### Forecast System Configuration


**Operational model configuration:**
- **Domain:**
  - Central Long Island to mouth of Delaware Bay, out to approximately the 100-m isobath
  - 1 km horizontal resolution; 30 vertical s-levels
- **Forcing:**
  - Daily mean Hudson River flow from USGS Mohawk and Fort Edward gauges + persistence (for forecast) accessed via web using GNU wget
  - Boundary tides from ADCIRC
  - No boundary mean flow or pressure gradient at open boundaries
- **Output:**
  - Model runs daily to generate 48- to 60-hour forecast
  - Output graphics at [http://marine.rutgers.edu/~wilkin/latte/](http://marine.rutgers.edu/~wilkin/latte/)

### Forecast plume variability – equivalent freshwater distribution

**Equivalent freshwater depth**

\[
\int_{-h}^{h} \frac{S_o - S}{S_o} \, dz
\]

**Observations**

<table>
<thead>
<tr>
<th>OCM visible RGB and CODAR</th>
<th>09-Apr-2005 16:00 UT</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROMS salinity and velocity at 2m</td>
<td>09-Apr-2005</td>
</tr>
<tr>
<td>RGB Terra with Codar overlay</td>
<td>09/18/2005 3:30 P.M. GMT</td>
</tr>
</tbody>
</table>

**Model**

<table>
<thead>
<tr>
<th>OCM visible RGB and CODAR</th>
<th>09-Apr-2005 16:00 UT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface salinity and velocity</td>
<td>18-Apr-2005</td>
</tr>
</tbody>
</table>

### Observations vs. Model

- **OCM visible RGB and CODAR**
- **ROMS salinity and velocity at 2m**
- **RGB Terra with Codar overlay**
- **Surface salinity and velocity**

### Forecast dye trajectory: second injection

- **For high river discharge typical of the spring freshet, a set of idealized wind-forcing simulations shows how the plume responds to wind direction.**

  - **Westerly wind**
    - Directs plume toward Hudson Shelf Valley
  - **Easterly wind**
    - Arrests plume
  - **Southerly**
    - Directs plume north of Hudson Shelf Valley and toward Long Island
  - **Northerly**
    - Amplifies coastal current and drains freshwater bulge

### Plume response under idealized wind scenarios

- **No wind**
  - Freshwater bulge continues to grow

- **Wind not shown**

- **Two high discharge events at the end of March and beginning of April**

- **LaTTE: The Lagrangian Transport and Transformation Experiment**

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**Modeling the Hudson River Plume**

**John Wilkin, Gregg Foti and Byoung-Ju Choi**

**Ocean Modeling Group**

**Institute of Marine and Coastal Sciences, Rutgers University, New Brunswick, NJ**

**jwilkin@rutgers.edu**

**http://marine.rutgers.edu/~wilkin**