

Global Lake Ecological Observatory Network

GLEON GSA Newsletter



Spring Blitz global experiments participating lakes and their locations.

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Now in its fourth issue, the GLEON GSA Newsletter includes a wide variety of articles that showcase just a few of the many GLEON activities. We hope this issue with a brand-new design will promote information sharing and GLEON communication.



The Spring Blitz is a coordinated effort from researchers around the world to link changes in water stability during the onset of stratification to plankton diversity.

This project makes use of the GLEON network of sensors in lakes differing in stratification regime, and is testing whether lakes with stronger stratification in spring develop higher plankton diversity due to the variability in plankton diversity in a strongly layered water column.

An intensive sampling campaign was undertaken by GLEONites in the northern hemisphere during the spring 2013 (March – June). However, some European and Canadian sites experienced an unusual prolonged winter. Some quotes from GLEON colleagues: “Summer is coming late, if at all, and has skipped spring altogether”, “Spring – what’s spring? We had snow halfway through the blitz!!” In the southern hemisphere, spring blitz is currently underway (September – November). This is an unprecedented effort in GLEON, and will undoubtedly provide useful insights in plankton diversity and lake ecosystem functioning.

The spring sampling campaign

High-frequency	Lake Profile	Sampling*
Chl fluorescence	Temperature	Chlorophyll a
Dissolved oxygen	Dissolved oxygen	Nutrients
PAR	pH	Microplankton
Wind Speed	Conductivity	Phytoplankton
Air Temperature		Zooplankton
Precipitation		

* 3 discrete depths - Depth 1: sub-surface, Depth 2: deep chlorophyll maximum (DCM) or at the secchi depth, and Depth 3: bottom of the photic zone as determined by 2.5 times the secchi depth.



GLEON Spring Blitzers hard at work, gathering community composition data in participating lakes.

GLEON Fellowship August Workshop

by Jake Zwart

The second GLEON Fellowship Program training workshop held from August 18th – 23rd 2013 was hosted by Trout Lake Station, the field station of the Center for Limnology at the University of Wisconsin-Madison. Located in northern Wisconsin (Boulder Junction, WI, USA) the field station is an excellent venue to contemplate the major questions in freshwater science as the station is located in the middle of a lake-rich region and there are ample opportunities to rub shoulders with world-class scientists of the past, present and future.

The workshop continued the overarching goal of the fellowship program which is to train a cohort of graduate students how to effectively conduct forward-thinking science within a diverse scientific team using large datasets. Within this framework, the cohort continued their significant progress on two projects while also receiving training on statistical methods and best practices of team science. Two groups have emerged from this cohort based on the datasets on which they work. The “Space Group” has been analyzing the United States Environmental Protection Agency’s (US EPA) National Lake Assessment (NLA) dataset, which includes hundreds of lake and landscape variables measured in over 1000 lakes in the continental United States. The “Space Group” is using this dataset to address the relative importance of watershed land cover, land use, and intrinsic lake characteristics for continental-scale water quality. The “Time Group” has been analyzing a large high-frequency GLEON lake dataset used in two recent publications (Solomon et al., 2013 doi: 10.4319/lo.2013.58.3.0849; Read et al., 2012 doi: 10.1029/2012GL051886) to examine the effect that differing gas exchange models has on the estimate of gas emissions from lakes. Both groups plan on submitting manuscripts for review by early 2014.

In addition to working on both of these projects, the cohort learned from Bayesian modeling expert Shannon LaDeau (Cary Institute of Ecosystem Studies) how to apply a Bayesian statistical model to both the NLA and high-frequency datasets. Shannon led the cohort through a Bayesian model written in the free software OpenBUGS and also provided valuable feedback on the current analyses in both projects. Jon Cole (Cary Institute of Ecosystem Studies) and Jordan Read (United States Geological Survey) also provided valuable insight into the direction of each project and Jordan gave a talk about the value of data and code sharing, a topic that resonates closely with the mission of GLEON. Other topics discussed during the workshop included; best practices for team science, specifically conflict resolution, led by Emily Read (Cary Institute of Ecosystem Studies), and how to manage datasets correctly, which was led by North Temperate Lakes Long Term Ecological Research data manager Corinna Gries (University of Wisconsin).

The workshop also included valuable social time which, not surprisingly, drew most people to the water. Trout Lake Station is situated right on one of the largest lakes in the area, Trout Lake, and provided the cohort with fun recreational experiences such as boat rides, swimming, and star gazing. The Trout Lake Station staff was also kind enough to invite the cohort to the end of the year potluck, celebrating yet another successful and safe year in ecological research. After long days of practicing science, the cohort enjoyed unwinding with some of the more simple things in life such as playing Euchre, ‘the box game’, celebrating birthdays, and just enjoying each other’s company.

A big THANK YOU to all the staff at Trout Lake Field station for accommodating us during the week and to the leadership team (Emily Read, Kathleen Weathers, Paul Hanson, Grace Hong, and Luke Winslow) for ensuring that all travel and agenda items went as smooth as possible. The fellowship program is funded by U.S. National Science Foundation Awards #1137353 and #1137327 (**NSF MacroSystems Biology Program**)



Fellowship workshop at Trout Lake station, Wisconsin (fellowship.gleon.org)

A lake scientist lost in the ocean

“studying the impact of climate change on the ocean using a zero emission boat”

by Bas Ibelings



Last year, at a GLEON meeting, we were greeted by a senior government official with - I believe - a degree in oceanography. Let me welcome you by insulting you: you are insignificant he started his speech. Then followed the usual arguments: 97% of the water on our blue planet is salt water and oceans dominate all of the global biogeochemical cycles. They sometimes do get on my nerves these oceanographers. Not only does modern research prove this statement to be untenable – freshwater systems matter at a global scale for instance by making a very significant contribution to worldwide primary production. And then, the water we drink is it salt or fresh? The fruit and vegetables we eat have they been produced with salt or fresh water? Isn't the fact that only 3% of the water is fresh – of which 2% is locked up in ice and snow, leaving just 1% for all of us to share – the exact reason why freshwater matters so much? After all, what is more valuable sand or diamonds? From a scientific point of view, my discipline – ecology – arguably started with Forbes famous paper 125 years ago “The lake as a microcosm”. Forbes writes: “It forms a little world within itself, a microcosm within which all the elemental forces are at work and the play of life goes on in full, but on so small a scale as to bring it easily within the mental grasp”. Lakes offer science at a human scale — the Anti-Globalization Movement would love it. And yet, there is also something very human about being fascinated by the large and incomprehensible. So yes, although as a lake scientist I felt lost in the vastness of the Atlantic Ocean, I must admit it has been very exciting to study the Gulf Stream. I don't think oceans will ever win me over completely, however the Planet Solar Deep Water campaign in which I am involved is worth a little story even for lake scientists.

At the University of Geneva, there are a number of atmospheric and aquatic scientists who teamed up to study the role of the oceans in producing aerosols. These small particles in the atmosphere play an important role in our climate, amongst others, through their role as condensation nuclei in cloud formation. A considerable fraction of the aerosols is of biological nature, in particular phytoplankton. What we are interested in is to study the impact of climate change on phytoplankton growth and through this on aerosol formation, both in terms of their quantity and composition. We link instruments that sample the ocean to instruments that sample the air and we do this along the Gulf Stream. To study the aerosols in their purest form, without pollution from a ships diesel engine, we are using Planet Solar, the world's largest ship solely powered by solar energy, and the first solar boat to circumnavigate the world. I believe this is a strong image: scientists studying the impact of climate change on the ocean using a spectacularly looking vessel which itself does not produce any CO2. In fact, much of what we do is about outreach: communicating with the public about how climate change is changing our oceans and how this may threaten our future. It was the communication department of the University of Geneva who took the initiative for this whole project and they play a very important role in the execution. We made stops in many cities (Miami, Boston, New York, Halifax, London, Paris etc), we docked the boat in the center of town and made sure we talked to all the television and radio stations, appeared in all possible newspapers (from New York Times to Boston Herald or die Welt). We invited schools to visit the boat and we taught (I did a day of solar boat building at the Boston Children Museum). Of all the activities the interactions with the children perhaps has been the most gratifying. Whereas we struggle to react to a changing climate as it unfolds, I hope that the children we teach will become the change, live the change.



Planet Solar in New York (www.planetsolar.org)

GLEON AT LARGE

SAFER

Sensing the Americas' Freshwater Ecosystem Risk from Climate Change

Use freshwater ecosystems as sentinals or sensors of climate variability and to determine management and mitigation strategies.

by Ana Laura García Montero



SAFER

<http://safer-iai.org/>

What is SAFER? At the GLEON 12 meeting in Israel we decided to concentrate efforts to create a unified observational network for sensing the America's freshwater ecosystem risk from climate change. This is the origin of SAFER that materializes with the contribution of the Inter American Institute for Global Change Research (IAI) in November 2012. (IAI CRN3-038, NSF GEO-1128040)

Researchers from Argentina, Canada, Chile, Colombia, Uruguay and USA are part of this collaborative research network. SAFER objectives are to employ freshwater ecosystems as "sentinels" or "sensors" of climate variability and watershed processes and investigate their interaction with other multiple stressors to assess risks to ecosystem services in the Americas and to determine management and mitigation strategies which are both technically and economically feasible as well as culturally acceptable.

The foundations for this network have already been facilitated by the efforts of GLEON and the Pan-American Sensors for Environmental Observations (PASEO) workshops and short courses. The proposed research will enable these investigators to integrate in situ and remote sensor systems for streams, lakes and wetlands, develop common data acquisition, management and sharing schemes, and collaborate with social scientists to create common strategies and workflows for integrating ecosystem services risk assessment across inter-American, regional and cultural boundaries.

Where is SAFER? The selected sites for the initiation of the long term monitoring program are the pampean shallow lakes in Argentina, a series of major lakes across the Patagonia integrated with the Chilean group working at the same latitude lakes. In the United States the initial efforts are focused on complementary freshwater systems in Central California (San Joaquin River) and Wisconsin. In Canada the monitoring program is located in the Muskoka River Watershed. The Central American team will look into the ecosystem of a natural shallow lake located on the northwest region of Costa Rica and in Uruguay SAFER project team will observe a set of lagoons and wetlands on the Atlantic Ocean coast.

What does SAFER do for students? This five year initiative follows the GLEON criteria of research team integration, formation of human resources and the analysis of socioeconomic and cultural impacts due to climate variability and events. Also the integration of graduate students within the project is based on the probed GLEON structure and philosophy. This student-researcher interaction is one of the most important considerations of SAFER since education and training are at the very core of the project.



SAFER TEAM. Dr. James Rusak (Queen's University and the Ontario Ministry of the Environment); Dr. Silvia London (Departamento de Economía, Universidad Nacional del Sur); Prof. Jaime Escobar Jaramillo (Universidad del Norte, Colombia), Dr. Ma. Isabel Velez Caicedo (University of Regina); Dr M. Cintia Piccolo (Instituto Argentino de Oceanografía-CONICET); Dr. Daniel Conde (Universidad de la República); Dr. Brian Reid (Centro de Investigaciones en Ecosistemas de la Patagonia, Universidad Austral de Chile); Dr. Gerardo Perillo (Instituto Argentino de Oceanografía-CONICET) and Dr. Thomas Harmon (University of California at Merced).

GLEON AT LARGE

High School Students visit GLEON buoy at Lake Taihu

by Mengyuan Zhu

Every summer since 2010, students from various high schools have been visiting Wuxi, a city on the Grand Canal in eastern China. In August 2013, NIGLAS (niglas.ac.cn) welcomed a group of senior high school students from Nanjing Foreign Language School who visited Wuxi for a tour of the Taihu Laboratory for Lake Ecosystem Research (TLLER).

A few different organizations, including “Green Eyes”, “Operation Earth” and “Earthwatch Institute” hosted the activities, leading high school students from Beijing, Nanjing and Wuxi to Lake Taihu to learn and conduct experiments. They are all students interested in science, particularly in environmental protection, thus they always have many interesting questions and suggestions for Taihu. The students are especially impressed by TLLER’s long-term and high-frequency monitoring of the water quality in the lake, which is conducted by a GLEON buoy. They have never seen such a large data stream. The long-term, high-frequency data gives the students a very different view, when compared with what they see from normal experiments they conduct in high school. We also showed the students some research about the quick changes that occur in dissolved oxygen, water temperature, turbidity and chlorophyll a when



Mengyuan Zhu, a GLEON student member, shows students sensors on the Lake Taihu

cyanobacteria grow and accumulate. The students quickly understood that GLEON data could provide detailed information about the lake’s water quality, which is useful and necessary. Furthermore, the online exhibition of these data from the buoy is rather convenient. However, later they found convenient results always accompany a lot of hard work. The GLEON buoy has to be cleaned carefully very often — as much as once a week or more in summer. There are always small shells and filamentous algae, such as *Spirogyra*, sticking to the sensors and floating balls, making the whole system really dirty, and may influence the recording results of the sensors. This work may not be all that pleasant, but when they realized how important it was, they did it very carefully.

They experienced some of the work that goes on at the field station, including cleaning the GLEON sensors, taking a boat into the lake for sampling, and conducting chemical and physical measurements in the laboratory. Finally, they summarized their results in oral presentations. This is always the most interesting and informative part of their internships. Some of them gladly found themselves good at performing experiments, while others had a clearer understanding of scientific research. Even some of them thought science was tough and boring and not suitable for them, now they have a greater respect for scientists. Three or four days’ experience is short, but fruitful and meaningful for teenage students. Those students whose interest in science continue to keep in touch with us and have returned for further visits. Many of these students are now studying abroad or have plans to do so. They considered the internship at Lake Taihu very useful as they further their education. For us, we feel so happy and honored to have them.



Students with Professor Guangwei Zhu (right) on Lake Taihu

rLakeAnalyzer

by Jake Zwart

Lake Analyzer, a software package to calculate physical indices using high-frequency data has been translated into the R language by fellowship cohort members.

Lake Analyzer is a limnological software package that has been used extensively by the greater limnological field (Read et al. 2011, doi:10.1016/j.envsoft.2011.05.006). Lake Analyzer allows users to produce a suite of physical lake parameters derived from high-frequency data, and is suitable for various skill level users. The algorithms are based on established standard methods, and the calculated metrics include thermocline and metalimnion depths, Schmidt stability, and Lake number, among others. The current Matlab version of Lake Analyzer has seen robust usage directly through the downloaded Matlab package and the web interface. Due to the popularity of Lake Analyzer and overwhelming demand for an R-compatible version, we have translated the core functionality to the R language.

The R version of Lake Analyzer (rLakeAnalyzer) is distributed as an R package, takes similar input data as the Matlab version and can calculate many of the same physical parameters. The R package is designed as a collection of functions capable of producing the given output as both single time points and in a time-series. rLakeAnalyzer operates from the R command-line. Although it does not use a parameter file (*.lke) or contain built-in plotting or file output features, as an open-source project new contributions and ideas are welcome. A R-native interface with this widely used statistical package will make the Lake Analyzer toolset even more flexible and useful for lake scientists.

LakeAnalyzer is available on CRAN and can be installed on any version of R 2.15 and greater. **If you wish to receive future updates or have suggestions for improvement, please subscribe to the email list here**
<http://lakeanalyzer.gleon.org/R/>

Project Tracker

by Amy Hetherington

The GLEON Project Tracker is live on the GLEON website accessible from the Science-Technology menu under the Research Projects and Statuses link. The GLEON Project Tracker is a central repository which organizes and tracks GLEON science projects linking to working groups, people and publications. Project details, such as title, abstract, locations, leader(s), participant(s), working group, desired end product(s), timeline and phase are captured for each of the GLEON projects. All members are encouraged to utilize the GLEON Project Tracker which benefits various user groups including GLEON project participants, data providers, members, steering committee and the general public. The GLEON Project Tracker team is developing business processes for creating, editing, reporting and maintaining projects. Look for updates at the GLEON 15 meeting in Argentina.

Title	Leaders	Working Group	Associated Lakes	Phase
General Lake Model (GLM) Multi-Lake Comparison Project - Phase 1 Physics	Bruce Gil Hamilton Trude Read Hilary Hickey	Ecosystem Modelling Working Group		Yellow
Time-scale dependence in numerical simulations. Assessment of physical, chemical, and biological predictions on a stratified lake at temporal scales of hours to months	Read	Ecosystem Modelling Working Group		Red
Comparison of attenuation characteristics between gradually- and non-gradually fed lakes	Rose	Physics-Climate Working Group		Red
Lake-size dependency of wind shear and convection as controls on gas exchange	Read	Physics-Climate Working Group		Red
PROYECTO ARGENTINO DE MONITOREO Y PROSPECCIÓN DE AMBIENTES ACUÁTICOS (PMAIPA) Argentine Project for the monitoring and prospecting of aquatic environments	Perillo			Green
Sensing the Americas' Freshwater Ecosystem Risk (CAFER) from Climate Change	Shahar Belyansk	Lake Metabolism Working Group	Hard	Red
Light dependency of net ecosystem production in lakes	Read	Physics-Climate Working Group		Red
A standards-based framework for real-time web-available sensor processing services (DASPS)	Hamilton Read BISHOP	Physics-Climate Working Group		Yellow
EE: A GLEON tool for sensor data	Melinda Hamilton	Physics-Climate Working Group		Yellow

The project tracker website:

<http://community.gleon.org/research/projects-list>

Get involved! GSA Subcommittees

by Kohji Muraoka

The goal of the GSA subcommittees are to provide unique opportunities for GSA members to get involved in GLEON activities despite fewer All-Hands GLEON Meetings. The New Members Outreach sub-committee and Newsletter Subcommittee are led by students, but heavily interact with non-student members to coordinate some of the many GLEON collaborative efforts.

The primary mission of the GSA (GLEON Student Association) is to provide information, training, and mentoring to GLEON student members. To accommodate the reduction in face-to-face time with members, the GSA has evolved its model. The steps taken to do this include inviting an additional GSA leader (co-chair elect) and developing a document outlining the GSA's Operating Principles and Procedures. What is the best way to get students involved in GLEON "network science" and the "global collaboration atmosphere"? How can GLEON efficiently capture students' enthusiasm and creativity? One of the solutions was to create subcommittees that allow a broader participation of students in GLEON activities outside the All-Hands meetings. The GSA Subcommittees provide unique chances for students to get involved in the form of multi-disciplinary leadership, collaboration, networking, and training opportunities. Students will learn tremendously from collaboratively working and struggling along with others, including experienced non-student members. As a trial, we have initiated two subcommittees: the New Members Outreach Subcommittee and the Newsletter Subcommittee.

New Members Outreach Subcommittee

This subcommittee got its start after some feedback that was received following the G14 meeting in Ireland: "At G14, students were more smoothly integrated than any other time thanks to the team science workshop on Monday". We cannot run the same workshop at every meeting, but we can aim for the same results. The subcommittee was formed in February and generated "Things you should know about GLEON". The subcommittee made this material available to everyone using a micro-blog platform (gleon.jux.com). The subcommittee is also working with the program committee to plan an event at G15. The members will meet during G15 to further discuss the potential of the sub-committee and we welcome any interested students to attend and get involved.

Newsletter Subcommittee

The Newsletter Subcommittee was created to communicate up-to-date information about GLEON activities occurring



New Members Outreach Subcommittee's prototype web-based contents

during the GLEON off-meeting season. Although the newsletter was originally targeted at the GSA members, it gained popularity among the extended GLEON community. In order to increase the breadth of the newsletter and student participation, the subcommittee was formed. Now in its fourth issue, the GSA newsletter includes a wide variety of articles that showcase just a few of the many GLEON activities. This issue with a brand-new design will promote information sharing and GLEON communication.

Overall, the GSA subcommittee is led by students but many non-student members are also involved, promoting the GLEON collaborative environment. Also, the networking opportunity that students receive from the non-student member involvement is a big bonus.

We encourage anyone to contact the GSA leaders for further discussion (Kohji: kohji.muraoka@gmail.com or Jennie: brentrja@miamioh.edu).

This article was written with collaboration from Jake Zwart, Jennie Brentrup, Kohji Muraoka, Liz Ryder, Lyubov Bragina, Ludmila Brighenti, Mengyuan Zhu, Nicole Hayes, Rocio Luz Fernandez, Vicky Veerkamp and the support of many non-student members, especially Grace Hong, Catherine O'Reilly, Jim Rusak and Shelley Arnott.

GLEON/NETLAKE @ SIL 2013

by Lucy Crockford



SIL host, Vera Istvanovics and GLEONites/NETLAKEr's, enjoying the reunion dinner organised during the SIL meeting at Hungary.

A heat-wave hit central Europe in August, but that didn't deter worldwide limnologists and biologists from congregating in Budapest for the 32nd International Society of Limnology (SIL) conference. Amongst the c.500 delegates were no fewer than 42 GLEON members ranging from postgraduate students to senior lecturers and professors. The SIL conference began the week with sessions covering subjects from "Biodiversity in Aquatic Ecosystems" to "Biogeochemical Cycles" to "Limnology at Regional and Global Scales" with about 80 presentations given across nine locations. Each day was jam-packed with interesting topics and insights. Poster presentations from the different sessions were featured during the day and in the evening.

Plenary lectures focused on topics such as river restoration and the effect of global change on limnology and oceanography. Research on the effect of climate change and water level variability in Lake Balaton was also presented. The week finished with plenaries on brackish water lakes and assessing the ecological state of aquatic ecosystems using morphological analysis of phytoplankton.

There was some social activity for the GLEONites with a reunion dinner organised for Tuesday evening. The meal was beautifully prepared and was thoroughly enjoyed by all. An absent member contributed to the festivities by providing a potent GLEON "wine" for all of us to taste. Just the smell was enough to knock even the strongest of us out! It was much appreciated regardless.

It was not all fun and games for the GLEONites however, as on Thursday 8th August the network set to some serious work and discussion with a full day session on "Hypothesis testing using high frequency time series from aquatic ecosystems". Presentations by delegates focused on dissolved organic matter and carbon in the early part of the day, leading on to investigation of thermal stratification using a long-term temperature record. Gases and gaseous exchange were then investigated using wind and convection determinands. In addition, estimating lake metabolism and production using high frequency dissolved oxygen and temperature data was discussed, as well as estimating phosphorus release from sediments using conductivity readings.

While temperatures soared outside, SIL continued with excellent lectures, presentations and networking opportunities. As a thoroughly recommended conference not only for limnologists but also freshwater scientists alike, the next SIL conference has a lot to live up to.

Goldie: the 40th GLEON Site

by Denise Bruesewitz

New Site Goldie on Great Pond is a tremendous tool for engaging students and the local community in limnology and issues of water quality.

Great Pond is a central lake in a chain of 6 lakes in the Belgrade Lakes region in central Maine, USA. Great Pond is 11 km long, 6.5 km wide, with an average depth of 6.5 m and a maximum depth of 21 m. Goldie is located in a deep basin at the maximum lake depth. Great Pond is generally a low-nutrient lake, but water quality has been declining in recent years. At the end of August, Great Pond is 12% dissolved oxygen in the hypolimnion, and it is very likely to go completely anoxic before fall mixing. Great Pond continues to experience *Gleotrichia* blooms, as has been shown by fellow GLEONites (Carey et al. 2012).

Goldie's name is a reference to the film 'On Golden Pond', which was originally a play by Ernest Thompson inspired by his summers along the shores of Great Pond (though movie starring Henry Fonda and Katharine Hepburn was filmed in New Hampshire).

The buoy was funded by Colby College, and is cooperatively managed by Denise Bruesewitz (Environmental Studies) and Whitney King (Chemistry). We are measuring light (above and below the water), oxygen (surface and depth), fluorescence (as a proxy for chlorophyll), and temperature with 10 thermistor nodes. We collect weather data from the roof of the Maine Lakes Resource Center (MLRC) on the shore of the outflow stream to the lake. Goldie communicates with a computer on the campus of Colby College every 15 minutes, and the data are graphically displayed on our website: web.colby.edu/lakes. We purchased the buoy from NexSens/Fondriest Environmental and are happy to share our experience with anyone thinking of purchasing and deploying a buoy.

We have found Goldie to be a tremendous tool for engaging students and the local community in limnology and issues of water quality. We have given several public talks about Goldie over the last several months. As we round out our first season of data collection, we are excited to be involved with synthetic GLEON projects!



Denise and colleagues launching GOLDIE on Great Pond

If you have recently published a paper or presented at a conference, please send us details for inclusion in the next issue of the Newsletter

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What to expect at the G15 meeting in Argentina

By M. Cintia Piccolo

The GLEON 15 meeting will be held in Bahía Blanca, a small coastal city of 400,000 inhabitants southerly located in the Buenos Aires province, Argentina. On Monday, the GLEON Student Association pre-meeting workshop will take place at the Historical and Cultural Centre of the Universidad Nacional del Sur (UNS) focusing on "Working with high frequency data: GLEON tools and local case study of Argentina lake La Salada".

The GLEON meeting will be held at the Instituto Argentino de Oceanografía (IADO). On the last day of GLEON 15 (Friday 8th), the participants will have a full day field trip to the "pampas (flat land)". People will enjoy a typical Argentine "asado" (barbecue) at La Salada Lake located in Pedro Luro, 50 km south of Bahía Blanca. The visitors will have the opportunity to listen to Argentine folk music, take a boat ride to have a close look at IADO's buoy, walk (or run) under the trees or around the lake, visit a local historical site (Army fortress from late the 1800's), small natural historical museum, and the Colorado River. Children from a local English school will join us for an hour to see visitors from around the world interested in their lake and the lake environments. There will also be an opportunity to interact with local stakeholders and decision makers.



G15 activities. Figure by Liz Ryder

Welcome to an unique experience: Argentina!!!!

- The country of the Mate, Gauchos, Pampa and Tango -

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