Ocean Navigator

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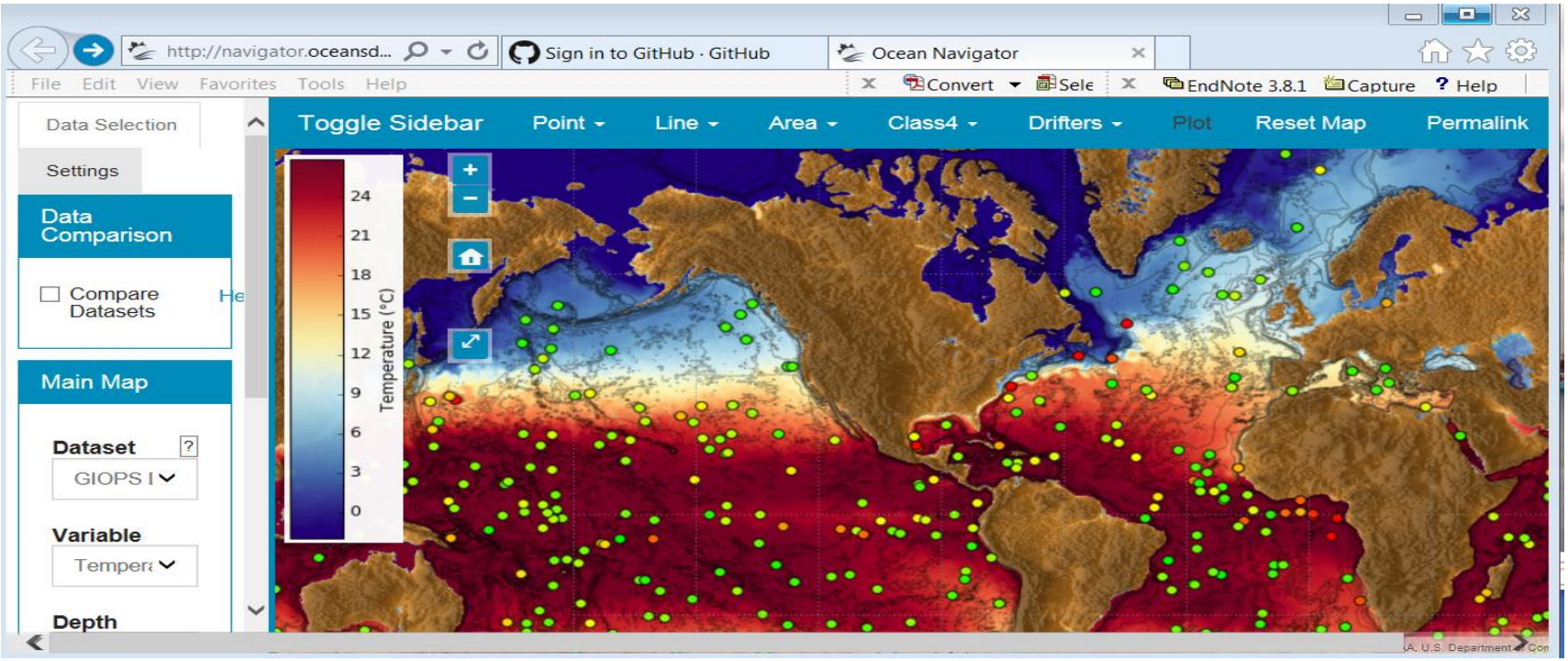
Presented by: Anh Tran on behalf of the Ocean Navigator team
Oceans Sciences Branch
ADMT20, Villefranche-sur-mer
Oct 13, 2019

Background
What is Ocean Navigator (ON)?

- ON is an interactive online map displaying scientific ocean data gathered from various models around the world. The application allows users to access, verify, extract information on different variables such as temperature and ocean currents products generated from Canadian Operational network of Coupled Environmental Prediction Systems (CONCEPTS).
- The ON application Programming Interface can also be used to create custom, value-added applications for various decision- making processes
- Funding was provided by Department of Fisheries and Oceans Canada, National Defence, Environment and Climate Change Canada, MEOPAR (Marine Environmental Observations Predictions and Response) and Memorial University
- We also collaborated with other partners such as Mercator Ocean and GODAE OceanView.

What is the Ocean Navigator?

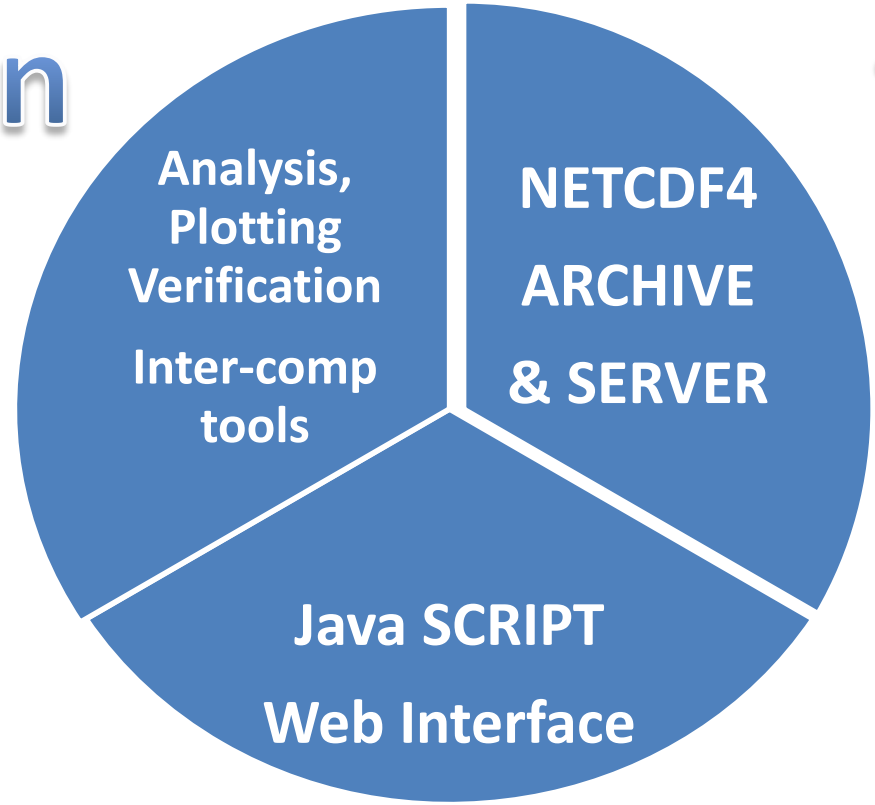


Built a visual interface to explore large directories of NETCDF files:

- No software installation
- Intuitive interface
- Hardware and software tuned for efficiency
- Open-source

ON Components

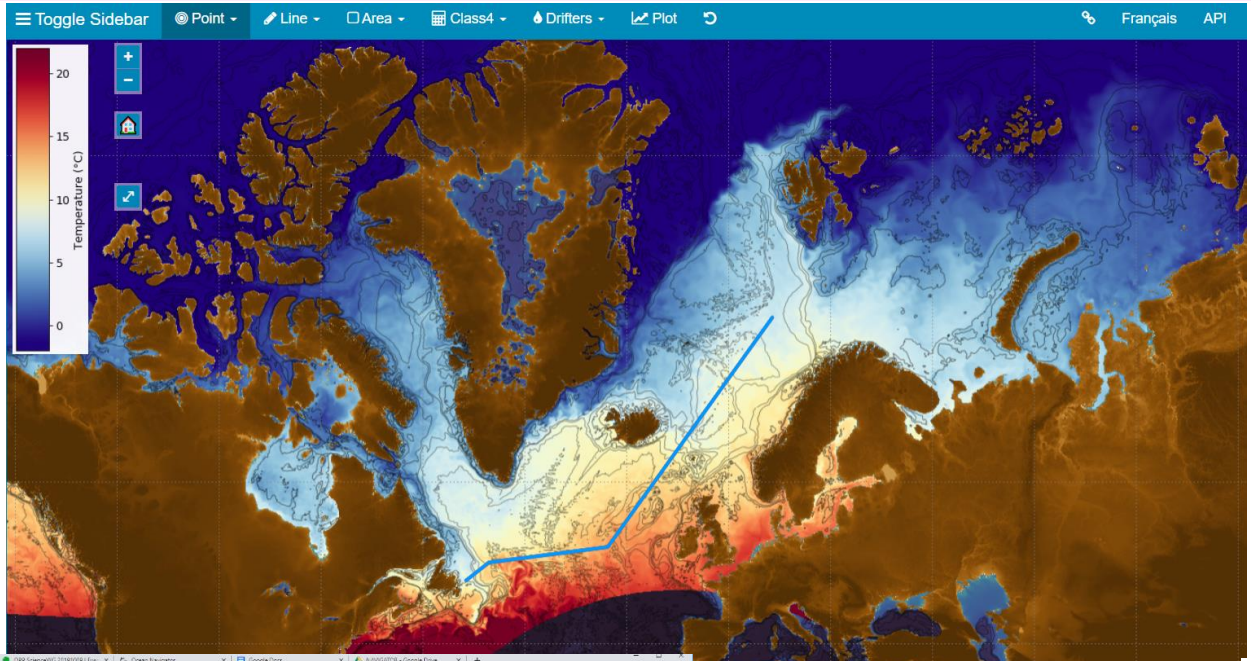
Python tools

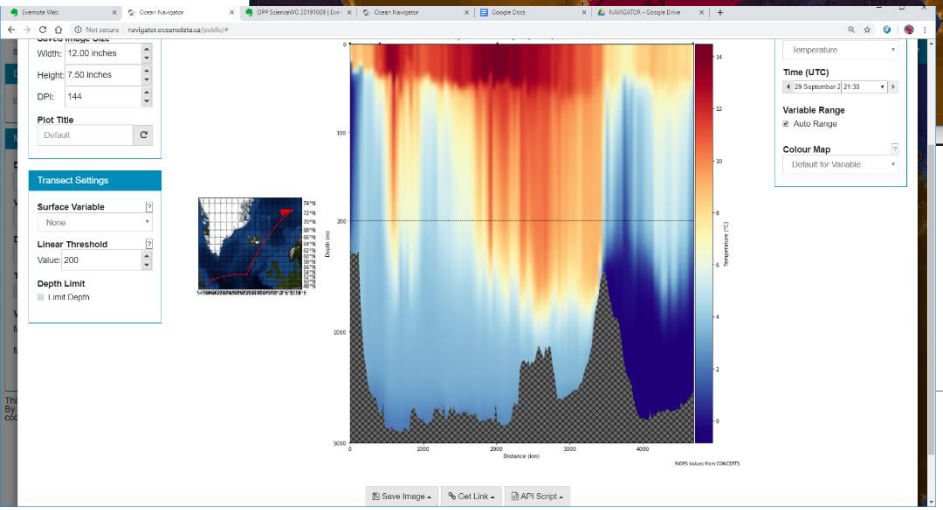


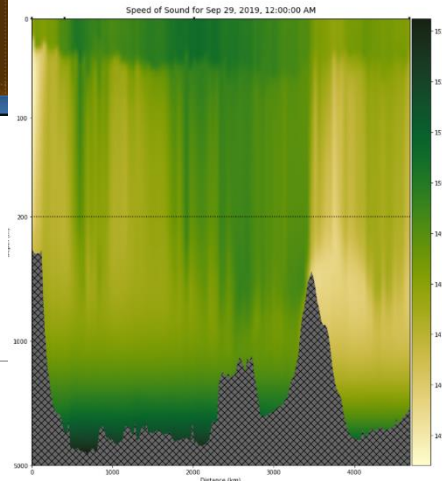
THREDDS
SQLite3

http://navigator.oceansdata.ca

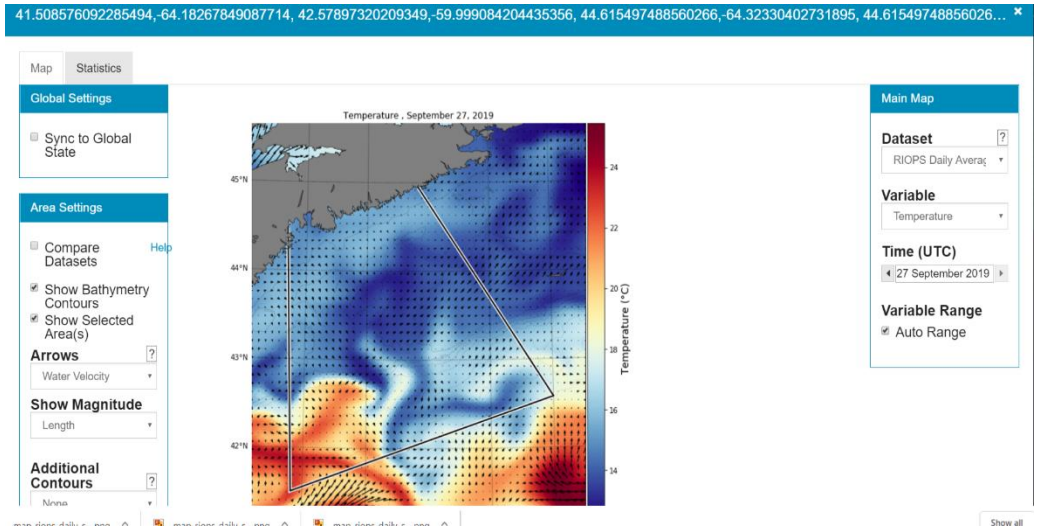
Ocean Navigator: Enabling webrowser to view/explore NETCDF Ocean Data

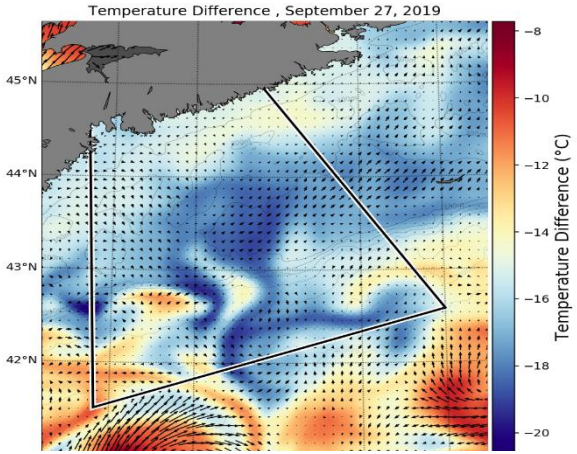


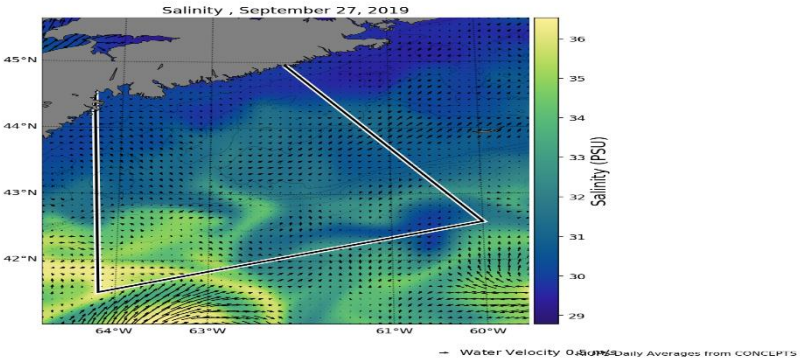


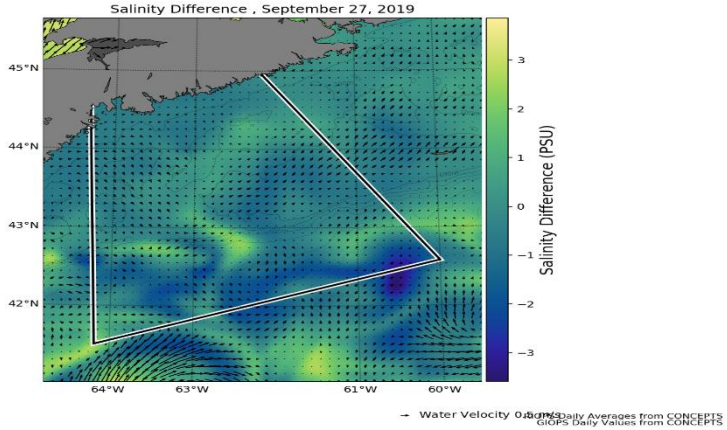


Glider application





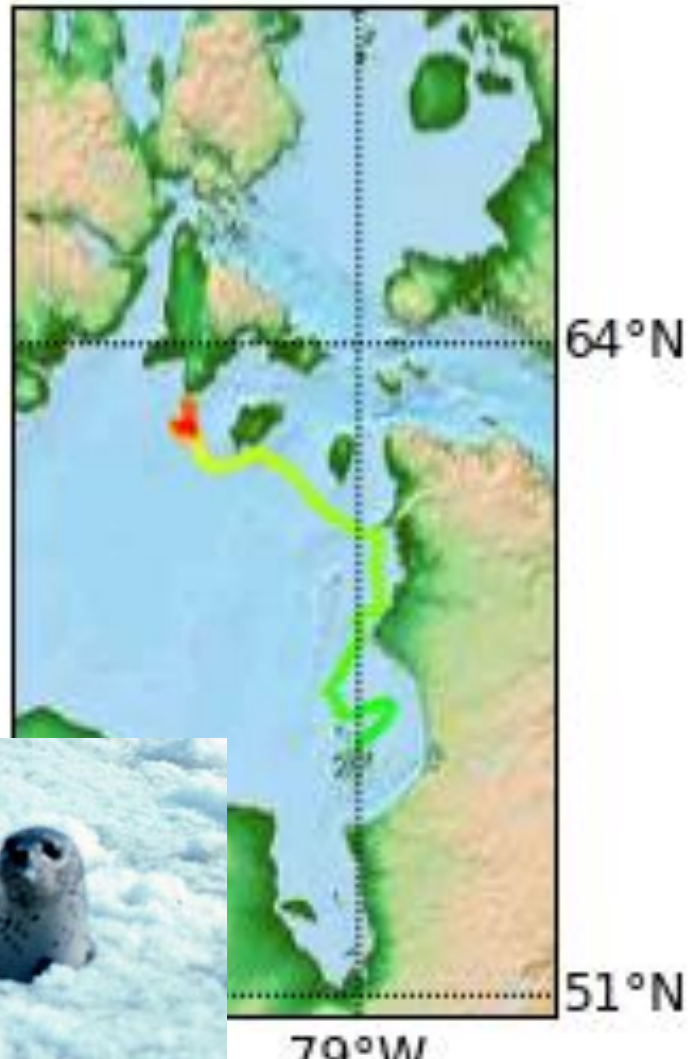


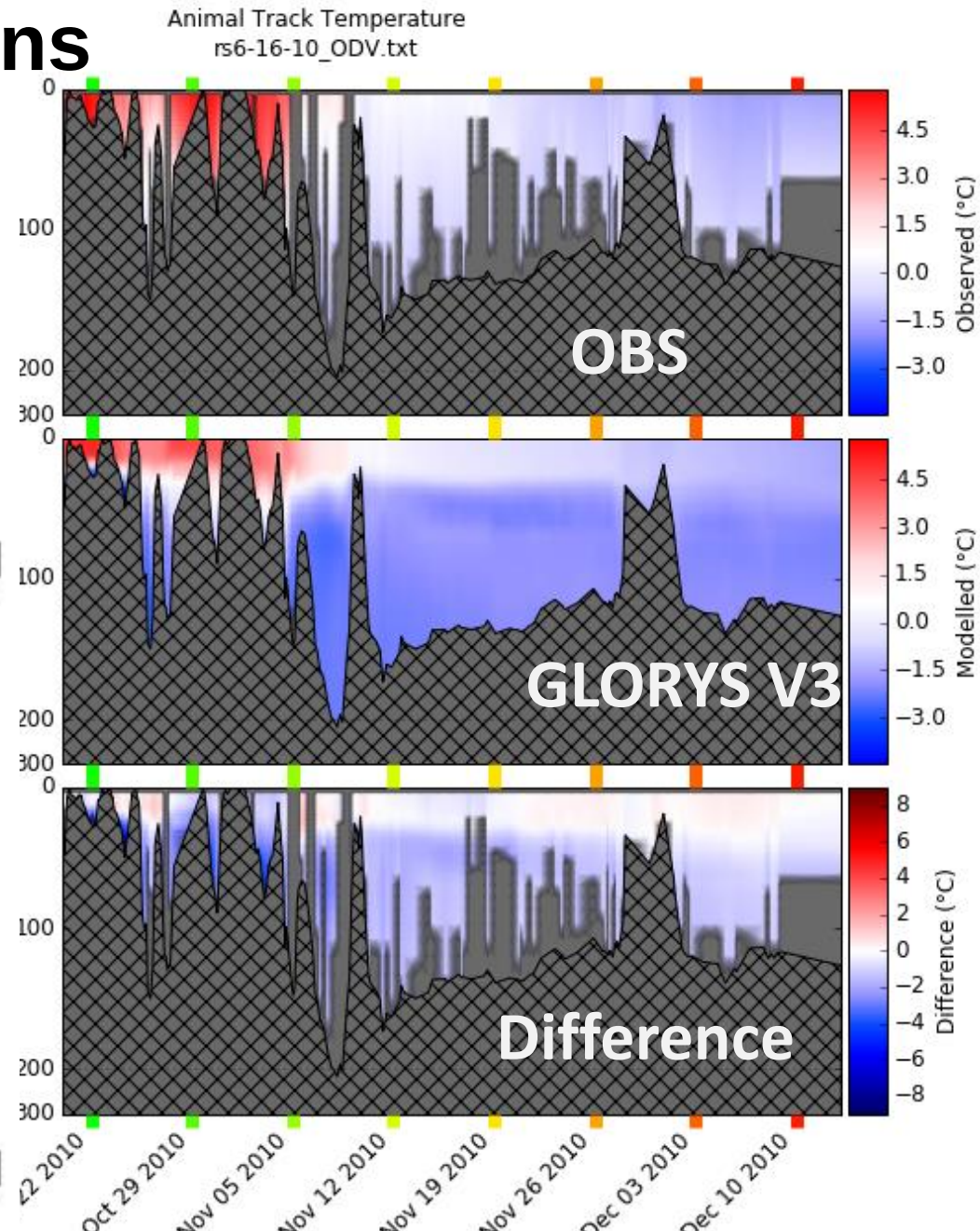


Canada

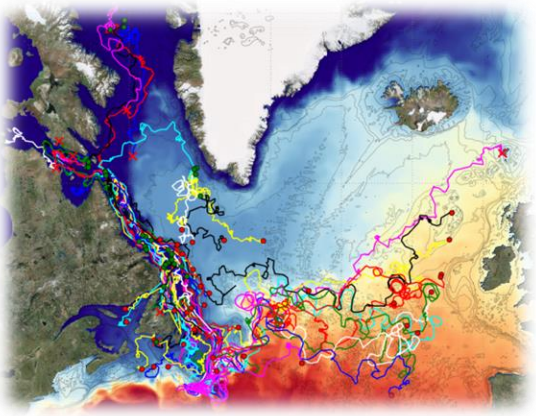
Verification against Ring Seal TD observations

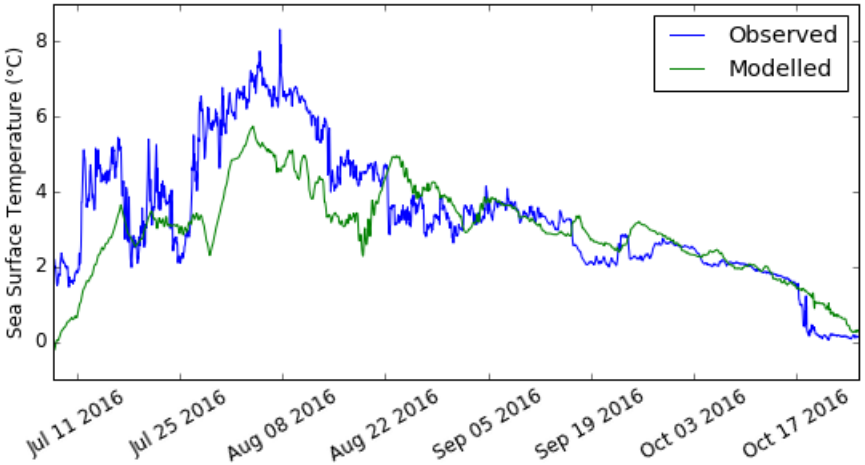
Data Courtesy Steve Ferguson





Comparison with Drogued drifters





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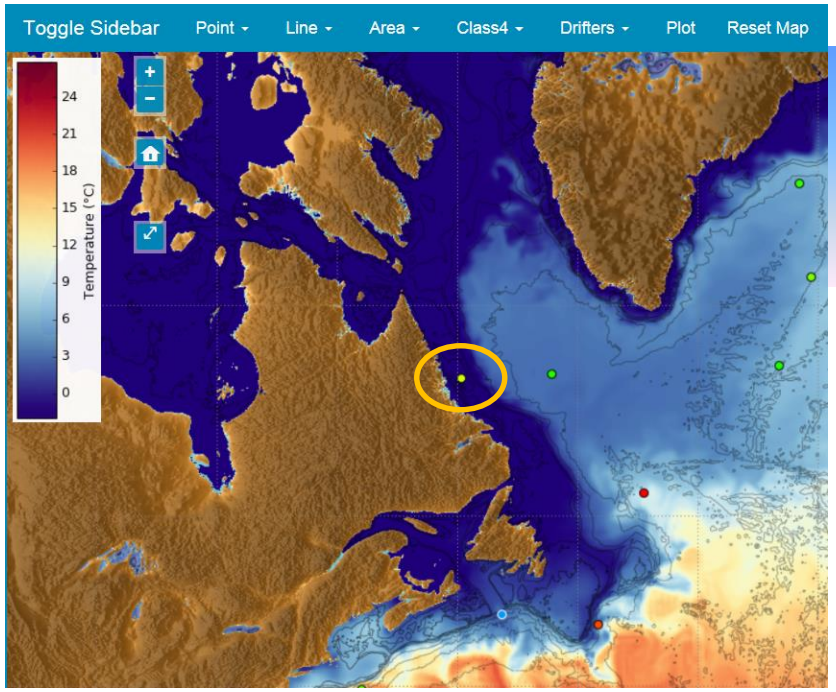
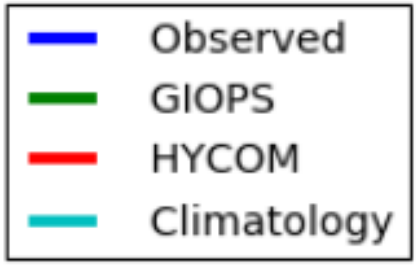
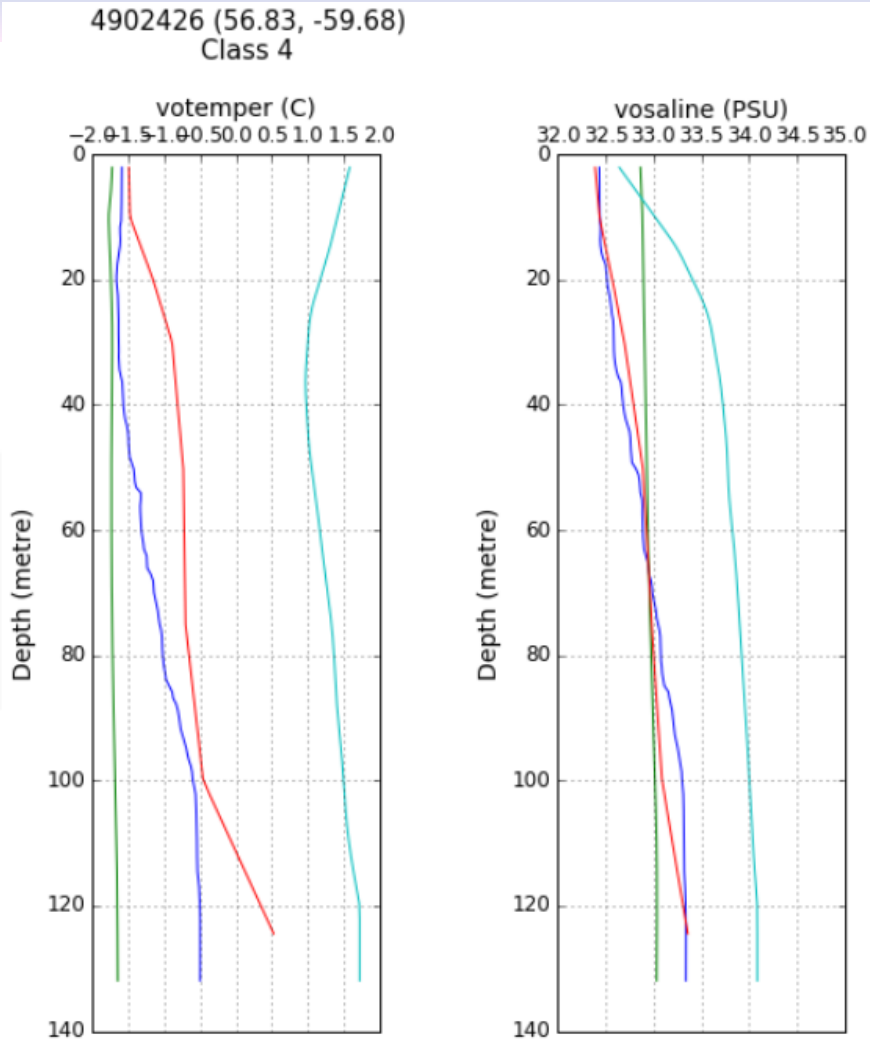
Verification Class 4







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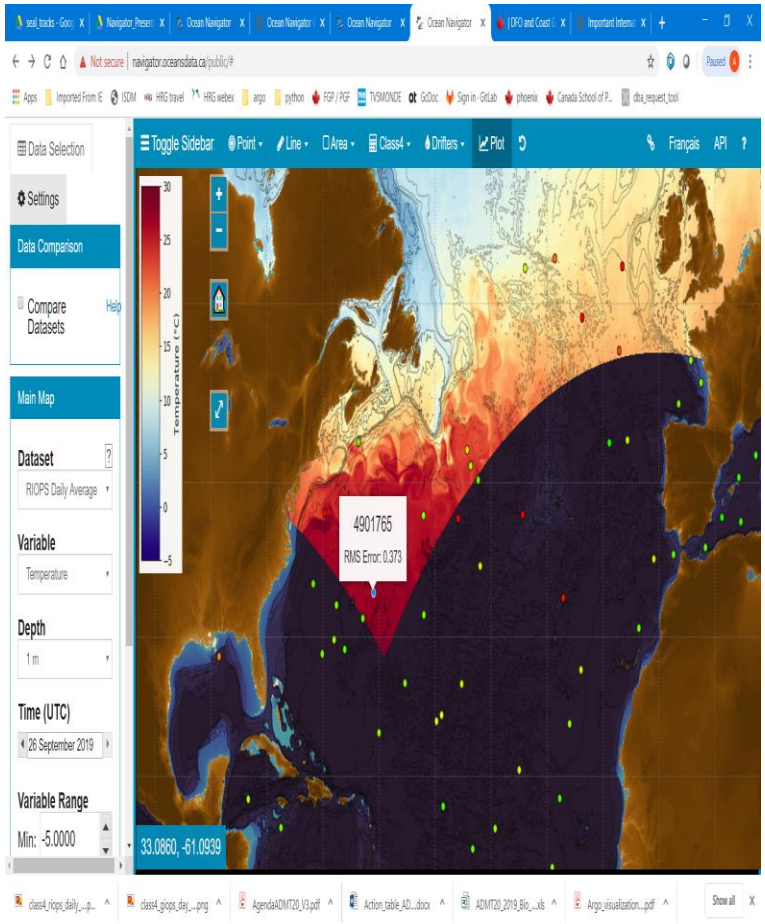
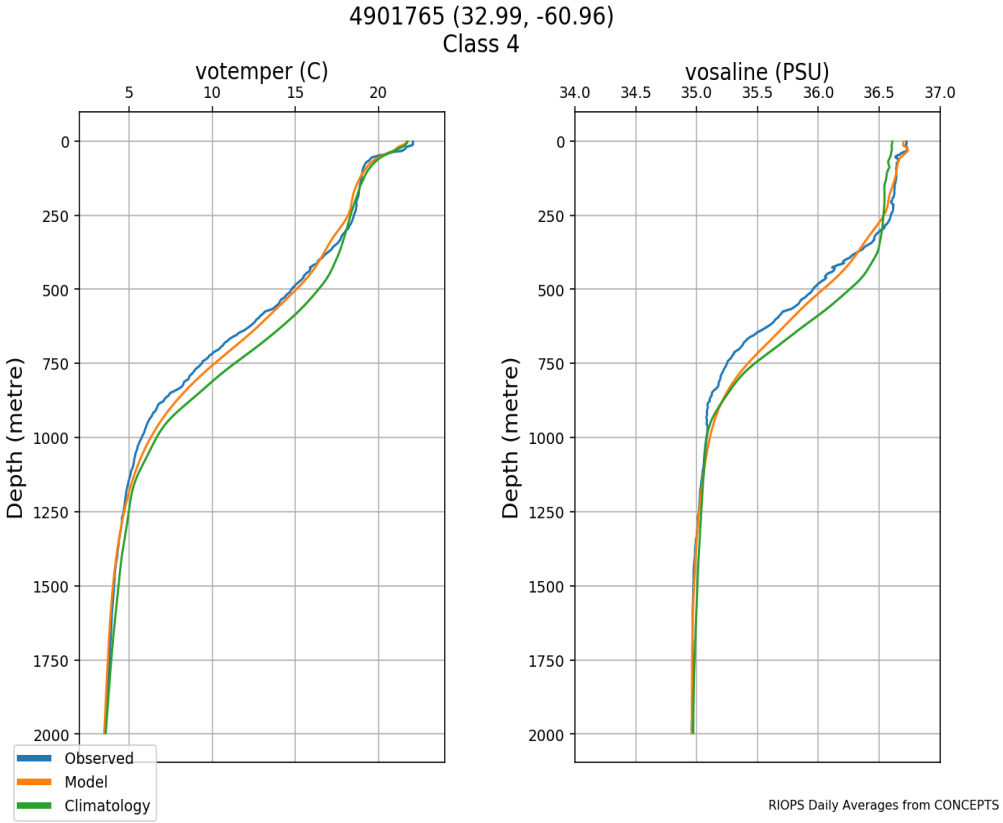
Verification Class 4





Canada

Demo

- http://navigator.oceansdata.ca SQLite
- http://dory-dev.cs.dal.ca/public/ **THREDDS

** as data holdings increased on Navigator, THREDDS no longer handled large amount of files (beyond 1 TB), a faster approach using SQLite3 was implemented, with functionality gradually put back. This site has a few months of data and will be kept until the SQLite version is updated with full functionality.

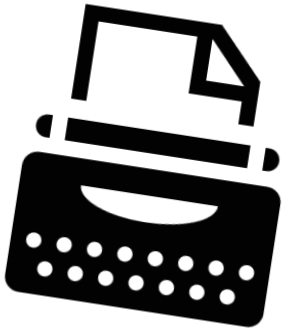
Potential future developments

- Given that ON will obtain secured funding, the team plans to :
  - Secure its own server to run ON
  - Improve data available via the ON by including all ocean forecasts using the original grid output, DFO/ECCC hindcasts and reanalysis system when produced
  - Improve navigator functionalities such as:
    - 2D/3D plots, animations of all variables
    - Expanding Class 4 verification approach (e.g. Argo Data)
    - Inter-comparison: Gridded intercomparison, including Model vs Model, Model vs Obs.
    - Evaluation of single Argo/Glider or seal tag vs available forecasts/reanalysis system
    - Plots of derived variables: Drift distance, drift precision, divergence, Curl, EFO's, MOD, etc.

Contact Us

- Fraser Davidson: fraser.davidson@dfo-mpo.gc.ca

Ocean Navigator Github: https://github.com/DFO-Ocean-Navigator/Ocean-Data-Map-Project



What is the Ocean Navigator?

Infrastructure

Software split in two segments:

- Front-end which supports the UI & Business Logic layers of the Ocean Navigator. Is making use of Ubuntu 16.04 LTS + LXD containerization. Access scientific data via NFS.

- The backend system which stores the various datasets is also making use of Ubuntu 16.04 LTS with ZFS. ZFS offers compression & the ability to create Copy On Write (COW) to ensure that the original data is not is kept pristine.

Hardware:

- Dory: 32-core, 256GB RAM, 12TB SSD, w/ 20Gbps link to Hank data storage.
- Hank: 16-core, 32GB RAM, 240TB ZFS filesystem in RAIDv2 striped (like RAID 60).