Global Lake Census

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Objectives

• Create a single season snapshot of Canada’s lakes using PALSAR
• Produce a map of lake size distribution for Canada
• Parameterize carbon fluxes from lakes regionally
• Use JERS-1 from 1990s to detect change
Key parameterization
= Slope m

Slope (m) $\alpha$ C uptake
m varies across landscapes
m impacted by image resolution


Truthing using CANVEC Dataset

Being Used as independent data source for comparison to PALSAR Lake Classification


- New and free cartographic reference product by Natural Resources Canada
- Contains thematic information grouped into 11 themes including hydrographic data.
- Data originates from the best available sources: mainly from the National Topographic Data Base, Geobase initiative, and Landsat 7 imagery.
- Spatial accuracy ranges 15 to 30 meters for most areas.
- Source data ranges from 1960’s to 2007. Not always well known.

ISSUES

- Coverage is not complete and connectivity is problematic
  - can’t yet be used seamlessly for continental scale investigations
- Coverage is for Canada only
- Temporal analysis (change detection) is complicated – age range of data is more than 40 years
Comparison in Pilot Areas
CanVec vs PALSAR

- In the left graph, the x-axis represents the lake size range in hectares, and the y-axis represents the area (in hectares). The bars indicate the comparison between Palsar Classification and CanVec data for different size ranges.

- In the right graph, the x-axis represents the lake size range in hectares, and the y-axis represents the number of lakes. The graph shows the distribution of湖泊 sizes classified by PALSAR and the actual data from CanVec.
Results of Comparison

• Lake Area:
  – Average 2.5% difference in lake area
  – PALSAR consistently under-estimates lake area across all size classes except 10,000 – 100,000 Ha.

• Lake Numbers:
  – good agreement between the two datasets except for the smallest size class.
  – CanVec has better spatial resolution and sees very small lakes which PALSAR cannot.
  – Impacts regions some regions strongly such as the NWT where there are high densities of small lakes.

• Main problems identified: - mainly due to spatial resolution
  – Edge effects - area lost as a function of blended pixel
  – One Lake with narrow channels in CanVec may appear as 4 lakes to PALSAR because narrow regions are lost.
  – This can shift lakes into different size classes making across lake class examinations more difficult.
Monitoring Artisanal Gold Mining (ASM)

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Repeat-Pass InSAR for detecting and monitoring Artisanal Gold Mining (ASM)

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- ASM (artisanal mining) has become the largest direct-use source of mercury to the environment
- Concentrated in areas of heavy cloud in the tropics
- PALSAR high res. and polarimetric products, from separate passes, are used to monitor past and active ASM

2 FBS PALSAR scenes, from June and November of 2006, have been used to identify changes in the landscape caused by ASM.

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