Outline

• Introduction to HF radar
• Forward Trajectories of Particles
• Reverse Trajectories of Particles
• Conclusion
High Frequency Radar

CODAR Tx/Rx Antenna
Lewes Beach, DE USA
Surface Currents from SeaSonde HF Radar

Radial Map of Currents

Total Map of Currents
Study Area
Forward Trajectory of Particles
Rowg/hfrprogs

Programs for analysis and visualization of oceanographic HF radar data

Community toolbox used to process and manage HFR surface current data
Nor’easter December 2023

Wave Height (m) from NDBC Buoys
Nor’easter December 2023
NDBC Buoy 44025 Broke Free on December 18

Station 44025 (LLNR 830) - LONG ISLAND - 30 NM South of Islip, NY

- Owned and maintained by National Data Buoy Center
- 3-meter foam buoy
- SCODP payload
- 40.251 N 73.164 W (40°15'3"N 73°10'24"W)

- Site elevation: sea level
- Air temp height: 3.7 m above site elevation
- Anemometer height: 4.1 m above site elevation
- Barometer elevation: 2.7 m above mean sea level
- Sea temp depth: 1.5 m below water line
- Water depth: 36.3 m
- Watch circle radius: 83 yards

The buoy from station 44025 has gone adrift as of 1300z, 12/18/23. To view the latest position from the buoy, click [here].

Right whales are active off NY from November to April. Speed restrictions of 10 knots apply to vessels 65 feet or greater in specific areas along the mid-Atlantic coast. To learn more about right whales and rules protecting them, go to: http://www.nmfs.noaa.gov/pr/shiostrike

Latest NWS Marine Forecast 1 and Latest NWS Marine Forecast 2

Important Notice to Mariners

Meteorological Observations from Nearby Stations and Ships

22 km
After 18 days
Reverse Trajectories of Particles
New Jersey Offshore Wind Lease Areas

<table>
<thead>
<tr>
<th>State</th>
<th>OSW Goal (MW)</th>
<th>Target Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Massachusetts</td>
<td>5,600</td>
<td>2027</td>
</tr>
<tr>
<td>Rhode Island</td>
<td>430</td>
<td>2025</td>
</tr>
<tr>
<td>Connecticut</td>
<td>2,000</td>
<td>2030</td>
</tr>
<tr>
<td>New York</td>
<td>9,000</td>
<td>2035</td>
</tr>
<tr>
<td>New Jersey</td>
<td>11,000</td>
<td>2040</td>
</tr>
<tr>
<td>Maryland</td>
<td>8,500</td>
<td>2035</td>
</tr>
<tr>
<td>Virginia</td>
<td>5,200</td>
<td>2034</td>
</tr>
<tr>
<td>North Carolina</td>
<td>8,000</td>
<td>2040</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>49,730</strong></td>
<td></td>
</tr>
</tbody>
</table>

Federal Goal: 30,000 MW by 2030

Assuming 10 MW turbines ~5,000 turbines
Environmental DNA

- DNA is shed as cellular or extracellular material into the surrounding water.
- Collect & filter water from aquatic systems.
- Extract DNA from filters.
Reverse Drift

Mummichog
Reverse Drift
Distance from Origin for Each Drifter
2021-12-08 08:00:00 to 2021-12-03 08:00:00

Average slope: 0.27 km/hour
Doppio – a ROMS (v3.6)-based circulation model for the Mid-Atlantic Bight and Gulf of Maine:

Total number of observations per month for 2007–2017

- NERACOOS moorings
- NEFSC ECOMON CTD
- UKMO Argo
- UKMO CTD/XCTD/TESAC
- UKMO XBT
- IOOS glider DAC
- RU/MARACOOS gliders
- CODAR totals MARACOOS

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CODAR totals MARACOOS
Sentinel-3A
AltIka
CryoSat
Envisat
Jason-3
Jason-2
Jason-1
AMSR microwave SST
WSAT microwave SST
TRMM microwave SST
GOES geostationary IR SST
AVHRR IR SST
Reverse Drift at Bottom

Particle Depth Over the 5 day Reverse Drift
Surface + Bottom DOPPIO, and HFR
Distance from Origin for Each Drifter
2021-12-08 08:00:00 to 2021-12-03 08:00:00
Conclusions

• Provided introduction to HF radar
• Described the network in the Mid Atlantic and how its used for particle tracking
• Now we are expanding the use to estimate the source water of eDNA samples
Determining the Origin and Fate of Oceanic eDNA

Thanks

CWTM 2024
March 18-20, North Carolina