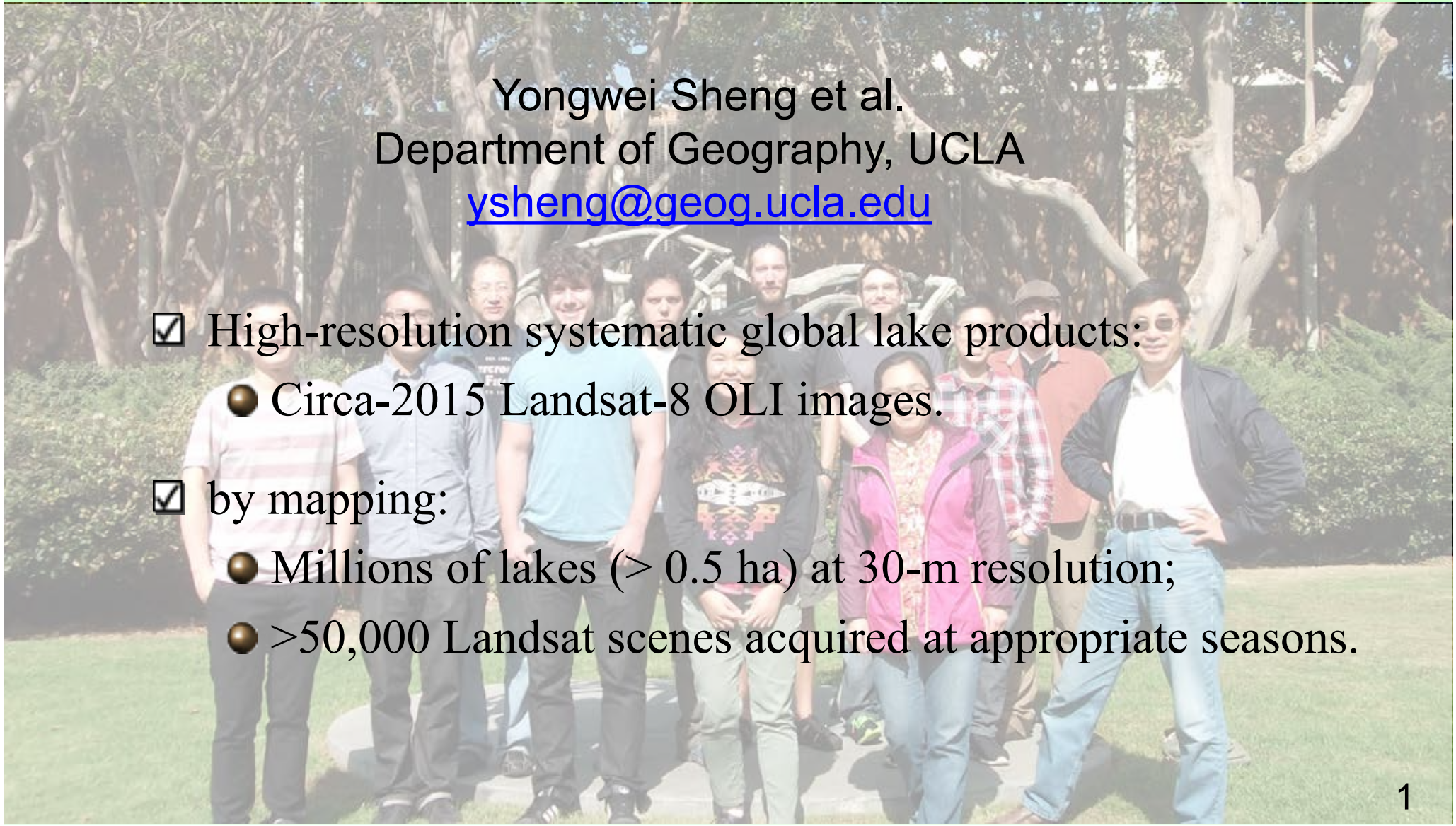
Circa-2015 UCLA Lake Database: a potential a priori lake dataset



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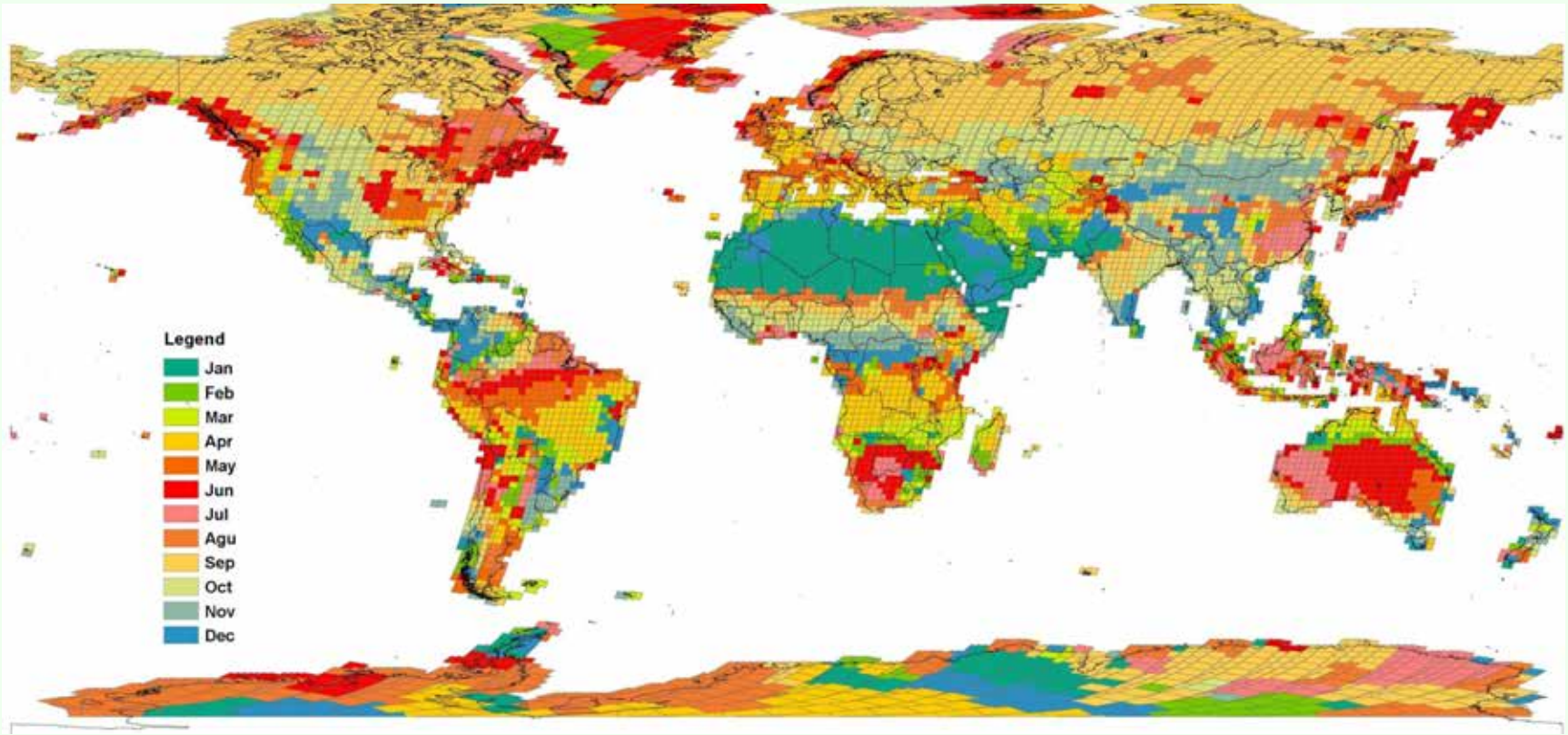
- ☑ High-resolution systematic global lake products:
  - Circa-2015 Landsat-8 OLI images.
- ☑ by mapping:
  - Millions of lakes (> 0.5 ha) at 30-m resolution;
  - >50,000 Landsat scenes acquired at appropriate seasons.

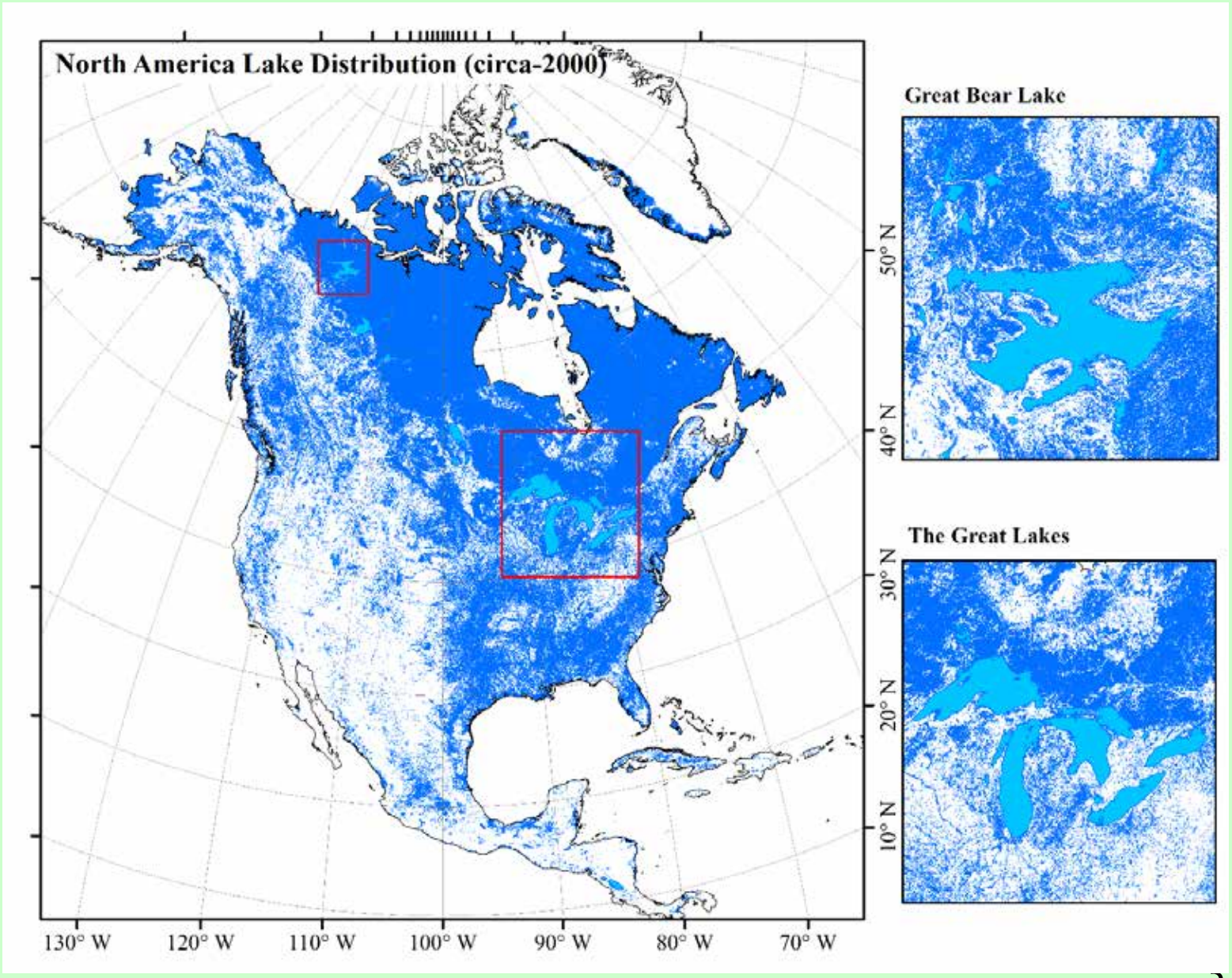
Acquisition of lake imaging at relatively stable season

- Optimal lake imaging acquisition season

  to avoid mapping lakes from wet and dry seasons/years and thus enable us to inventory lakes in relatively stable size



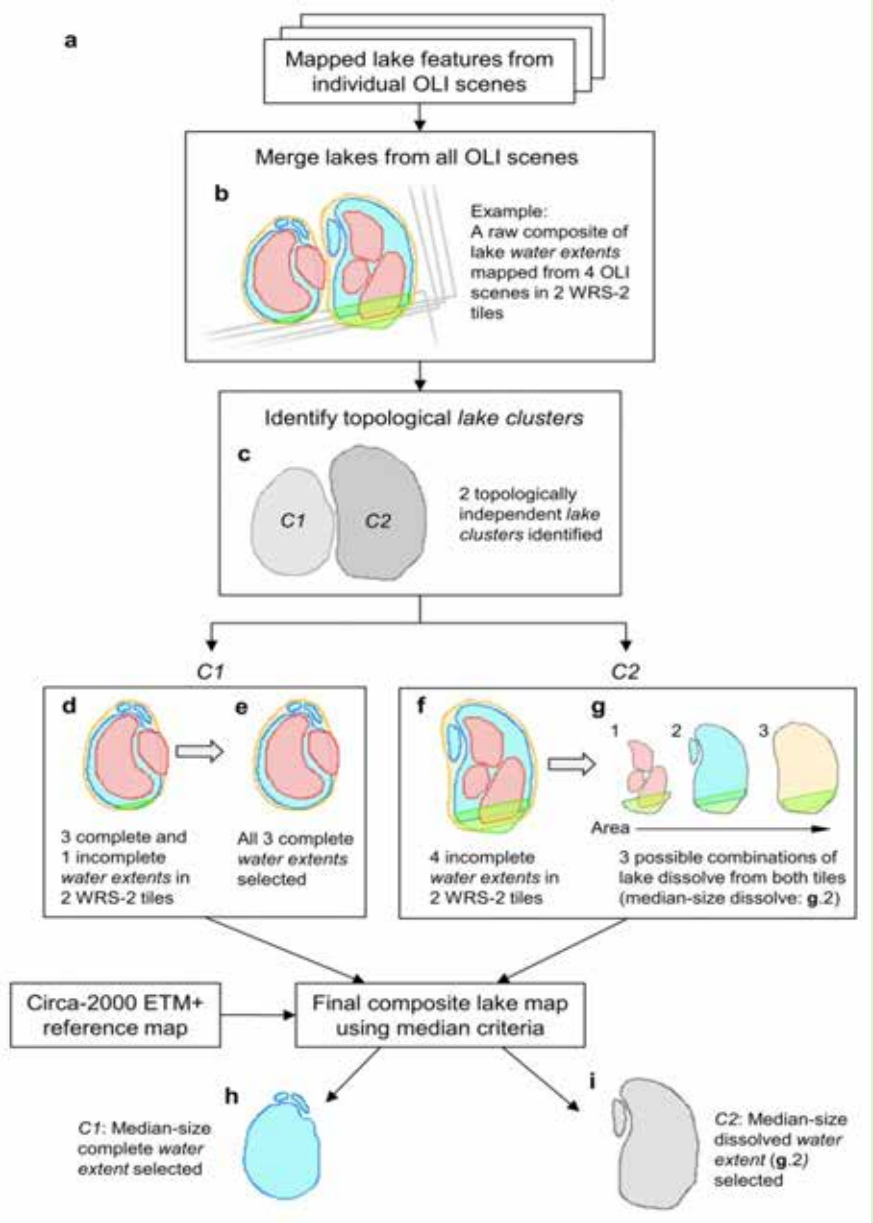
Circa-2000 UCLA lake database



Circa-2015 global lake database development

- Better products are expected
  - Using Landsat-8: a better sensor
  - All usable Landsat-8 images are collected during 2013-2017
- Improvements: representative lake extents (Sheng et al., 2016)
  - Multi-temporal approach;
  - Circa-2000 lake data set as a reference;
  - Cloud masking;
  - Uncertainty measure;
  - Minimizing labor-work using automated QA/QC;
  - Addressing lake variability.

Circa-2015 global lake database development



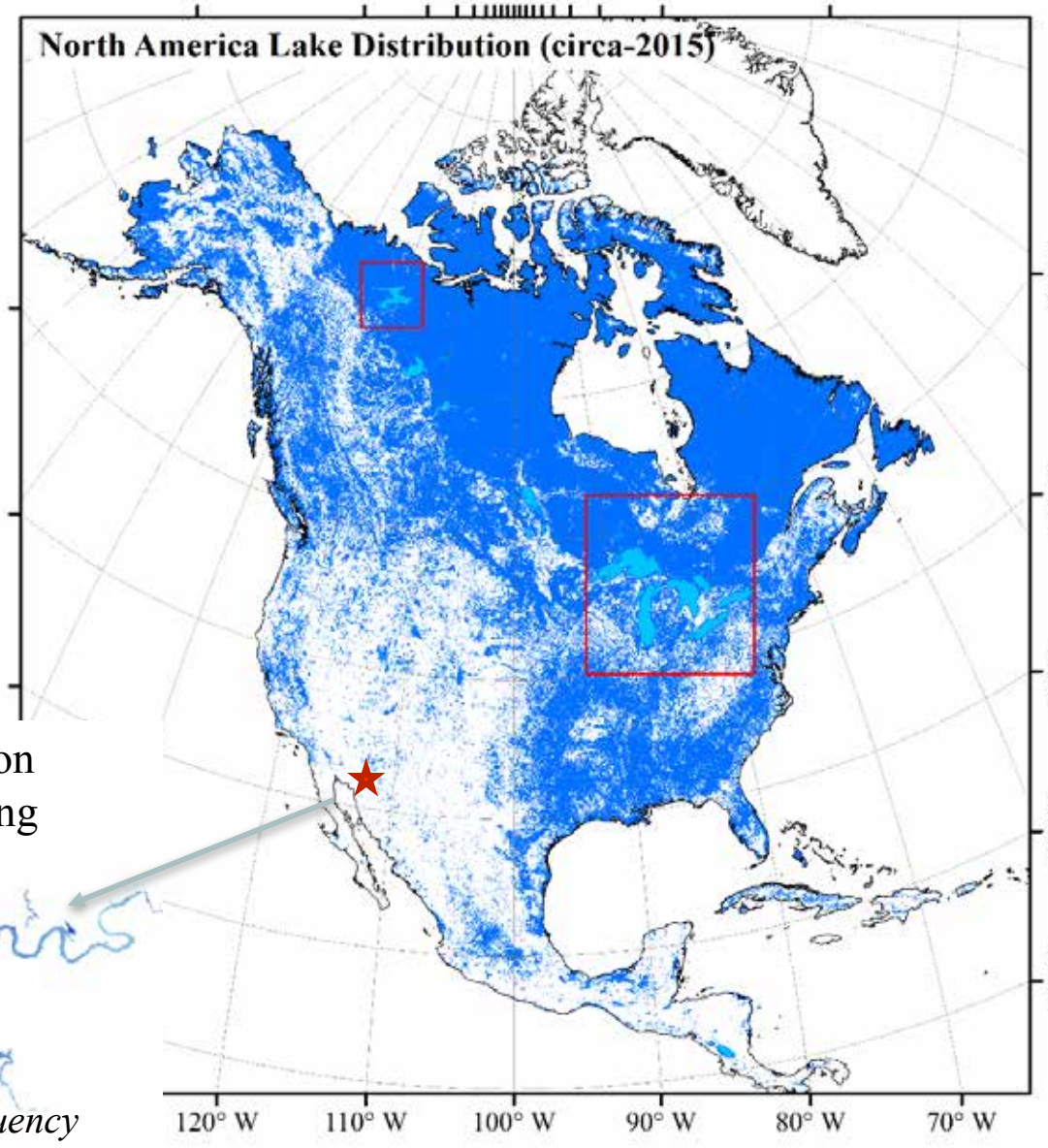
- Representative lake extents from multi-temporal images

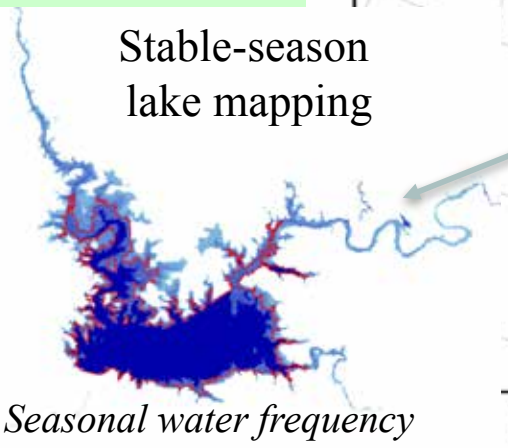
  Spatial-linked lake pairs

  Full lakes

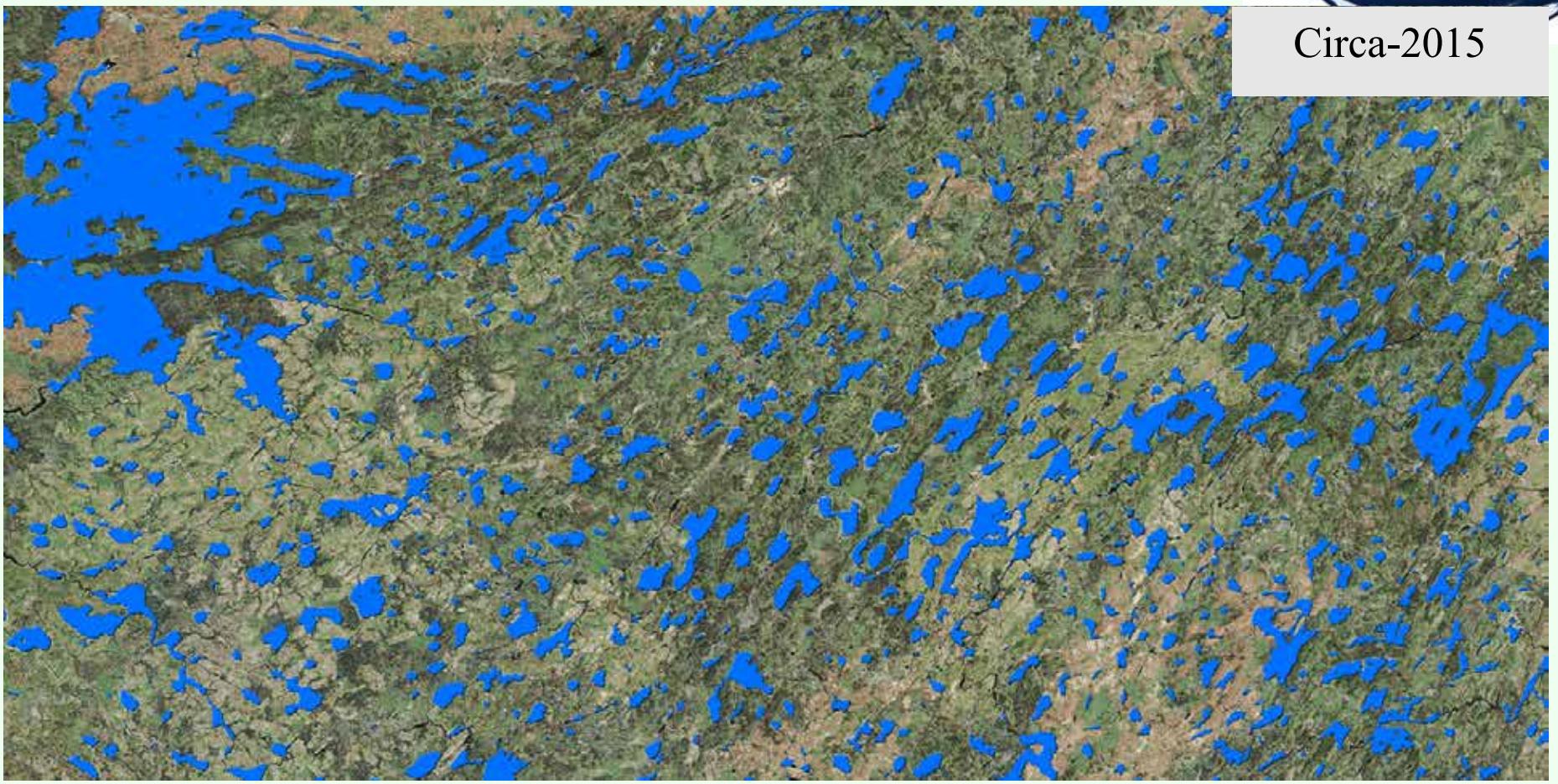
  Half lakes

Circa-2015 global lake database



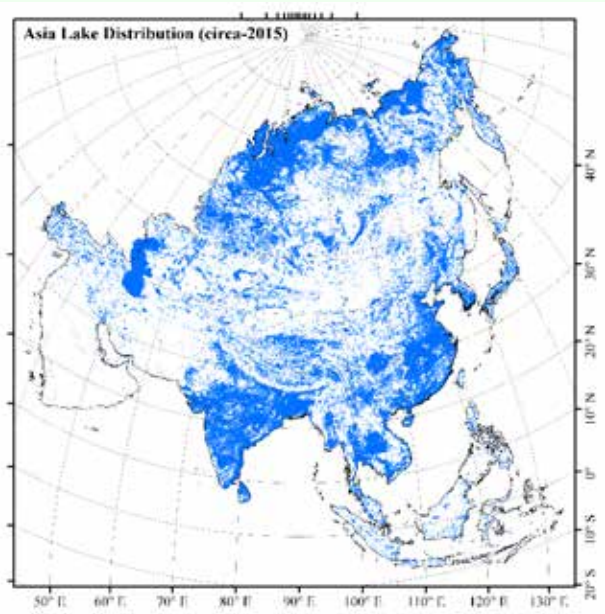


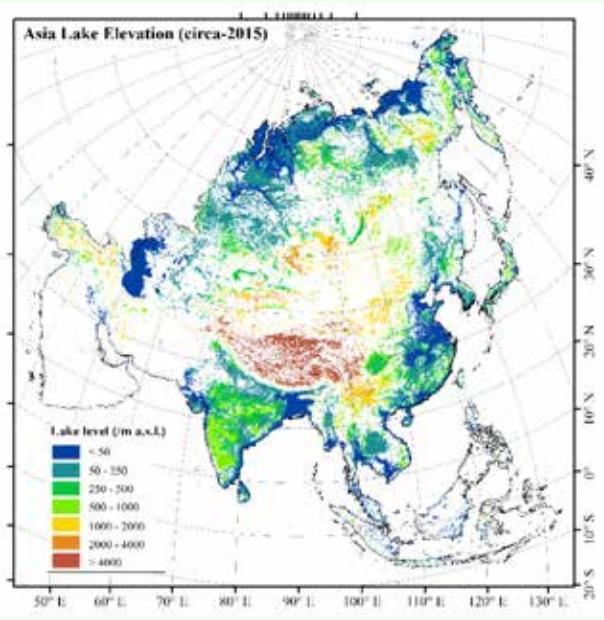
Comparison of Circa-2000, Circa-2015 lakes with GLWD and SWBD data sets



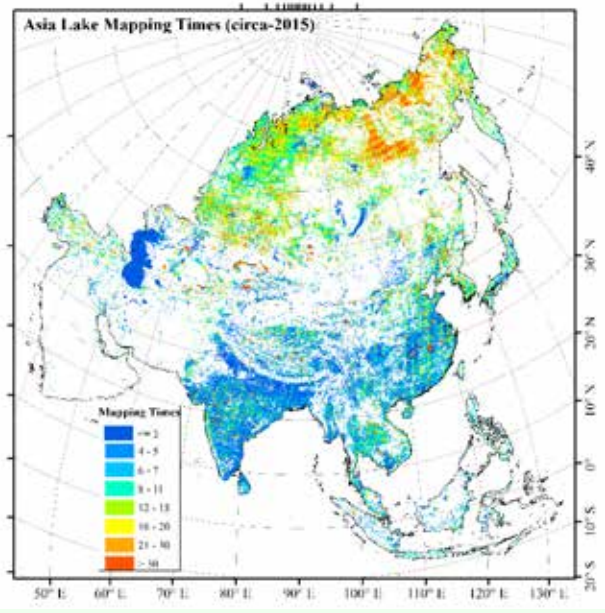
Circa-2015

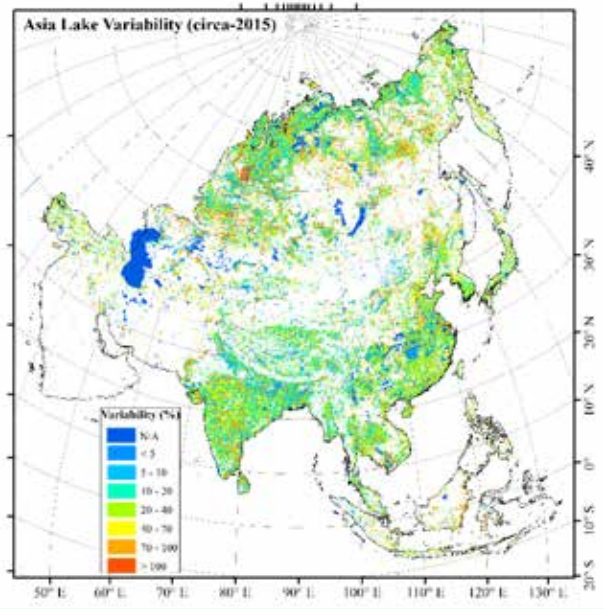
Inventoried Circa-2015 global lake database



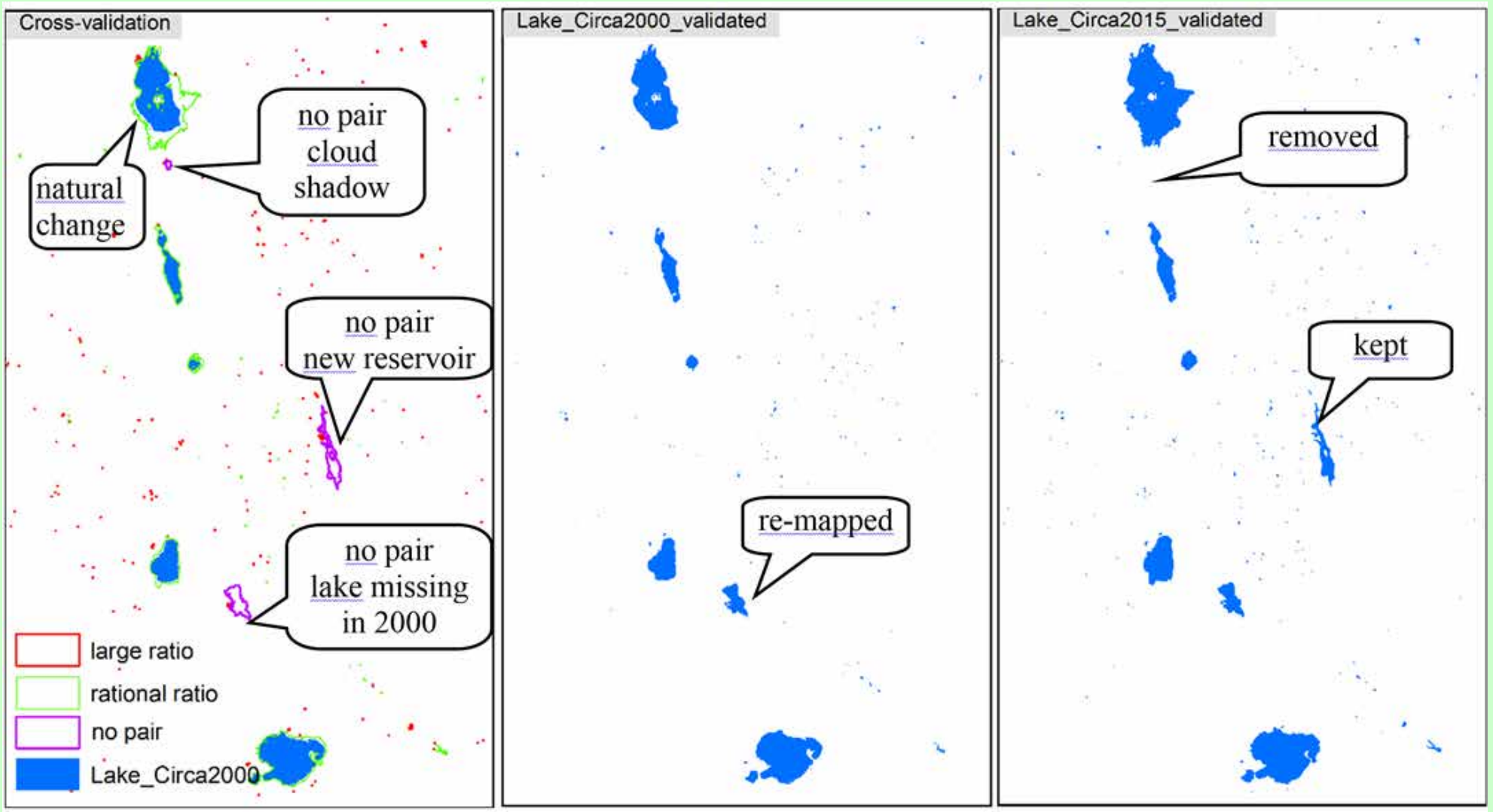


Asia



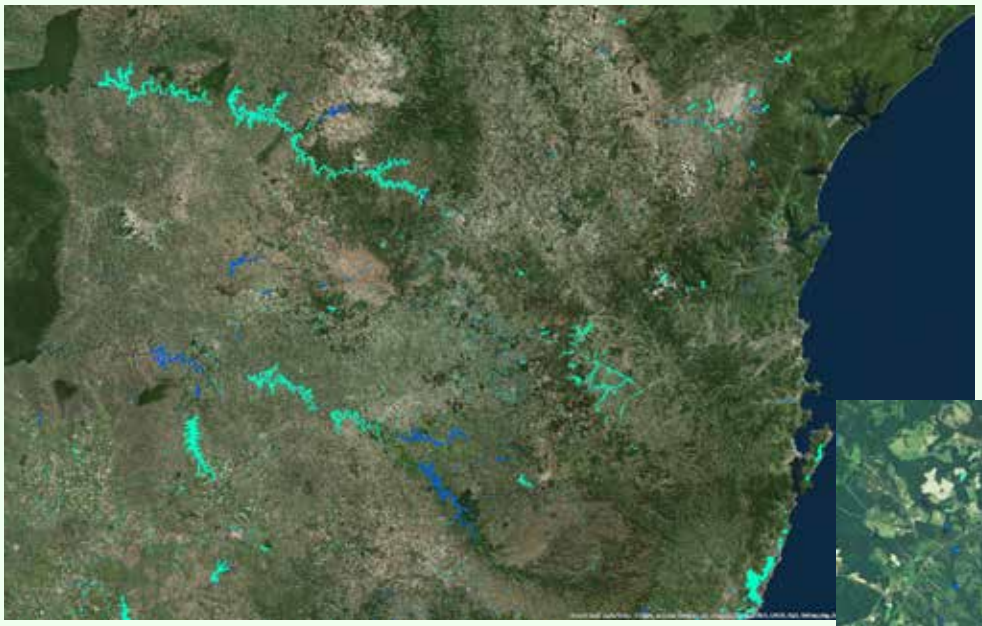


Cross validation between Circa-2000 and Circa-2015



Lake changes revealed from the two inventories

Newly dammed reservoirs in South America



Circa-2000
Circa-2015

Missing reservoirs with dam removal in USA

Circa-2015
Circa-2000