

GLEON 5 Summary – Montréal

11 August 2007

Welcome – Tim Kratz

Introductions

Tim Kratz	Tiina Nõges
Marilyn Larsen	Peeter Nõoges
Cayelan Carey	Susan Hendricks
Kathie Weathers	Bob Foy
Don Pierson	Katherine Webster
Kurt Pettersson	Boqiang Qin
Thorsten Blenckner	David Tsai
Rita Adrian	Laurence Choi
Paul Hanson	Peter Arzberger
Darren Bade	David Hamilton
Erik Jeppesen	Fang-Pang Lin
David da Motta Marques	Vera Istvánovics
Evelyn Gaiser	Marc Honti
Stefan Bertilsson	Adam Kovács
Trina McMahon	Fabio Roland
Stuart Jones	Anne Pouwels
Diane McKnight	

* = *Presentation will be available at gleon.org*

***Overview of GLEON and update since GLEON 4 – Tim Kratz (tkkratz@wisc.edu, Wisconsin, USA)**
Tim provided an update on GLEON sites, the RCN award, and an overview of accomplishments and lessons learned at Lake Erken. He asked the audience to think about whether the activities that GLEON is doing is applicable to their site. He made several announcements: expansion of GLEON to Argentina, GLEON web site, development of a mission statement, and special events at SIL. Cayelan Carey announced the GLEON student association meeting. Tim provided examples of how to acknowledge GLEON.

Overviews of Local Sites

*Kathie Weathers (weathersk@ecostudies.org, New York, USA)

- Lake Sunapee, New Hampshire

Rita Adrian (Adrian@igb-berlin.de, Germany)

- Müggelsee, Berlin (climate impacts on lake – phytoplankton)
- Invites people to visit to play with data (especially grad students)
- Cares a great deal about students being involved
- Polymictic shallow lake
- Research interests: climate impacts on lake ecosystems, day/night water temp, high temporal resolution data and how variability at small scale translates to variability at large scales
- Temp data is well-organized; DO data not so organized

Tim noted that one purpose of GLEON is to find mechanisms in sharing expertise.

*Bob Foy (Bob.Foy@afbini.gov.uk, Northern Ireland)

- Lough Melvin (in part of under-developed area – still clean)

- Other data 40 years of data (high density – every 5 minutes)
- Some lakes are on salt water bogs – so mix of fresh water and salt water
- Remote sensing on coastal sites
- Northern Ireland In Situ Monitoring Programme, www.afbini.gov.uk/index/services/specialist-advice/coastal-monitoring.htm

*Thorsten Blenckner (Thorsten.Blenckner@ebc.uu.se, Sweden)

- Overview of Lake Erken, Sweden

Tiina Nõges (tiina.noges@emu.ee, Estonia)

- Water level (large fluctuations, more than 100 years of data)
 - o Interested in impact of water level on ecosystems
- Have water temperature data since 1940s
- High frequency data since 2003
- Limnological station on shore of large polymictic lake (<3m depth)

*Jackie Qin (qinbq@niglas.ac.cn, China)

- Taihu Lake
- Wuxi without water for a week, algal blooms in March
- Sensors going in Taihu in September

*David da Motta Marques (dmm@iph.ufrgs.br, Brazil)

- Lake 100 km long
- Use 7m towers (lakes are too stormy for buoy)
- Have seven years data – every 15 minutes
- Part of LTER
- CNPq, PELD

*Erik Jeppesen (ej@dmu.dk, Denmark)

- Lake Væng
- CLEAR Project, 2006-2010 – Lake restoration
 - o Look at bio-manipulation (e.g. fish stock)
- Have 37 lakes, many years
- Controlled experiments
- Be very critical of data (because of sensor drift)

*Darren Bade (dbade@kent.edu, Ohio, USA)

- Cuyahoga River Watershed (now)
- From University of Wisconsin
- Kent State has collaboration with Costa Rica
- Million sonde march
 - o 35 sensors in lake of 60 hectares
- Lakes and reservoirs near campus in NE Ohio
- Lake Pippin preserved for drinking water

Diane McKnight (diane.mcknight@colorado.edu, Colorado, USA)

- Integrate physical processes with biogeochemical
- Use spectral data
- Editor of JGR-Biogeosciences – invites submissions

*Tim Kratz for Chih-Yu “Charles” Chiu (bochiu@gate.sinica.edu.tw, Taiwan)

- Water level fluctuates by 4 to 6 meters
- Can be two lakes
- Sensors new: depth and temperature
- Systems designed by undergrad at University of Wisconsin
- Activities of Yuan-Yang Lake and Emerald Lakes, Taiwan

*David Hamilton (d.hamilton@waikato.ac.nz, New Zealand)

- Lake Rotorua GLEON Buoy 20m deep
- Have some grant to work with NIGLAS (Nanjing Institute of Geography & Limnology) on Taihu Lake; the grant is from the International Science and Technology Fund (New Zealand)

*Fabio Roland (fabio.roland@ufff.edu.br, Brazil)

- Ecological monitoring of Lake Potato since 1987
- Bulk aluminum company (Furnas)
- ~30% of lake impacted: high turbidity
- studying since 1998, buoy since 2003 but changed every year

*Paul Hanson (pchanson@wisc.edu, Wisconsin, USA): Overview of RCN

- Modeling and three-d modeling: There is interest in setting this up
- What are the domains of control in lakes? (patterns and trends)

*Peter Arzberger (parzberg@sdsu.edu, California, USA): Overview of GLEON Operating Principles and Procedures

- Announced Tim Kratz as chair of GLEON steering committee
- Stressed that this is a living document
- Document on web http://www.gleon.org/media/GLEON_OpPrincProc.pdf
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A suggestion was made for the GLEON web site to include sensors with comments about what works.

The steering committee (Arzberger, Hamilton, Kratz, Lin) proposed names of expanded steering committee members. They were approved for three-year terms: Lauri Arvola, Thorsten Blenckner, Ami Nishtri, Justin Brookes, Jackie Qin, Paul Hanson, Kathie Weathers

Review progress of working groups

*David Hamilton (d.hamilton@waikato.ac.nz, New Zealand) – Update on Diel O₂ Modeling

- High frequency and routine DO measurements and DYRESM simulations: Trout Bog
- EMBRACE: Enabling Modelers, Becoming Reactive, and Communicating Experiences

*Fang-Pang Lin (c00fpl00@nchc.org.tw, Taiwan) – Watershed Modeling at YYL

*Paul Hanson (pchanson@wisc.edu, Wisconsin, USA) – Erken Installation

*Trina McMahon (tmcmahon@engr.wisc.edu, Wisconsin, USA) – Microbe working group update

- Initial working group meeting: Trina McMahon, Stuart Jones, Cayelan Carey, Stefan Bertilsson, Sally Holbrook
- Science activities: proposal writing, two AMG units in fabrication, metagenome sampling of 10 lakes in Sweden, freshwater microbial taxa inventory, and building the science network (Taiwan, China, outreach at conferences)
- Workshop: Research Frontiers in Freshwater Microbial Ecology at UQAM on Wednesday, 15 August, 0900-1630

Anne Pouwels (pouwelsanne@hotmail.com, New Zealand) – An Introduction to GLEON’s Applicability for Student Education

- How scientists use statistics in their scientific investigation
- Putting together environmental education, statisticians, education; very similar to what GLEON is doing (e.g. web-based data access)
- Generation of instant feedback (science is too hard); outreach is needed to get students interested in science
- Resource for GLEON

Tim asked everyone to think of a research question they’re interested in or some activity or project that would depend on more than one site within the GLEON network, i.e. what aspects of the GLEON network (human or physical) would you, the participant, like to take? **Email responses to Marilyn Larsen (mlarsen2@wisc.edu) to collect and synthesize.** Examples:

1. Paul Hanson (pchanson@wisc.edu): For the lakes that are in the network, to what extent are the variables that we care about influenced by internal vs. external processes?
Kathy Weathers (weathersk@ecostudies.org): And influence of watershed characteristics?
Tim Kratz (tkkratz@wisc.edu): And what causes nighttime spikes in DO concentration?
David Hamilton (d.hamilton@waikato.ac.nz): High frequency data is emphasizing the sharp interfaces and transitions associated with different water masses
2. Don Pierson (dpierson@dep.nyc.gov): Is it possible to use the GLEON data to see how general you can make the models? (e.g. deep, shallow) Degrade detailed data to see how far you can go.
3. Darren Bade (dbade@kent.edu): How can we characterize different lakes/regions in less subjective ways? e.g. lakes in northern WI similar to lakes in FL and how climate change is affecting them. Talks about paper using GIS, statistics, authors in ... Wolock et al 2004 (Wolock, D.M., Winter, T.C., and McMahon, Gerard, 2004, Delineation and evaluation of hydrologic-landscape regions in the United States using geographic information system tools and multivariate statistical analyses: Environmental Management, v. 34, p. S71-S88.)
 - Hydrologic landscapes
 - Way of categorizing lakes to being similar in hydrologic landscapes
4. Trina McMahon, (tmcmahon@engr.wisc.edu): YYL interesting dynamics across typhoon events; saw unique response to typhoon in YYL, but haven’t been able to replicate that – would like to track bacterial composition in 3-4 GLEON lakes (Trout, Erken, S America, Rotorua) – patterns of seasonal change and response to episodic events
 - Pick lakes in similar hydrological landscapes
 - Observational study
 - Interested in mixing
5. Susan Hendricks (susan.hendricks@murraystate.edu): Reservoirs are so different from lakes and provide tremendous surface water component to landscape – GLEON would help us answer, for example, C turnover & storage & flux; GLEON could provide replication across reservoirs (n=1 to n=more)
6. Evelyn Gaiser (gaisere@fiu.edu): How concentrations of DOC affect (thermal) reactivity to air temperature (water clarity and climate change)? ~NCEAS **proposal (Jan proposal deadline)**
7. Peeter Nõges (peeter.noges@jrc.it): Strong gradients after temporary events in large shallow lakes that are polymictic – what are the effects of the events? e.g. phosphorus Is there a triggering mechanism for phosphorus, or microbes?
8. Tina Nõges (tiina.noges@emu.ee): DOC & CO2 dynamics – measuring high frequency in lake and in atmosphere (**Paul – tap into Yves Prairie’s group**, need to do in an affordable way)

9. Erik Jeppesen (ej@dmu.dk): Benthic...coupling – disentangling; do this along gradient (north/south, size); fish are badly included in models (bottom up thinking behind most models) – clear change in predation (temp up, more recruitment & higher survival...); there is a change in predation across north/south variation
10. Thorsten Blenckner (Thorsten.Blenckner@ebc.uu.se): High-frequency data from thermistor chains and linking them to phytoplankton... Use wavelength method to...link high frequency data to climate data (?)

Presentation of shirts to members of the governance committee and expanded GLEON steering committee

Not present (**mail**): Lauri Arvola, Ami Nishri, Justin Brookes, Kevin Rose, Marko Jarvinen, Bomchul Kim, Craig Williamson, Guangwei Zhu

WATERS Network: An MREFC initiative in NSF’s Engineering and Geosciences Directorates – Pat Brezonik

- Funds big-ticket items (ice cubes, research vessels, NEON...)
- WATERS is merger of CLEANER and CUAHSI (hydrologic observatories)
- In conceptual phase now, complete conceptual design review in 12/08 and preliminary design review in winter 09/10
- Start of construction in 2012
- \$250-300 million project
- NEON ahead of them, another design review this winter
- NEON Phase I: build 5 observatories on transect from AK to northern FL
- NEON Phase II: beg ~2012 – fill in the rest of their network
- Why WATERS network?
- WATER and Environmental Research Systems Network: WATERS Network
- Trick to come up with MREFC is to determine what questions cannot be answered with current facilities
- Network design principles: enable multi-scale, dynamic predictive modeling for water, sediment, and WQ, inc. near-real-time assimilation of data, high frequency measurements, and point- to national-scale prediction
- 3 hydrologic regions: coastal, humid-continental, arid-continental
- Map of counties in US – precipitation & population (master variables), need ~9 observatories
- WATERS Network will include watersheds, urban water systems inc. their engineered components, major water reservoirs, coastal embayments and estuaries
- National Dynamic Water Network = WATERS Network observations + HIS + other agency data + remote sensing + NHDPlus
- WATERS Network will be an “open” system for water data. Its CI...
- The glue holding the network together will be CI. Three-prong: sensors; digital watershed hydro info systems; synthesis, modeling & visualization

Tim noted that WATERS is national and that GLEON is global and posed the question: How do we realize opportunities for interaction? Pat suggested getting involved in WATERS Network, like Trina McMahon, adding that there are water-related environmental observatories in other countries, and there may be a network of networks someday. Pat will continue to be involved in WATERS from a citizen perspective.

Tim announced that GLEON 6 will be held in Florida, and GLEON 7 will be in New Zealand. He asked that people think about where GLEON 8 should be, and items of interest for the GLEON 6 agenda.

Actions (from discussions during the week at SIL)

1. Science Issues:
 - a. Expand on questions from discussion – aimed at capturing interests of GLEON scientists in the use of the physical and human network of GLEON.
 - i. Look at long-term issues that require “network” approach
 - b. Follow-up on a couple of key activities
 - i. Dissolved Oxygen
 - ii. Microbial Ecology
 - iii. Modeling
 - iv. Reservoir issues?
 - v. Carbon sequestration in lakes
2. Governance Issues:
 - a. Membership Issues
 - i. Complete Form for Individual Membership Applications
 - ii. Strategy for Individual applications
 1. Have expanded Steering Committee sign up
 2. Invite people who have attended two or more GLEON meetings to sign up
 - a. Ask Marilyn to create list!
 3. Identify individuals to be involved in GLEON (this may be an issue that needs to be resolved after some discussion of science focus)
 - iii. Encourage Site Applications
 1. List below
 - b. Future GLEON Workshops:
 - i. Set time/date for subsequent meetings
 - ii. Current list includes
 1. GLEON 6: Lake Annie, FL, USA; 11 – 14 February 2008
 2. GLEON 7: New Zealand, July – Dec 2008 (to be determined)
 3. GLEON 8: ???
 - c. Steering Committee Meeting.
 - i. Establish time for
 - ii. Topics to include
 1. Develop long-term strategy
 - a. Sustain momentum
 - b. Identify other community activities to undertake – e.g., organizing special sessions
 - c. Identify sources of funding and who might be asked to lead efforts (e.g. Evelyn Gaiser for NCEAS proposal)
 - d. Discuss and set key deliverables in a year from now
 2. Establish plan to address diversity on the committee
 3. Set priorities of activities to highlight/promote (e.g., should engage more than two or three sites)
 - d. Publicity/Dissemination
 - i. Any updates for Web
 - ii. Brochure of highlights?
 - iii. Publications

3. Technology Issues
 - a. Look at roll-out of lake deployments from strategic perspective
 - b. Identify key barriers to use of data
 - c. Review strategy of data storing (as backup, as overcoming firewalls, as overcoming lack of personnel to maintain site)

4. Student Issues
 - a. Add information on web site about funding opportunities
 - i. RCN or other awards
 - ii. Funding agencies: NSF EAPSI, NSF Fellowship)
 - b. Add information about long-term research projects
 - c. Follow-up on items from graduate student meeting (Tuesday 14 August)

Expanded Steering Committee:

- Peter Arzberger, US
- David Hamilton, New Zealand
- Tim Kratz, US
- Fang-Pang Lin, Taiwan
- Lauri Arvola, Finland
- Thorsten Blenckner, Sweden
- Ami Nishri, Israel
- Justin Brookes, Australia
- Boqiang Qin, China
- Paul Hanson, US
- Kathie Weathers, US

Potential Site Members:

- Trout Lake Stn, U Wisconsin, USA
- Center for Biodiversity and Ecology, U Waikato, NZ
- Academia Sincia and NCHC (YYL), YYL, Taiwan
- Lammi Field Stn, U Helsinki, Finland
- Center for Lake Mgt, Kangwon U, Korea
- Kinneret Limnological Lab, Israel
- Nanjing Institute for Geography & Limnology, China
- Lake Sunapee, NH, USA
- Lake Annie, FL, USA
- Uppsala U (Erken), Sweden
- Kentucky Lake, USA