Seasonal Change in Grain Size and Erodibility on a Tidal Channel-Flat Complex in Kingsport, NS



Talk Outline

- Seasonal Change in Grain Size
- Seasonal Change in Erodibility
- Sediment Budget Calculations
- Lessons Learned, Challenges (Summary)
- What's Next

Remote Sensing Suspended Particulate Matter (SPM) Data Minas Basin (MERIS)



Monthly Grain Size Sampling (DIGS)





Highlights (Avg. Grain Size)

- Fine in April, May (F & C)
- Coarsening in June, July
- Fine in August (F & C)
- Coarsening in Sept, Oct (F & C)
 - Lag in Channel

Cross Flat Grain Size – Distance to Channel







Highlights (Trends)

- Apr, May \downarrow d50, \uparrow (m)
- June, as A,M •
 - Transition

Oct, Nov as Apr, May, ↓ d50,个 (m) •



Gust Chamber



Flat Erodibility

Plot of Flat Erobibility OEER_April 27-2012



Plot of Flat Erobibility OEER_Oct 25-2012



Plot of Flat Erobibility OEER_July 25-2012







Channel Erodibility

Turbidity (NTU)

Plot of Channel Erobibility OEER_April 27-2012



Plot of Channel Erobibility OEER_July 25-2012





SPM (Minas) vs CME (kg/m2) Channel and Flat Kingsport



Highlights (Trends)

- Apr, May, June
 - 个 erodibility
- July, Aug, Sept, Oct, Nov
 - Low erodibility
- Dec, Jan, Feb, Mar
 - Increasing erodibility
- Time lag b/w 个 erodibility and 个 SPM

Minas Basin – Cobequid Bay Sediment Mass Balance

Total Area – 1111 Km²

Mud Flat – 358 Km²

Total Volume – 26 km³

Canning •

CME – Range of ~0.1 to 1.0 Kg/m^2

SPM ~ 1.4 to 14mg/L

Ha. tsport

•Kentville

Wolfville

Coldbrook

Kings County

o Brooklyn

🛃 Windsor

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Google earth

Debert

Lat 45:225494° lon -63.994269° elev 19 m eye alt 93.56 km 🔘

a

Summary

- Grain Size change likely due to sediment availability. Channels are conduit for sediment, broadcast finer grains farther up the flat with higher concentration in suspension.
- Erodibility shows a distinct seasonal cycle with approximately an order of magnitude difference over a yearly cycle.
- The order of magnitude difference in erodibility could explain the order of magnitude difference in SPM during summer and winter.
- At present an equilibrium between Inputs (River Run-off, Sea, Cliff Erosion) balances output between accumulation (deposition) and output of material (Sea) to maintain the constant SPM Cycle.
- Changes to these dynamics could have an effect on this equilibrium. (i.e. tidal power)
- An updated sediment budget is required. (Sea, Rivers, Cliffs)
- Modelling with accurate sediment transport parameters is needed to validate spatial and temporal dynamics.

CCGS Hudson Cruise – June 4th to 16th Minas Basin and Cobequid Bay

Acknowledgements

- OERA
- DFO
- Tim Milligan, Paul Hill, Vanessa Zions, Jessica Carrier-Garwood, Gary Bugden, Casey O'laughlin, Emma Poirier, Karen Devitt, Danika VanProosdij