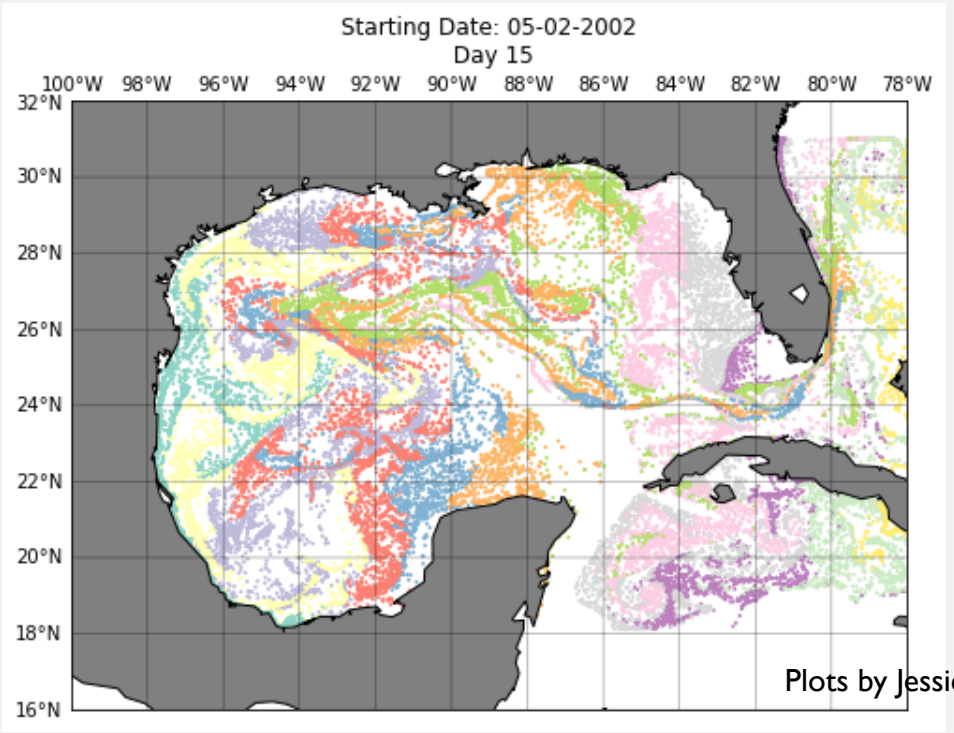
Using the Lagrangian method

1,838,782 particles in the Gulf of Mexico

Different time intervals

(i.e. 0, 5, 10, 15 days, etc)





Plots by Jessica Stevens

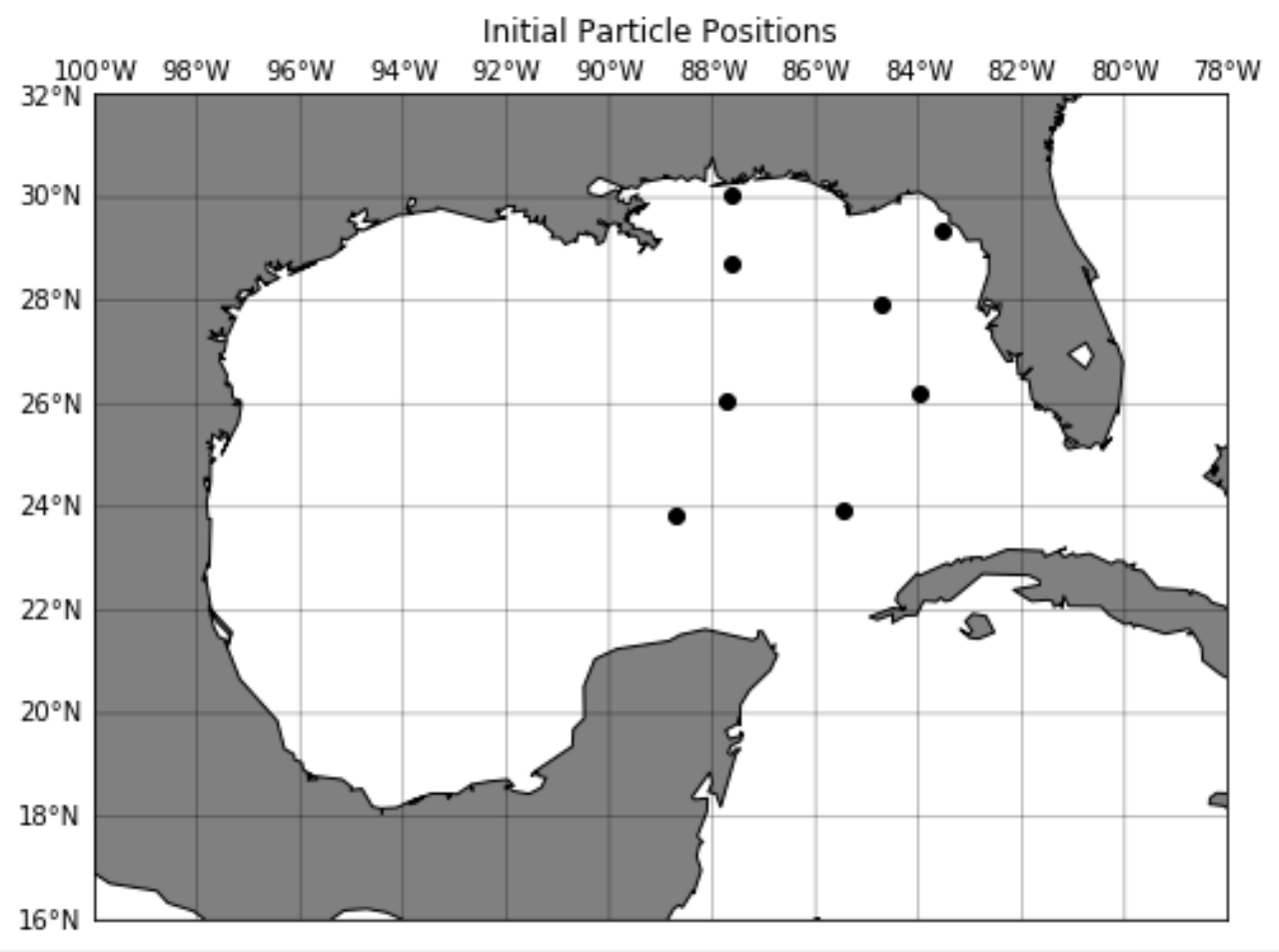
METHODS

Indexing in code to find correct coordinates

Analyzed the movement of aforementioned coordinates

Picked a date based on loop current state

Start date: February 1, 2002

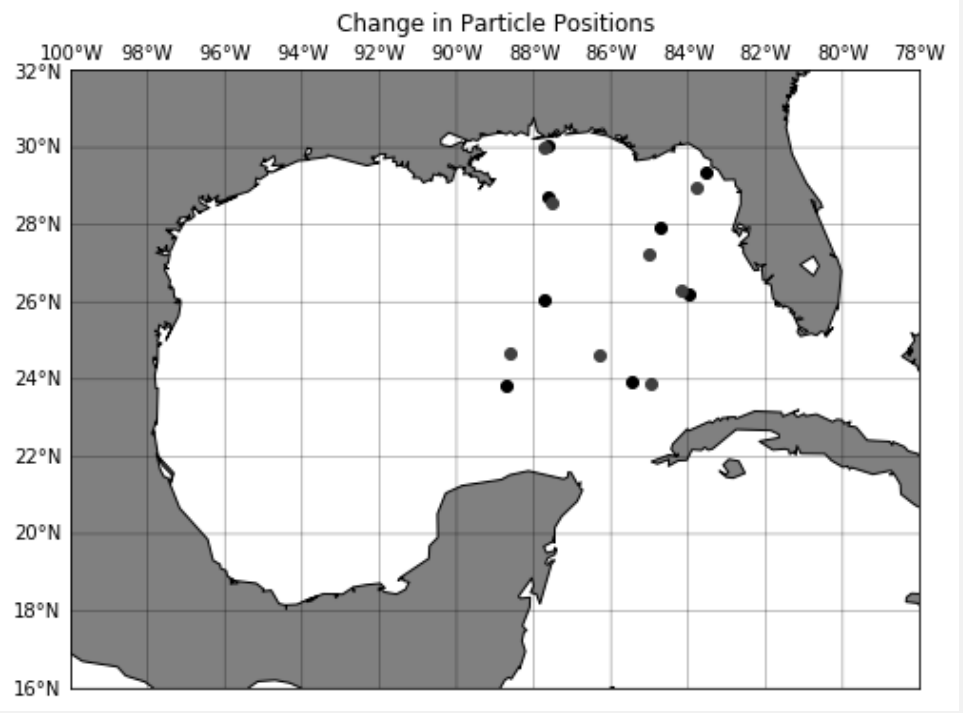


RESULTS

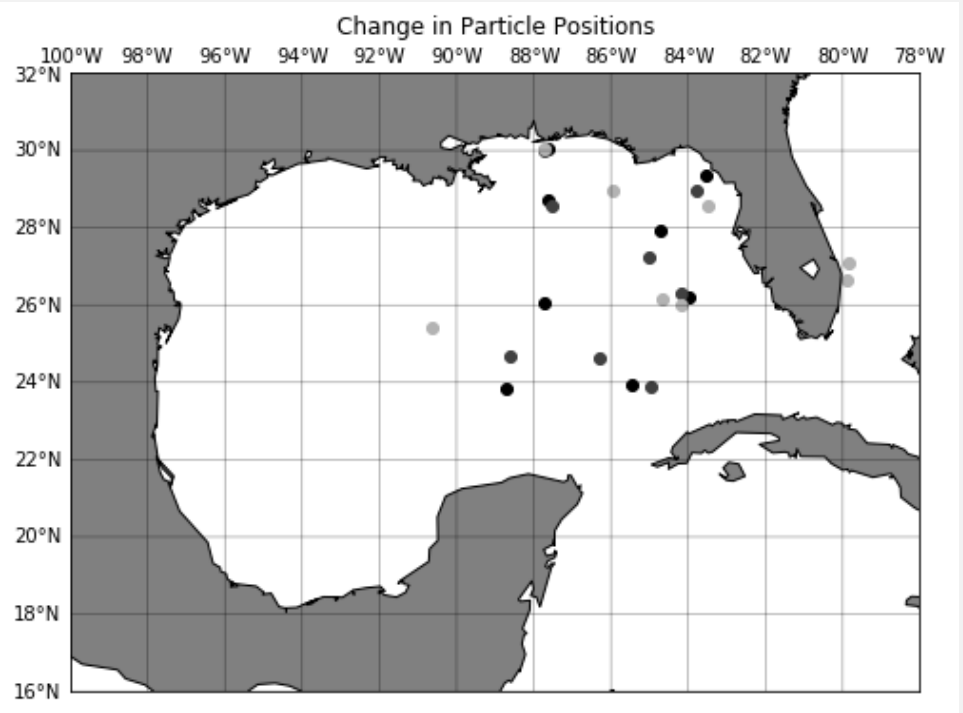
Figure a: shows day 5 with an integer step of 0.1

Figure b: shows day 15 with an integer step of 0,1

a)



b)

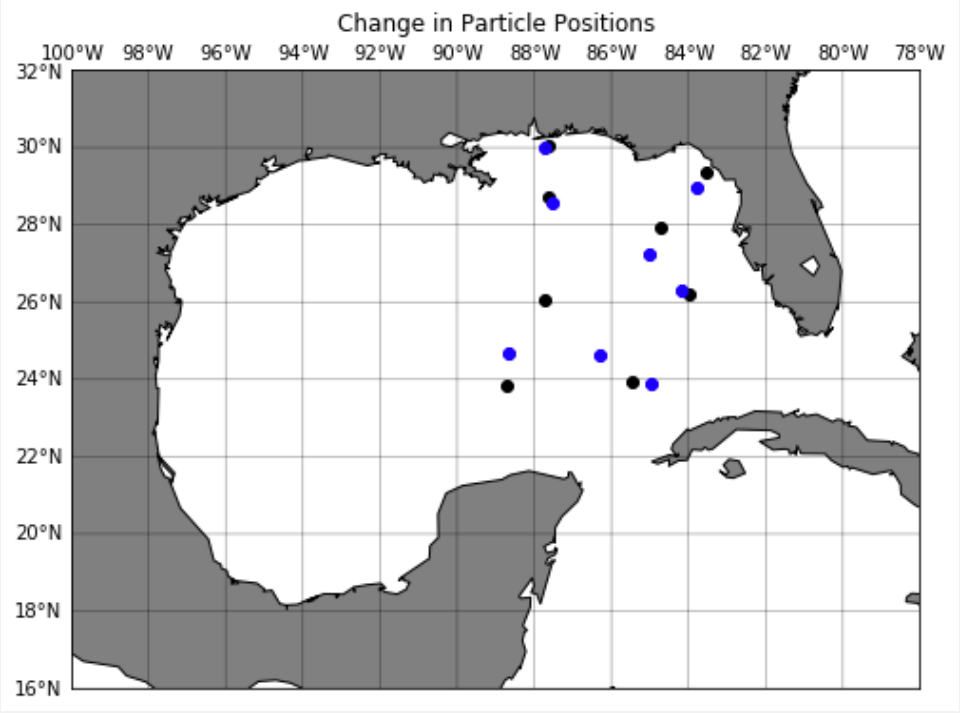


RESULTS

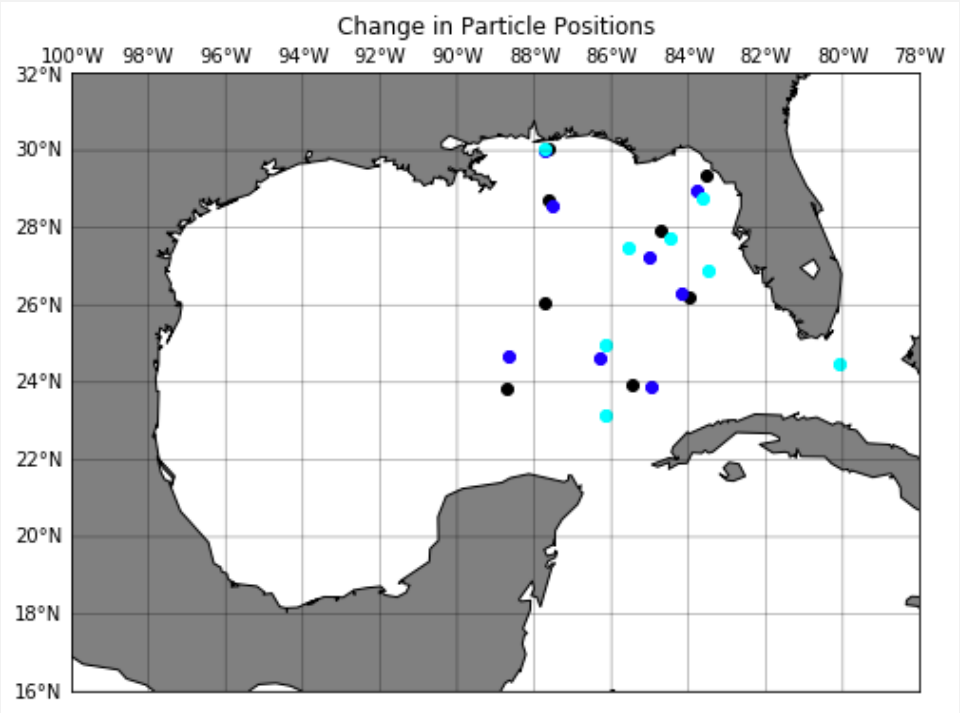
Figure c: shows day 5 with an integer step of 0.01

Figure d: shows day 15 with an integer step of 0.01

c)



d)

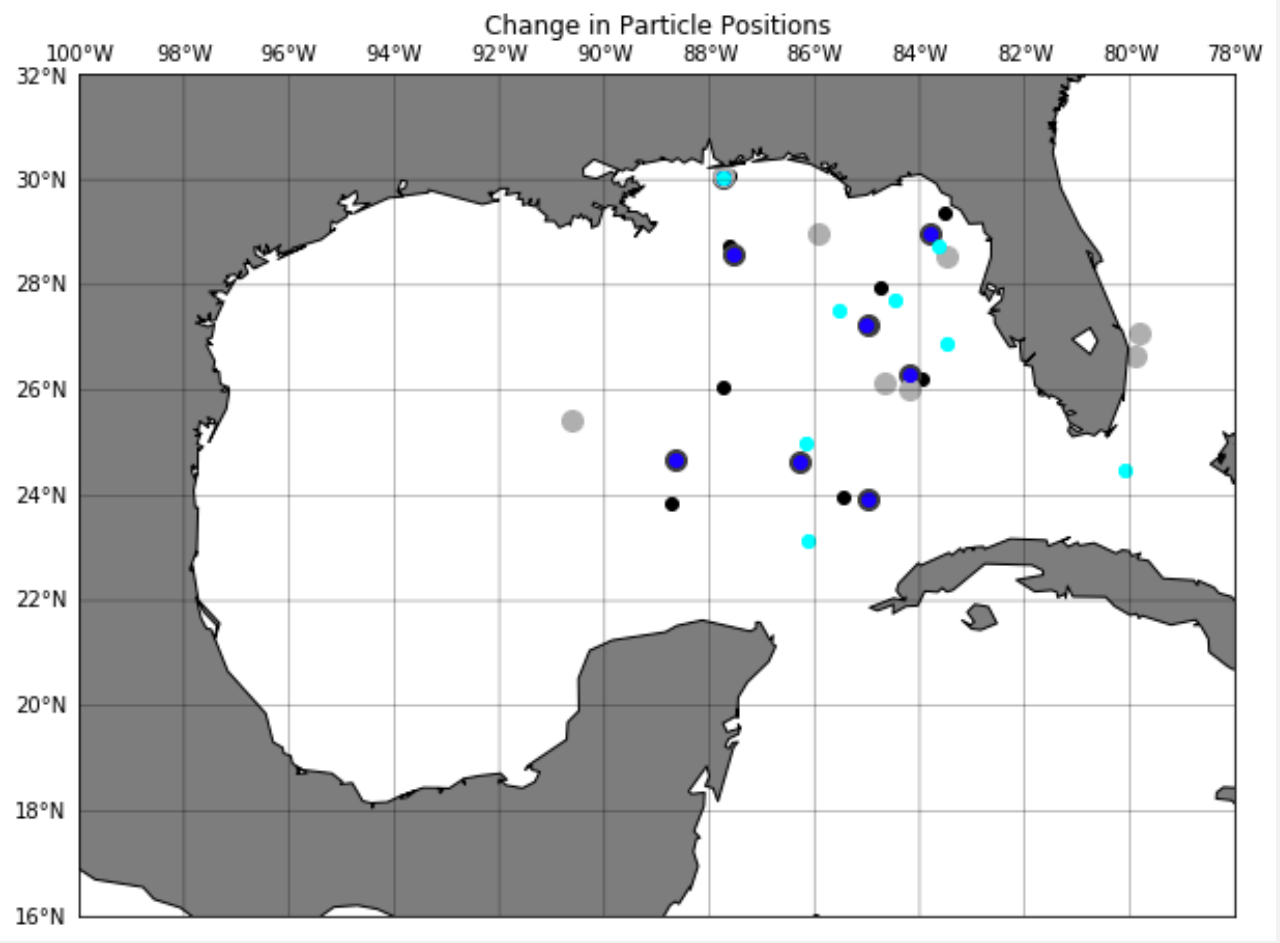


ANALYSIS

Day 5 of either integer step gives us very similar points.

Day 15 shows a drastic change in position.

Conclusion: I need more data to decide which integer step to use.



Black dot:	start position
Dark gray:	0.1 day 5
Light gray:	0.1 day 15
Dark blue:	0.01 day 5
Cyan:	0.01 day 15