# MOSART-Lake: Development and global validation 

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## MOSART-Lake

Both lake water and heat balance can be improved by 1) accounting for advective fluxes between rivers and lakes and 2) using more realistic area-volume-depth lake geometry


River Model (MOSART)
Lake module

## Simulation protocol

* Simulation period: from 1979 to 2008
* Forcing data: $0.5-\mathrm{deg} 3$-hourly GPCP data
* Simulation resolution: 0.5-deg for both ELM and MOSART
* The 1979-2008 cycle was repeated 10 times to spin-up large lakes


## Benchmarking datasets

* Monthly surface temperature for 202 large lakes in 2002-2012
(Copernicus Global Land Operations Cryosphere and Water)
* Annual surface area data for 672 large lakes in 1995-2015 (Global lake area, climate, and population dataset V4)


Long-term average lake surface temperature validation (2002-2008)


## Long-term average lake surface area validation (1995-2008)



## Monthly lake surface temperature



## Annual lake surface area



## Summary \& next steps

* MOSART-Lake reasonably captures the seasonal variation of lake surface temperature and long-term lake surface area.
* We will continue to improve the parameterizations of lake hydrology and heat balance

