Global Lake Census

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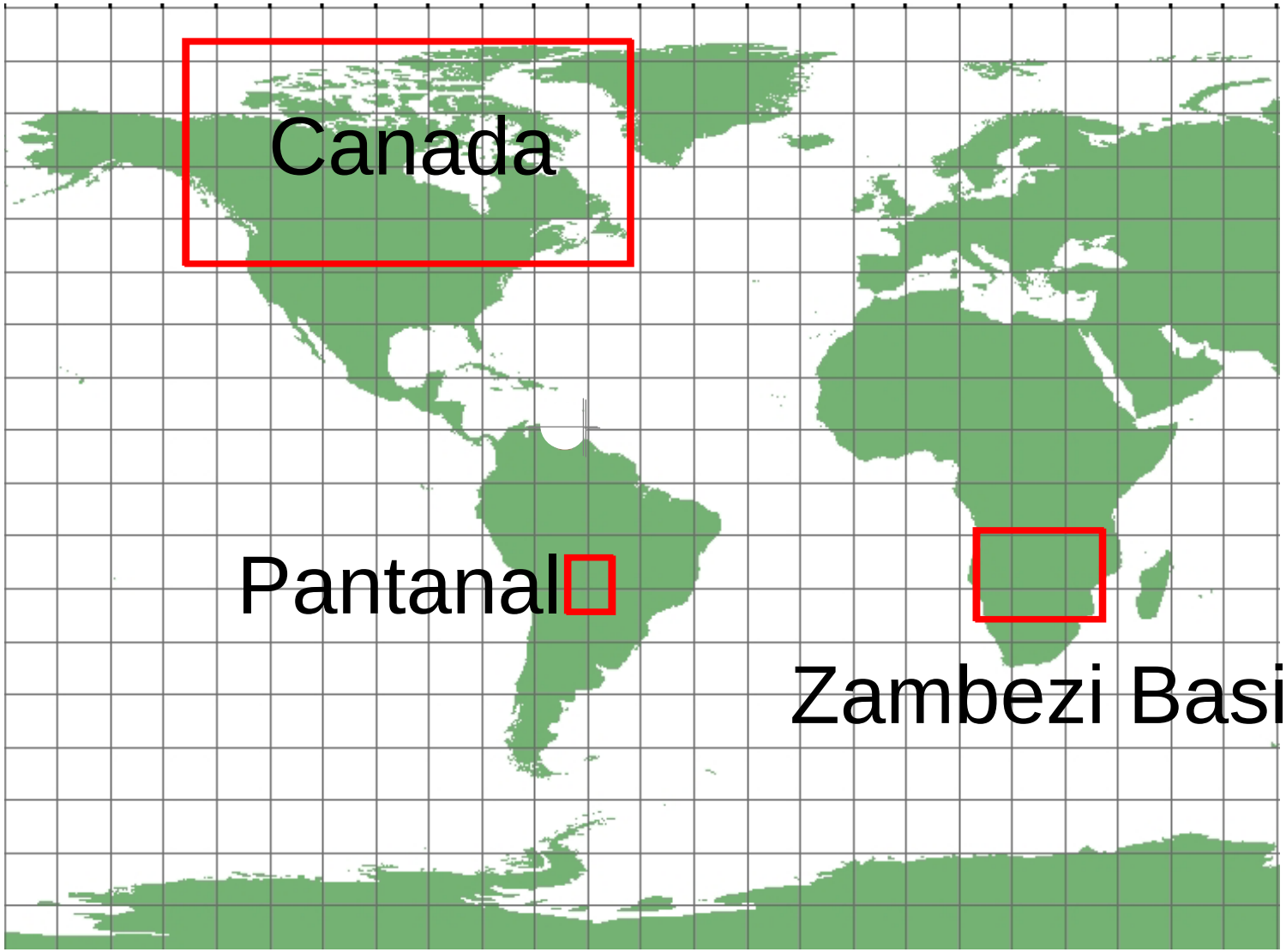
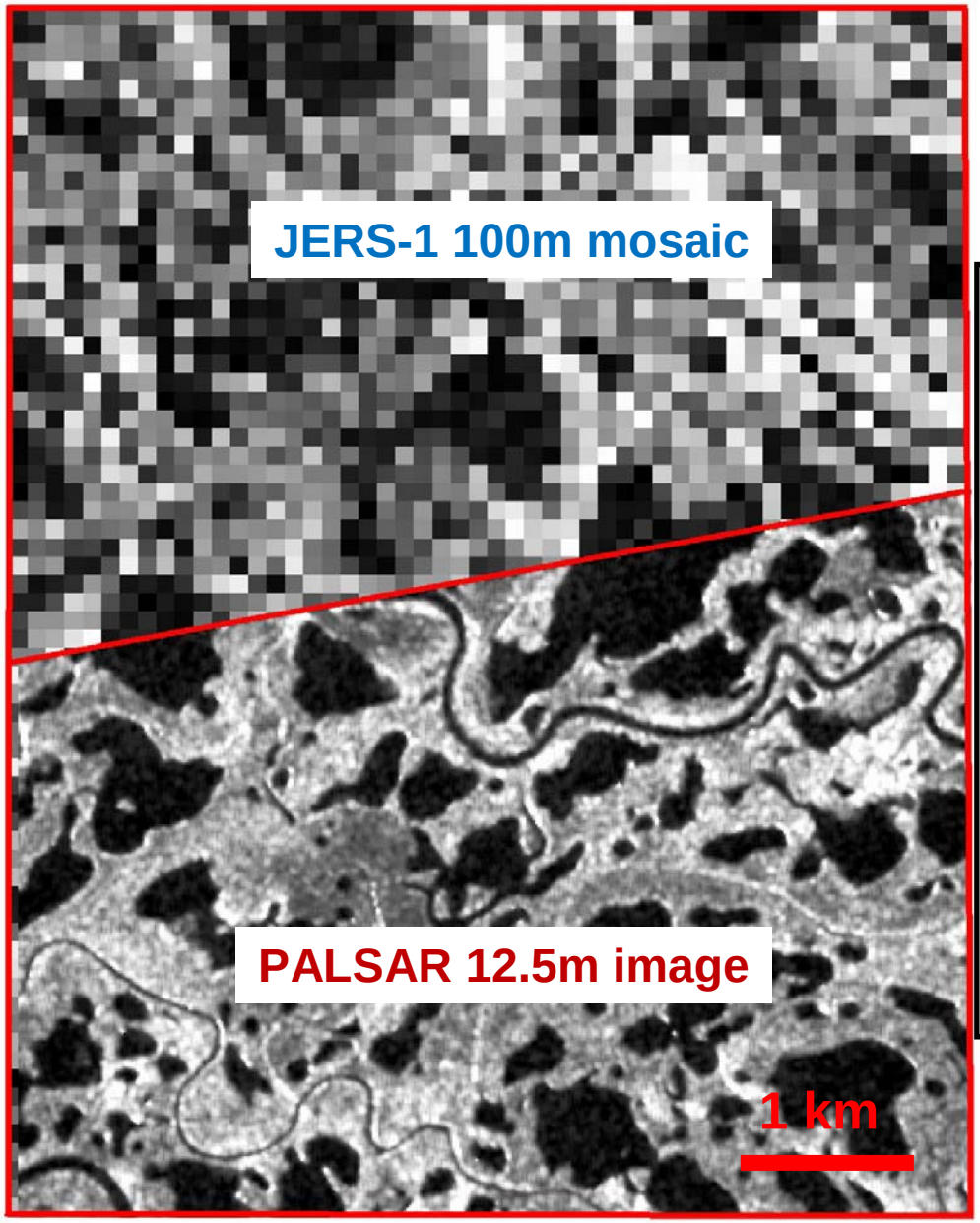
Prototype Areas

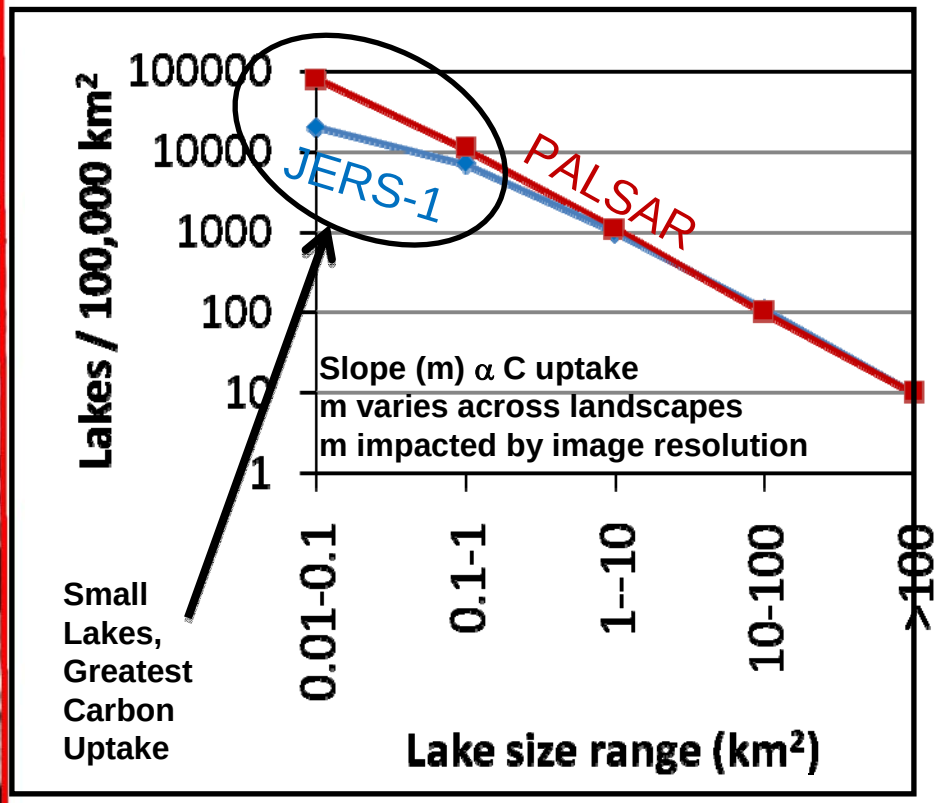


Objectives

- 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



Costa M.P.F. & Telmer K.H. (2007) Mapping and monitoring lakes in the Brazilian Pantanal Wetland using synthetic aperture radar imagery. *Aquatic Conservation-Marine and Freshwater Ecosystems* **17**: 277-288.

Telmer K.H. & Costa M.P.F. (2007) SAR-based estimates of the size distribution of lakes in Brazil and Canada: a tool for investigating carbon in lakes. *Aquatic Conservation-Marine and Freshwater Ecosystems* **17**: 289-304

Truthing using CANVEC Dataset

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

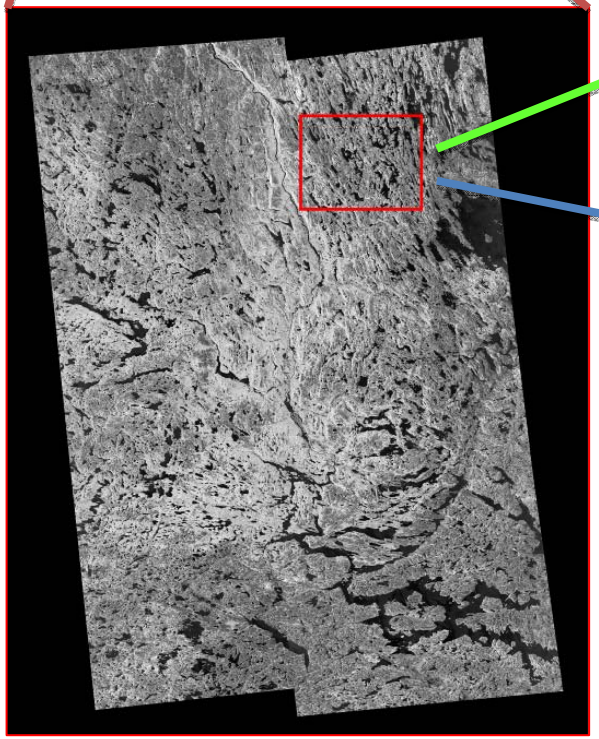
DESCRIPTION: http://www.geogratis.ca/geogratis/en/collection/detail.do?id=28954

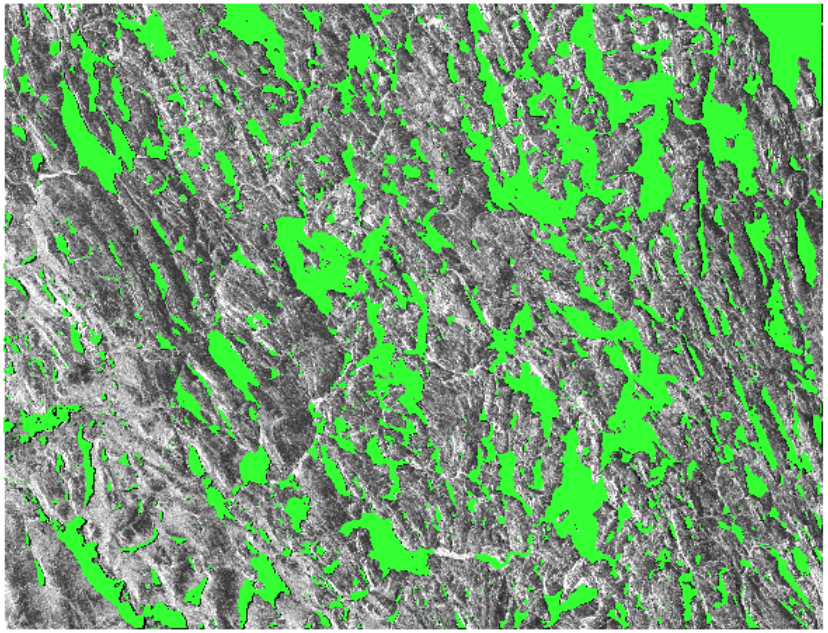
- New and free cartographic reference product by Natural Resources Canada
- Contains thematic information grouped into 11 themes including hydrographic data.
- Data originates from the best available sources: mainly from the National Topographic Data Base, Geobase initiative, and Landsat 7 imagery.
-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

ISSUES

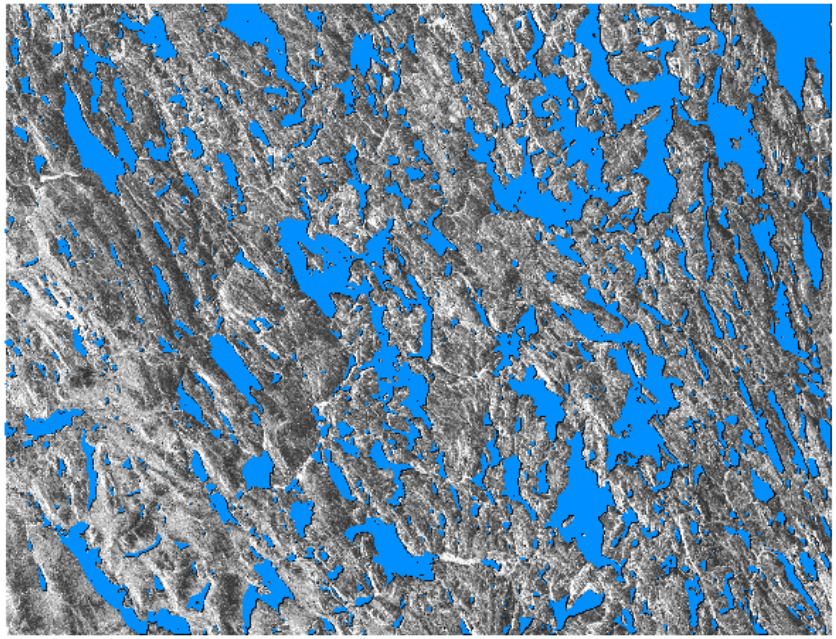
- Coverage is not complete and connectivity is problematic
  - can't yet be used seamlessly for continental scale investigations
- Coverage is for Canada only
- Temporal analysis (change detection) is complicated – age range of data is more than 40 years

CanVec lake vectors

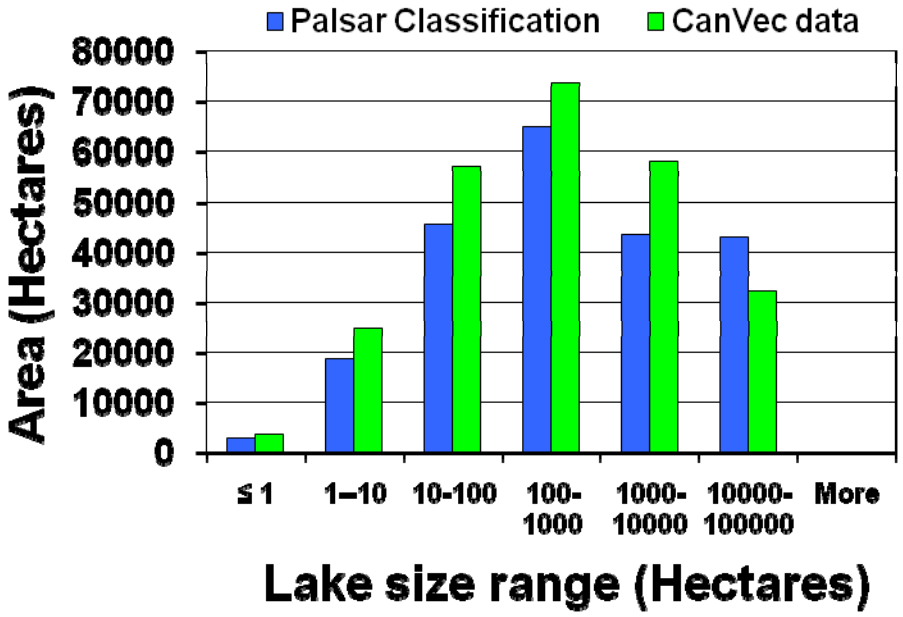


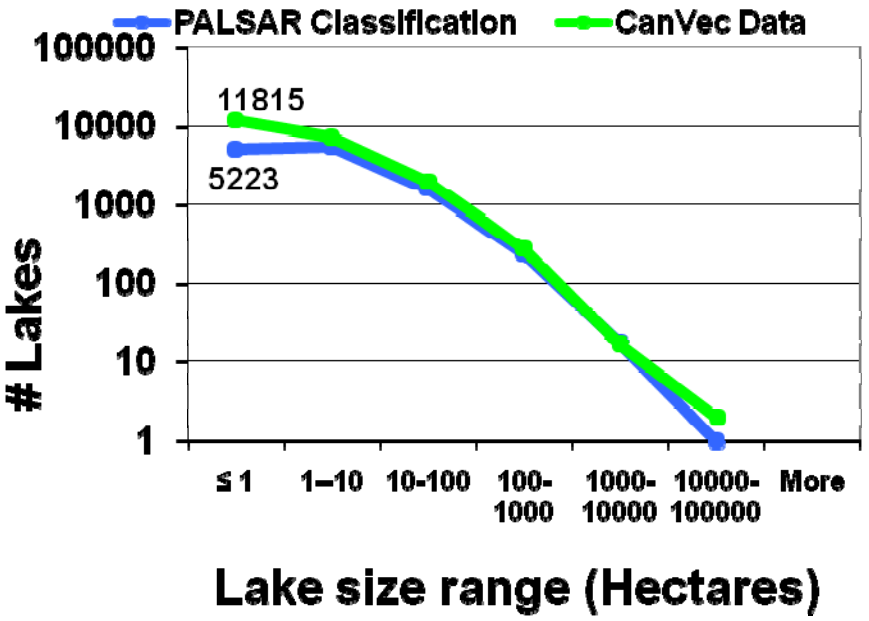


PALSAR lake classification



Comparison in Pilot Areas
CanVec vs PALSAR





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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University of Victoria

- **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.