Remote Sensing for MEOPAR: Data management

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1. Remote sensing data: OC, SST and more to come
2. Takuvik/MEOPAR's approach to satellite data management
3. Current collaborations (end-users)
4. Challenges and opportunities
5. Funding
6. International linkages

1. Remote sensing data: OC, SST and more to come

Satellite data:
- OC: Chl-a, Suspended Particulate Matter (SPM), Coloured Dissolved Organic Matter (CDOM) and associated errors
- Sea Surface Temperature

Satellite Sensors:
- SeaWiFS (1997-2010), MERIS (2003-2012), MODIS (2003-current) and Globcolour dataset (multi-sensor merging, 1997- current)
- MODIS (2003-current), AVHRR (1998-current), GHRSST (2006-current)

Regions of interest:
- Northwest Atlantic (Canadian east-coast), Chl-a, CDOM and SST
- Strait of Georgia, SPM and Chl-a to come
- Arctic (in the coming months)

Temporal and spatial resolution
- Temporal: Daily, 3 and 8-day period
- Spatial: 250m to 4 km

Note that an important effort is made to tailor products to end-user needs
=> development of new products

1. Remote sensing data: OC, SST and more to come

Memory requirement for current projects

Sensor/Level	Data	Format	Storage memory
Globcolour	L3	NetCDF	1 Tb
MODIS	L1	HDF/NetCDF	3 Tb
SeaWiFS/ MODIS	L3	HDF/NetCDF	4 Tb
AVHRR	L3	HDF/NetCDF	500 Gb
GHRSST	L3	HDF/NetCDF	500 Gb

2. Takuvik/MEOPAR's approach to satellite data management

Computing and Storage facility:

- Operational processing: MacPro 2x2.93 GHz – 6 cores, 24 Gb Memory
- Re-processing of time series: Access to super computer at Laval University (12000 processors)
- Storage: 72 Tb of Memory

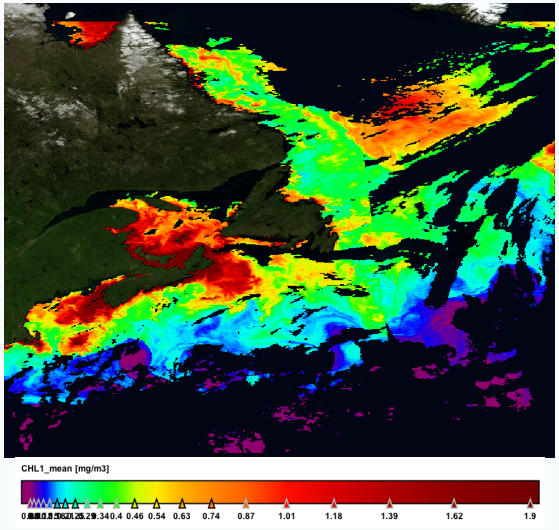
Data Distribution:

FTP server from Québec-Océan, password protected. Access given to each individual PI and collaborators (students, postdoc) – Not sustainable !

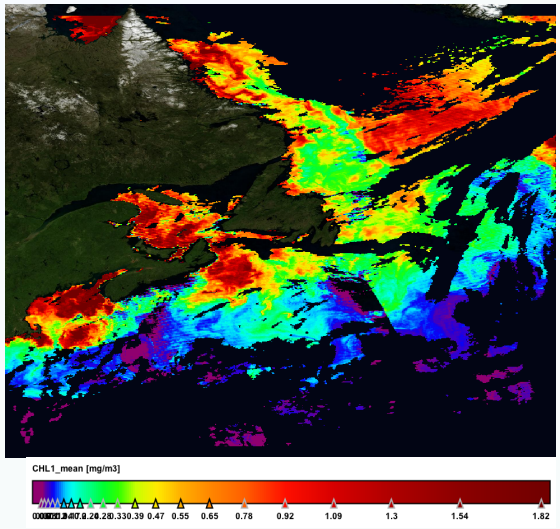
3. Current Collaborations

K. Fennel, Dalhousie: Chl-a and SST for data assimilation in a coupled biogeochemical-circulation model

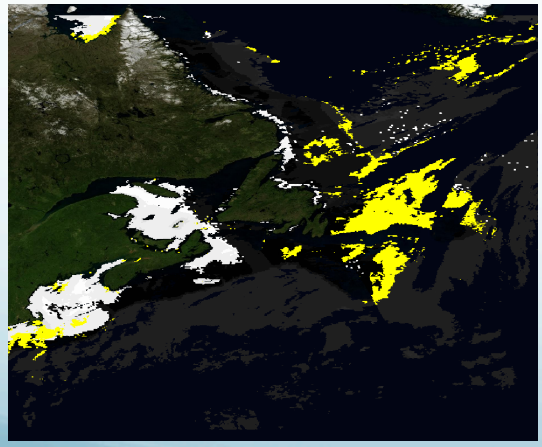
Chl (Blue-green Band ratio)



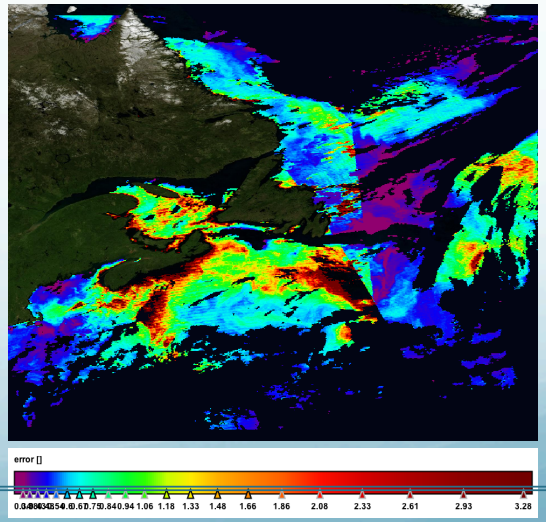
Inversion scheme



Turbidity flag



Associated uncertainties (error)



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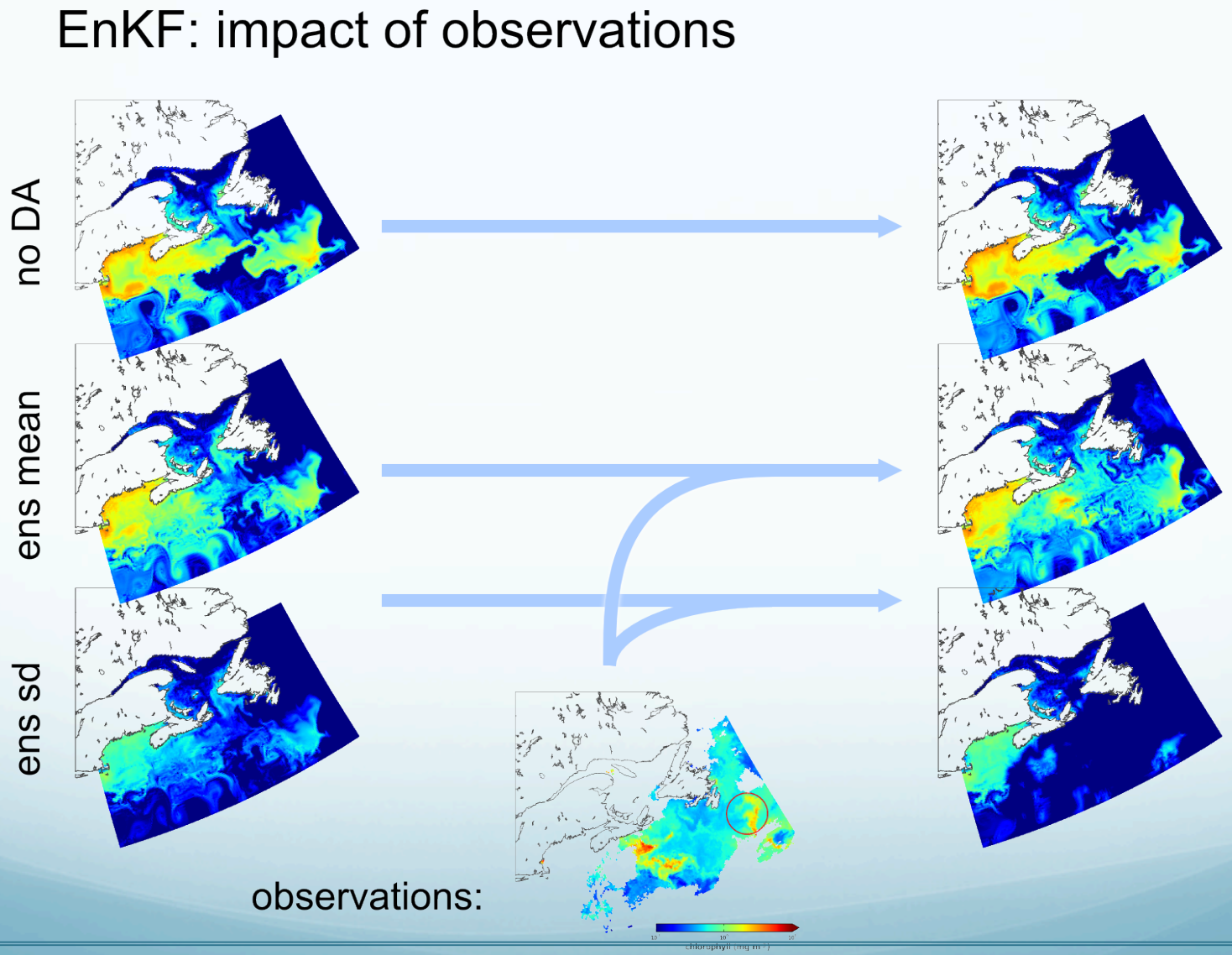

Remote sensing of Suspended Particulate Matter, collaboration with M. Halverson and R. Pawlowicz (Physical Oceanography, UBC)

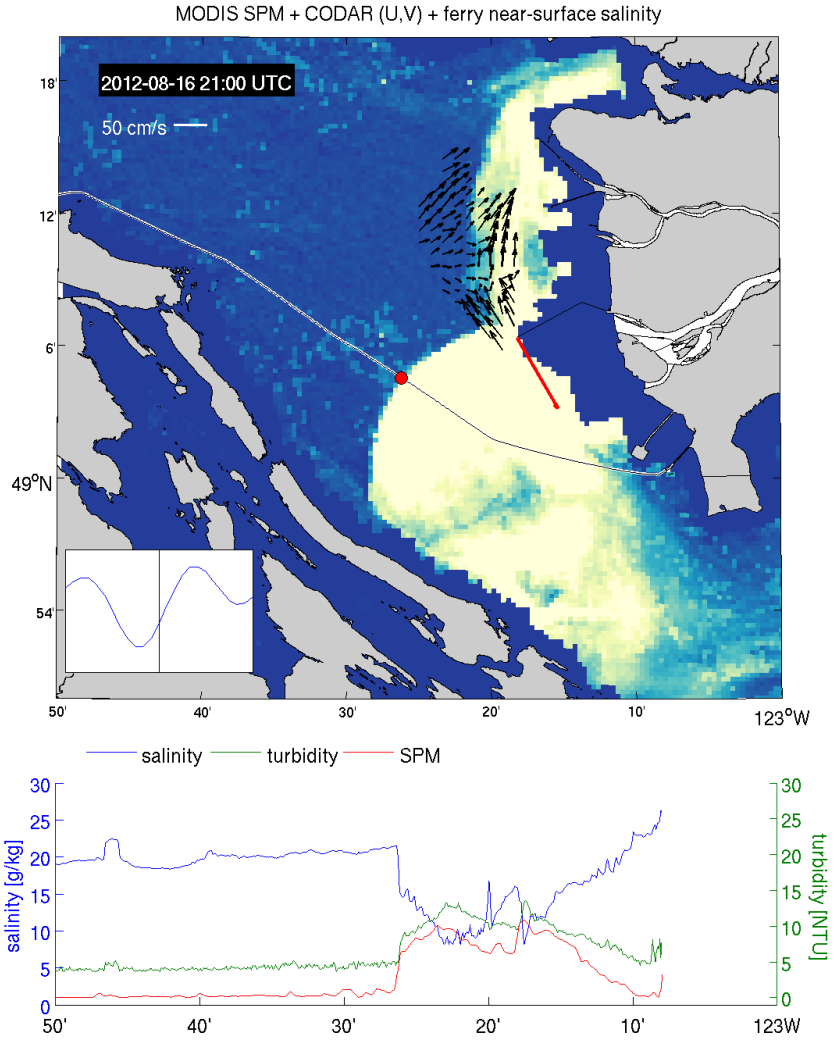

Figure from M. Halverson (UBC)

1. Preliminary results are encouraging, need to validate/ calibrate SPM product

2. Entire 2010-2013 time series is processed and quality controlled
3. Possibility to derive POC from SPM concentration (Doxaran, 2012)

3. Current Collaborations

- Oceanviewer.org: code and support for automatic download of satellite data (see Diego's presentation)
- Contact initiated to bring coastal altimetry data to MOPAR's satellite capacity

3. Challenges and opportunities

Challenges

- The large amount of data, which will increase as more products and sensors will become available, requires important computing and storage capacity
- The data format, which has to be easy to use by none experts
- Data distribution, which is related to the large amount of data (network connection)
- Require a long term approach, with sustained funding (Canadian Space Agency, Canadian Center for Remote Sensing, DFO?)

Opportunities

- Possibility to use existing networks such as OCN, SLGO to distribute data (regional approach)
- Develop a national approach as already done in other countries
- Link satellite data to database of in situ measurements

5. Funding

- The main contributor is MEOPAR (60K per year)
- In kind from Takuvik (travel, computing and storage facility, 25K)
- Need to involve other partners

6. International linkages

- Use of data services from National Space Agencies (NSA, ESA, CNES)
- No need to duplicate existing systems developed by space agencies

CONCLUSION

- Takuvik and MEOPAR have extensive experience in data processing (mainly OC and SST) at various temporal and spatial scales
- The expertise includes the use of standard products from space agencies and development of state-of-the-art algorithms for regional applications
- The main Challenge of satellite data lies in the very large volume of data for storage and distribution (10s of Tb)
- Currently dissemination of data has been made on case by case using Québec-Océan FTP server
- As volume of data distribution grows, an automated procedure for downloading data has to be developed
- High potential to increase end-users community
- Database as to go beyond a simple repository of images