Welcome to the:

Chequamegon Ecosystem-Atmosphere Study (ChEAS) 2003 Meeting

Kemp Natural Resources Station
Woodruff, WI
June 29 - July 2, 2003

Sponsored by the Chequamegon Ecosystem Atmosphere Study and
National Science Foundation (NSF) Research Collaboration Network grant

Participant list and room assignments

Name	Affiliation	Position	Email	Arrival/Departure	Room
Scott Denning	Colorado State	Prof	denning@atmos.colostate.edu	Sun-Wed	White Pine
Marek Uliasz	Colorado State	RA	marek@atmos.colostate.edu	Sun-Wed	White Pine
Ian Baker	Colorado State	Grad	baker@atmos.colostate.edu	Sat-Wed	White Pine
Joanne Skidmore	Colorado State	Grad	joanne@atmos.colostate.edu	Sat-Wed	Leatherwood
Aaron Wang	Colorado State	Grad	aaron@atmos.colostate.edu	Sat-Wed	White Pine
Paul Bolstad	U. Minnesota	Prof	pbolstad@umn.edu	Sun maybe	Cabin
Eileen Carey	U. Minnesota	Prof	ecarey@umn.edu	Sun-Wed	Hemlock
Bruce Cook	U. Minnesota	RA	bcook@essc.psu.edu	Sat-Wed	Tamarack
Deborah Hudleston	U. Minnesota	RA	hudl0002@umn.edu	Sun-Wed	Hemlock
Leslie Kreller	U. Minnesota	Grad	krel0008@umn.edu	Sun-Wed	Hemlock
Paul's grad student	U. Minnesota	Grad		Sun-Wed	Cabin
Leah Rathbun	U. Minnesota	UGrad	rath0015@umn.edu	Sun-Wed	Hemlock
Faith Ann Heinsch	U. Montana	RA	faithann@ntsg.umt.edu	Sat-Wed	Leatherwood
Ned Patton	NCAR	Sci	ned@patton.net	Sat-Wed	Tamarack
Peter Bakwin	NOAA	Sci	pbakwin@cmdl.noaa.gov	Sun-Wed	Wintergreen
Yiqi Luo	Oklahoma University	prof	ylou@ou.edu	Mon-Tue	Lakeview
Dafeng Hui	Oklahoma University	RA	dafeng@ou.edu	Sun-Wed	Lakeview
Julie Styles	Oregon State	Prof	Julie.Styles@orst.edu	Sun-Wed	Leatherwood
Ken Davis	Penn State	Prof	davis@essc.psu.edu	Sun-Wed	Wintergreen
Tasha Miles	Penn State	RA	nmiles@essc.psu.edu	Sat-Wed	Leatherwood
Scott Richardson	Penn State	RA	srichardson@psu.edu	Sat-Wed	Tamarack
Chuixiang Yi	Penn State	RA	cxyi@essc.psu.edu	Sun-Wed	Lakeview
Martha Butler	Penn State	Grad	mpbutler@essc.psu.edu	Sun-Wed	Hemlock
Ankur Desai	Penn State	Grad	adesai@essc.psu.edu	Thu-Thu	Tamarack
Dan Ricciuto	Penn State	Grad	ricciuto@essc.psu.edu	Sun-Wed	Lakeview
Weiguo Wang	Penn State	Grad	wang@essc.psu.edu	Sun-Wed	Lakeview
Dave Eissenstat	Penn State - Hort	Prof	dme9@psu.edu	Sun-Wed?	Lakeview
Joe Berry	Stanford	Sci	joeberry@stanford.edu	Sat-Wed	White Pine
Ron Teclaw	U.S. Forest Service	Sci	rteclaw@fs.fed.us	Mon-Tue	-
Jiquan Chen	U. Toledo	Prof	jiquan.chen@utoledo.edu	Sun-Wed	Lakeview
Asko Noormets	U. Toledo	Prof	asko.noormets@utoledo.edu	Sun-Wed	Lakeview
Scott Mackay	U. Wisconsin	Prof	dsmackay@facstaff.wisc.edu	Sun-Wed	Cabin
Sudeep Samanta	U. Wisconsin	Grad	ssamanta@wisc.edu	Sun-Wed	Cabin
Brent Ewers	U. Wyoming	Prof	BEEwers@uwyo.edu	Sun-Wed	Cabin

About the meeting

The Chequamegon Ecosystem-Atmosphere Study (ChEAS) is a multi-organizational research effort studying biosphere / atmosphere interactions within northern mixed forests in Northern Wisconsin and Michigan. The unifying goal of ChEAS is to understand the processes controlling forest-atmosphere exchange of carbon dioxide and water on the regional scale and the response of these processes to climate and land-use change. Our annual summer meeting brings together a wide range of participants from within and outside of the ChEAS network to focus on approaches to measure and explain interannual variability in NEE of northern temperate forests.

This meeting is supported by a Research Collaboration Network grant from the National Science Foundation. This grant also provides funding for exchange of research staff among participating ChEAS research groups.

What is the purpose of the annual meeting?

1) The annual meeting brings together ChEAS investigators to exchange research results and make plans for future research. To this end, the meeting includes time for research presentations and discussion time. *Existing investigators are encouraged to attend, and present research progress and future plans.* Investigators are encouraged to bring recent publications and to provide presentations and other materials that can be linked to the ChEAS web page (http://cheas.psu.edu). *NSF funds are available to support travel so that students and postdocs can attend in addition to project PIs.* Students are encouraged to bring brief presentations of their graduate research plans, and ideas for exchanges with other groups that will enhance their research and the integration of ChEAS results.

2) The annual meeting also allows new investigators, or those interested in becoming involved with ChEAS research to become oriented in a short period of time via first-hand discussion with a large number of ChEAS PIs, students and staff. *New or potential investigators, including students, are encouraged to attend.* There will be introductory presentations, field site visits (to be arranged pending requests from attendees) and discussion time. Limited travel funding is available. Our workshops (2002, 2004, 2006) include more extensive training and educational activities.

This year's meeting will include discussions of

1) Integrating our work with the North American Carbon Program. ChEAS Research is a strong match for the types of regional intensive field research called for in NACP planning documents. How can we respond to this opportunity/challenge?

2) New results from our flux towers and associate measurements for the past year, focusing especially on the new science possible given the density and variety of flux measurement sites currently operating in the ChEAS domain.

3) Ongoing/new field projects including tower-biometric comparisons, a roving soil flux intercomparison project, and a demonstration regional inversion project.

Other suggestions for areas of focus are welcome.

Workshop Schedule

This is a tentative agenda. Times and titles can be changed. Presentations and activities can be added or removed. Please read it over and see where your name occurs!

Guidelines for talks: Bring publications to share or at least references. Emphasize collaborative needs or plans, since we'll all be together. Recommend future studies, publications, proposals during the course of your presentation.

Grad student talks: Be sure to briefly outline your degree research plans. Present your ideas on lab exchanges that might benefit your project.

Facilities: Overhead projector, Laptop PC (Windows XP Pro) with CD drive, LCD computer projector. We welcome archiving talks in electronic format if you are willing. Please leave a copy for us (CD-R preferred).

All presentations will be at the Kemp NRS classroom located above the boat house. Note that none of the facilities we will be using are climate controlled – be ready to dress for weather.

Breakfast and lunch are in the dining hall. Food for breakfast (cereals, breads, fruit, milk, juice, coffee), lunch (breads, cheese, peanut butter, salads, fruits, chips, juices) and snacks will be provided. Group dinners will occur most nights at local restaurants. Please let us know if you have any special dietary requests.

Depending on weather and interest, we will schedule an early morning or early evening stable boundary layer bubble release sometime during the meeting, probably at a flux tower site. This is optional for everyone *except* for A.S. Denning.

Saturday, June 28

7:30 Dinner at Minocqua Brewery (meet at Kemp, see directions)

Sunday, June 29

3:00 Field trip to WLEF Tall Tower, hosted by Bruce Cook and Martha Butler.
Drive on your own. Please see directions sections on how to get to WLEF
Group discussions

8:00 Dinner at Spang's Italian Restaurant, St. Germain (see directions section for how to get there)

Monday, 30 June

8:00 Breakfast at Kemp (self-service, food provided)

Background/introduction

9-9:30 *Ken Davis, Penn State*
Welcome, logistics.
A brief history of the ChEAS
Scope of the ChEAS – participants, projects/funds, sites, measurements.
Broader context – AmeriFlux, NACP, global flux network.
Goals for this meeting

9:30-10 *Ken Davis, Penn State*
A summary of major results from ChEAS.
Open discussion – impromptu contributions welcome
Draft ChEAS publications list.

10-10:20 Discussion, questions, floor open for contributions related to these topics

10:20-10:30 *Ron Teclaw, USDA-FS*
Reminder on access to USDA-FS land, any other USFS issues

10:30-10:40 Break

Research results

A. Flux site results (including eddy covariance, chamber flux, biometric measurements and sap flux studies)

10:40-11	*Dan Ricciuto, Penn State* (G) WLEF fluxes – why is there a source of carbon? Interannual variability?
11-11:20	*Chuixiang Yi, Penn State* Estimates of horizontal advection from WLEF
11:20-11:40	*Bruce Cook, University of Minnesota* Willow Creek update/caterpillars discussion
11:40-12	Discussion

12 – 1 Lunch break

1-1:20	*Eileen Carey, University of Minnesota* Sylvania flux tower site update
1:20-1:40	*Ankur Desai, Penn State* (G) Sylvania flux measurements, research plans.
1:40-2	*Leslie Kreller, University of Minnesota* (G) Grad research plans
2-2:20	Discussion

2:20-2:40 Break

2:40-3	*Asko Noormets, University of Toledo* Bayfield flux sites update/results
3-3:20	*Jiquan Chen, University of Toledo* Bayfield flux sites results, new projects/proposals
3:20-3:40	*Brent Ewers, University of Wyoming* Sap flux and transpiration studies at ChEAS
3:40-4	Discussion

4-4:20 Break

B. Down-scaling and atmospheric modeling:

4:20-4:40	*Ned Patton, NCAR* LES at flux towers
4:40-5	*Joanne Skidmore, Colorado State* (G) Using virtual tall tower measurements in global inversion models
5-5:20	*Aaron Wang, Colorado State* (G) Grad research plans
5:20-5:40	*Weiguo Wang, Penn State* (G) Progress towards regional flux derivations

5:40-dinner Summary of the day
Open time for discussions, hikes, etc.

7:30 Dinner at Kemp (BBQ)

Tuesday, 1 July

8:00 a.m. Breakfast at Kemp (self-service, food provided)

Research results

B. Down-scaling and atmospheric modeling, continued.

8:40-9:00	*Julie Styles, Oregon State* Inferring regional CO2 fluxes from surface concentration measurements
9:00-9:20	*Joe Berry, Carnegie Institution of Stanford* Relating CO2 and H2O in the ABL to surface fluxes

9:20-9:40 *Ken Davis, Penn State*
A summary of results from Bakwin and Hurwitz, in their absence

9:40-10 *Martha Butler, Penn State* (G)
Spatial coherence of climate, fluxes, atmospheric CO2

10-10:20 Discussion

10:20-10:40 Break

10:40-11 *Scott Denning, Colorado State*
Reflections on modeling remote locations like N. Wisconsin

11-11:20 *Marek Uliasz, Colorado State*
Mesoscale CO2 inversions and tower network design

11:20-11:40 Discussion

11:40-12 *Scott Richardson and Tasha Miles, Penn State*
ChEAS regional flux experiment. The Wisconsin cuvette.

12-1 Lunch break

C. Up scaling and ecosystem modeling:

1-1:20 *Yiqi Luo, University of Oklahoma*
Inverse analysis of eddy flux data

1:20-1:40 *Defeng Hui, University of Oklahoma*
Partitioning interannual variability in NEE into climatic variability and functional change

1:40-2 *Chuixiang Yi, Penn State*
Interannual variability of fluxes, atmospheric co2, climate

2-2:20 *Faith Ann Heinsch, University of Montana*
Use of Biome-BGC with the ChEAS flux tower to address scaling issues

2:20-2:40 Discussion

2:40-3 Break

3-3:20 *Ian Baker, Colorado State* (G)
SiB at WLEF and the effect of wetlands.

3:20-3:40 *Scott Mackay, SUNY Buffalo*
Interannual variability of water fluxes in northern Wisconsin

3:40-4 *Sudeep Samanta* (G)
Evapotranspiration model uncertainty estimation using ChEAS data

4-4:20 Discussion

4:20-4:40 Break

4:40-dinner Guided discussion of future plans, action items. Suggested topics below:
Proposal plans, calls.
Publication plans.
ChEAS RCN activities – ideas for 04 workshop, lab exchange plans, Other suggestions.
The long view: How long is long enough? Planning for the end of ChEAS.
Are there other major objectives on the distant horizon?

7:30 Dinner at Polecat and Lace, Minocqua (see directions section for how to get there)

Wednesday, 2 July

8:00 Breakfast at Kemp (self-service, food provided)

8:30 - 12:00 Discussion and planning time
Additional time for morning field visit to WLEF Tall Tower or other sites

12:00 Lunch at Kemp (self-service, food provided)

Directions to evening restaurants and other places:

Minocqua Brewing Company (America/Microbrewery) (715-358-3040)
238 Lakeshore Dr., Minocqua
Take Kemp Road out of Kemp Station. Turn left onto WI-47 back to Cnty J (3 miles). Turn left at the light onto West County J to US 51. Turn left onto US-51 south. Follow US-51 into downtown Minocqua (it turns into a one way street). Right after US-51 become one way, get into the right lane. Turn right onto Lakeshore Drive. Restaurant is on the right.

Polecat and Lace (American) (715-356-3335)
US 51 S and Milwaukee Street, downtown Minocqua
follow directions above to get to downtown Minocqua, but instead of turning at Lakeshore Drive, continue south on US-51. Pass Front Street. The next street is Milwaukee. The restaurant is on US 51 S at Milwaukee.

Spang's Italian Restaurant (Italian) (715-479-9400)
6229 Hwy 70 E, St. Germain
Take Kemp Road out of Kemp Station. Turn left onto WI-47 North to US-51 (4 miles). Turn right at the light onto US-51 North. Travel about 2 miles to the traffic light for State Route 70. Turn right at the light onto SR-70 East. Travel 11 miles to St. Germain. Turn right to stay on SR-70 through St. Germain for 1 mile. Turn left to stay on SR-70 at the end of town. In another 0.8 mile on the right is Spang's Italian Restaurant.

Trig's Grocery and Liquor store from Kemp (715-356-9456)
70 West Center, Minocqua
Take Kemp Road out of Kemp Station. Turn left onto WI-47 back to Cnty J. Turn left at the light onto West Cnty J to US 51. Turn left onto US-51 south. At next light, turn right onto WI-70. Trig's is on the right in less than a mile. The liquor store is connected to Trig's, you can pay for your liquor at the grocery checkout.

Mama's Supper Club (Italian/American) (715-356-5070)
10486 Highway 70 West, Minocqua
Follow the directions to Trig's, but once you get to Trig's, keep going. You will see Mama's in 3-4 miles down WI-70. The restaurant is on the right.

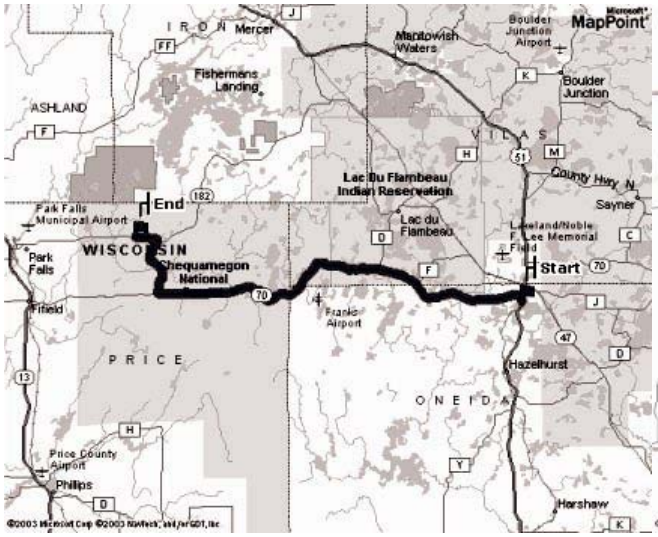
Fence Lake Lodge (Continental/Gourmet) (715-588-3255)
12919 Frying Pan Camp Lane, Lac du Flambeau
Take Kemp Road out of Kemp Station. Turn left onto WI-47 north toward Woodruff. Keep following WI-47 through Woodruff, past US-51 for 11 miles. Turn left at Frying Pan Camp Road (there will be a sign for Fence Lake Lodge). There are two restaurants here, one fancy, one regular (Lakeshore Restaurant).

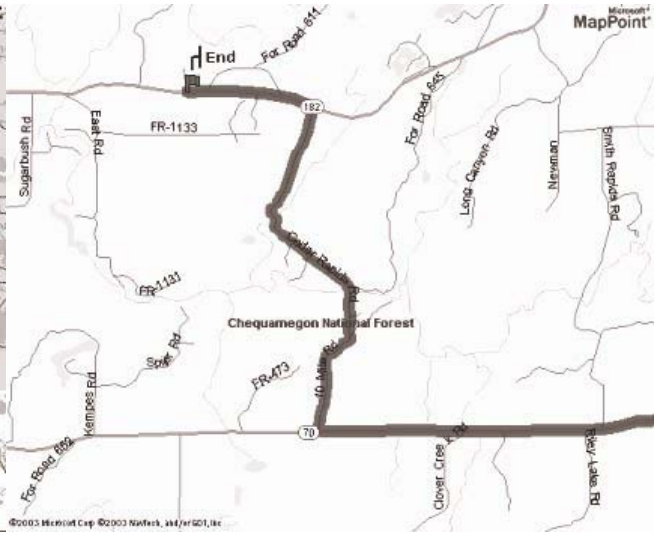
Norwood Pines Supper Club (American/Northwoods) (715-356-3666)
10171 Highway 70 West, Minocqua
Follow the directions to Trig's, but once you get to Trig's, keep going. You will see Norwood Pines Supper Club in 2-3 miles down WI-70 on the left.

Directions to field sites:

WLEF Tall Tower
Driving time: 40 miles, about 1 hour

Leave Kemp down Kemp Woods Road (2 miles)
Left (North) onto SR 47 North and go 3 miles to traffic light for Highway J
Left (West) onto Highway J West and go 1 mile to traffic light for US 51
Left (South) onto US 51 South and go < 1 mile to traffic light for State Route 70
Right (West) onto SR-70 West and drive 28.5 miles.
Right (North) onto Forest Road 149 also known as 10 Mile Road and go 1.3 miles
Road name changes to Cedar Rapids Road, keep going another 3.3 miles to SR-182
Left (West) onto SR-182 West. Over the next 2 miles or so, you will pass Camp 9 Road (Rt 908) on the right and Forest Road 529 on the right. After FR-529, on your left you will see a small clearing and a very tall tower. You made it! Turn left and park.
If you pass FR 512 on the right, or East Road on the left, you have gone to far.





Willow Creek Uplands Site and Flux Tower
Driving time: 25 miles, about 40 minutes

Leave Kemp down Kemp Woods Road (2 miles)
Left (North) onto SR 47 North and go 3 miles to traffic light for Highway J
Left (West) onto Highway J West and go 1 mile to traffic light for US 51
Left (South) onto US 51 South and go < 1 mile to traffic light for State Route 70
Right (West) onto SR-70 West and drive about 11 miles
Midway between Fifield and Woodruff on Hwy 70 you will pass a bar named Musky Jack's on the right. Then you will see Pike Lake on the right
Immediately afterwards, turn left (south) onto FR-132 South (also called Pike Lake Road)
Travel about 5 miles to FR-130
Turn left (East) onto FR-130 and drive about 1/4 mile
Turn left (South) onto FR-130D (2-track road) and drive 1/2 mile
You will first pass the generator shelter on the left (1/4 mile) and then the tower and shed

Directions to field sites (continued):

Lost Creek Wetlands Site and Flux Tower
Driving time: 25 miles, about 40 minutes

Leave Kemp down Kemp Woods Road (2 miles)
Left (North) onto SR 47 North and go 4 miles to traffic light for US 51
Continue on SR-47 another 14 miles or so toward Lac Du Flambeau and SR-182
About 1/4 mile after SR-47 intersects with SR-182 (on the left) is the alder wetland.
There is a gated snowmobile trail on the south side of the 47 that will take you out to the site.
You should also be able to see the tower from the highway.

Sylvania Old Growth Site and Flux Tower
Driving time: 40 miles, about 1 hour

Leave Kemp down Kemp Woods Road (2 miles)
Left (North) onto SR 47 North and go 4 miles to traffic light for US 51
Right (North) onto US 51 and go 6 miles to County Road M
Right (North/East) onto CR-M and go 8 miles to Boulder Junction
Turn left to continue on CR-M through Boulder Junction and go through town (< 0.5 mile)
Turn right again to continue on CR-M and go 7 miles until the road ends at CR-B
Right (East) onto CR-B and go 12 miles
You will pass a sign for Bent's Camp on the left and then Spring Creek Road on the left
The next major road after Spring Creek Road on the left is Thousand Island Lake Road (formerly County Z)
Left (North) onto Thousand Island Lake Road
Travel 4 miles or so until you get to a major intersection with lots of white signs
Turn Right (North) to continue traveling on Thousand Island Lake Road
In the next few miles, you will pass Jay's Resorts and then Wilderness Bay Lodge
After a sharp curve to the right, stop when you get to a sign for Snap Jack Lake
There is a paved road to the left that goes to Snap Jack Lake
Turn right onto the 2-track road to get to the site
Park at the forest service gate and walk down trail about 1/2 mile to an electrical utility box on the left, the tower and control shed are pass the utility box

Lodging, facilities and local information

Sheets and linens are provided (you can also bring your own sleeping bag). Towels are NOT provided. You may also want to have shower slippers, hiking shoes, a bathing suit, a flashlight, and some bug spray. We will have access to a large kitchen for group or individual meals. Cooking vessels, utensils, plates and cups are all provided. Food is available at nearby supermarkets. We plan to stock the kitchen for breakfasts and lunches and go out to dinner as a group. We can reimburse expenses (restaurant, groceries). We cannot reimburse you for alcohol. Save your receipts if you purchase food for groups meals. Save the other typical receipts as well (see reimbursement forms included with this packet).

We have the boathouse for large lectures and the lab for smaller groups meetings. We'll bring one LCD projector to hook up to your laptop. There is a high speed connection to the internet in the lab (**user: genuser, password: kempnrs**).

Groceries and Sundries - Trig's in Minocqua, WI is the best nearby 24-hour supermarket and liquor store. It is located on state route 70, 1/4 mile west of the intersection of 70 and US 51. Near Trig's are a bakery/coffee shop, Walmart and Radioshack. Ace Hardware in Woodruff, WI (north of Kemp on state route 47) is the best local hardware store.

Restaurants - Information about the Minocqua area, including restaurants can be found at http://www.minocqua.org/ and the directions section in this packet.

Recreation - Canoes and rowboats are available for use from the Kemp boathouse. From Kemp you can explore the many surrounding lakes. Hiking opportunities are infinite in the Chequamegon-Nicolet National Forest. Trails also exist on the Kemp property. The Upper Peninsula of Michigan, about 1 hour away, has beautiful state parks (i.e., Porcupine State Park). Fishing is also very popular up-here; a Wisconsin non-resident four-day fishing license will set you back about $15.

Other attractions - World's largest wooden penny and the Dr. Kate museum in Woodruff, the Rhinelander Hodag at the Rhinelander Chamber of Commerce, Fred Scheer's lumberjack show in

About the ChEAS research collaboration network laboratory exchange

Funding is available for short-term (2 weeks to 2 months) exchanges of students and postdoctoral researchers between ChEAS core participant laboratories. The objective of the exchange program is to promote cross-disciplinary research focused on understanding the processes controlling forest-atmosphere exchange of carbon dioxide and water and the response of these processes to climate and land-use change. Candidates will be chosen based on scientific merit of proposed research project as determined by the steering committee and participation by the maximum number of participant labs will be strongly encouraged. Funding for laboratory exchanges includes roundtrip airfare from the home institution and per diem. The host laboratory group is expected to provide temporary housing.

To apply for a 2003 lab exchange send the following materials to Diane Yoder (dyoder@meteo.psu.edu):

1. statement of research problem
2. proposed work
3. benefits to you, ChEAS, and host lab
4. expected products
5. letter of support from host lab

Local Area Map