Which languages do you speak?

- Chinese
- English
- French
- German
- Portuguese
- Spanish
- Others
AmeriFlux Webinar Series

Hosted by the AmeriFlux Tech Team

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AmeriFlux Webinar Series

Fieldwork safety planning

Hosted by the AmeriFlux Tech Team

Mute.
Unmute to speak

View chat window
Send messages for questions, comments, and zoom help.

Technical issues during the webinar: AMP-webinars@lbl.gov
Data collection: done accurately AND safely!

- Introduction - why safety?
- Site safety planning
  - Working at height
  - Fieldwork code of conduct
  - Work alone
- Breakout groups
Community Safety Survey

want to learn about:
- Working at height: 21.3%
- Site safety plan: 21.3%
- Covid & fieldwork: 8.2%
- Work alone: 26.2%
- Code of conduct: 23.0%

challenge:
- Lack of training: 30.8%
- Staff turnover: 17.9%
- Cutting corners: 20.5%
- Lack of resources: 20.5%
- No safety culture: 10.3%
Rationale - why safety?

- We, the AmeriFlux Management Project, care about your safety
- Your colleagues, family, and friends care about your safety
- You should care about your safety!

Preparing ahead of time is the best means of preventing accidents and knowing what to do, in the event of an emergency
- How to do implement?
Safety planning

Define Work - Clear description of the tasks to be accomplished

Analyze Hazards - Identification and analysis of the hazards, risks, and impacts associated with work

Develop Controls - Controls sufficient to reduce the hazards and impacts associated with any activity to acceptable levels (planning and training)

Perform Work - Work in accordance with the established controls.

Feedback and iterate
What hazards do you face collecting flux measurements?
Analyze Hazards (1/2)

Weather/environmental
- Heat stress and sun exposure
- Ice, snow, wind chill, low temperatures (hypothermia)
- Lightning / wildland fire
- Extreme events (e.g., tornados, earthquakes)

Biological
- Disease-carrying and stinging insects (e.g., ticks, bees, wasps)
- Venomous snakes
- Poison oak/ivy
- Bears, alligators, sharks, constricting snakes (on my!)
- COVID

Chemical
- Cryogens (e.g., liquid nitrogen)
- Scrubbers/desiccants ($\text{Mg(ClO}_4\text{)}_2$)
- Battery acid
- Gasoline

Pressure
- Compressed gas cylinder = stored energy
Analyze Hazards (2/2)

Electrical
- High voltage/current solar panel systems

Travel (motor vehicle operation)
- Particularly off-road and winter travel
- Collisions

Physical
- Moving large/heavy objects (e.g., cylinders, batteries)
- Foot travel over uneven terrain
- Power tool use
- Fatigue
- Ergonomic (e.g., repetitive tasks, poor positioning)

Working at height
- Falls
- Falling objects

Human
- Threat from non-team member (e.g., trespasser, hunter, adjacent land owner, etc)
- Inappropriate actions from a team member (psychological/emotional safety)
Develop Controls

- Local resources for pre-existing controls (e.g., University/Agency safety protocols)
- State/national safety authorities (e.g., Occupational Safety and Health Administration (OSHA), Cal/OSHA)
- Involve all stakeholders when developing safety plans

- Identify relevant training
  - Formal vs. informal
  - Basic outdoors training (Leave no trace, 10 essentials, what to wear)
  - First aid / CPR / wilderness first aid
  - Specialized training (tower climbing, avalanche, heavy machinery, etc)
Emergency communication

- **Who?**
  - Have emergency numbers ready

- **How?**
  - Land-line, cell phone, satellite phone, emergency beacon?
  - Have a backup communication option

- **Where?**
  - Know your location
  - GPS position

- **What?**
  - Incident details
A field work safety plan should be written and made available to all workers. It should include:

- Hazards and required training
- Emergency contact information for all personnel
- Directions and contact information of nearest hospital and clinic
- Nearby communication options (if cell phones do not work)
- Evacuation routes and meeting areas
- Incident / accident reporting templates
- Fire extinguisher/trauma (first aid) kit location(s)
- Checklist of items to always carry (first aid kit, permits, communication devices, PPE, fire extinguisher, etc).
Fieldwork activities are an essential part of our work, and need to be conducted in respectful, inclusive, and collaborative ways.

Institutions (PIs) should write a code of conduct for fieldwork activities before field trip begins to remind participants of their responsibilities to their institution and colleagues to prevent and respond to unacceptable behaviors.

**Expected behavior:**
- Treat everyone with respect.
- Respect your colleagues by using good practices for intercultural collaborations.
- Be mindful of your surroundings and of your colleagues.
- Alert fieldwork activity leader if you notice a dangerous situation or someone in distress.
Fieldwork code of conduct

Unacceptable behavior:
- Physical or verbal abuse, harassment, or assault
- Intimidation or bullying
- Coercion/Manipulation
- Gender, race-based, age-based, ability-based, or sexual harassment
- The use of hate speech
- Behavior that endangers the mental or physical health and safety of oneself or others
- Tampering with the proceedings of a misconduct report
- Retaliation against a person or group reporting code of conduct violations.

All team members have the **responsibility to report all instances of unacceptable conduct** as defined above to the appropriate party (team leader) and see that the issue is reported to the outside contact personnel (home institution).

**All instances of misconduct require reporting no matter the severity.**
Working at height

Towers used for above-canopy flux measurements are the main hazard
BUT also consider the following:
- Ladder work
- Roof tops
- Soil pits

AmeriFlux sites pose some unique fall hazards.
Working at height

Mitigating the risk

- Eliminate the hazard (e.g., reduce need to climb, guardrail system)
- Tower inspection (regular walk-around prior to use, annual by trained engineer)
- Proper use and inspection (e.g., mildew, frayed, damaged) of fall protection equipment
- Hardhats for all workers (even if not climbing)
- Tool lanyards for tower climbers
- Discuss and identify procedures should a fall occur
- Staff trained in self rescue

Training

- Available from commercial companies
- Ideally, should include hands-on component
Work alone considerations

Avoid working alone when possible

- Check with your institution/local guideline;
- Is working alone really necessary? Can work be coordinated with others (buddy system)?
- Don’t work alone in the field if you feel uncomfortable, threatened or unsafe.

Minimizing risk

- Define the work scope, provide team with work plan;
- Have a check-in/out system in place; Familiarize with emergency exit possibilities;
- Be realistic on envisaged work/task duration (5min jobs often end up being 2 hours and 5 mins;
Work alone considerations

Out and about, alone in the field...

- Make yourself visible and avoid the ostrich effect;
- Be alert of your surroundings (sounds, smells, dwindling daylight, weather, etc.)
- Play music, so animals/people are not startled when they “stumble” over you;
- Wear high-viz if possible (possibly identifying yourself as belonging to a particular University, etc.);
- Be prepared to explain what you’re doing, if approached; Don’t be rude if stressed.
- Keep phone, whistle, bear spray handy;
- Stay calm, don’t panic and don’t rush!

- And once again: Don’t work alone in the field if you feel uncomfortable, threatened or unsafe. Leave the site! Don’t put science over safety!
Safety feedback

- Incident reporting
- Near misses / close calls
- Daily debriefs / check ins
Questions?
Breakout groups introduction

- Short (8 minute) group discussions
- Groups of ~4 people
- Turn on your video, if possible

Open with a brief self-introduction (<30 sec per person)
- Name
- Home institution
- Site affiliation
- Role

Use the assigned scenario, discuss what you would do.

Share feedback and group discussion points in the poll when coming back.
Breakout topic 1 (odd groups)

You and your labmate are heading out to your alpine flux tower (9,000 ft asl) for scheduled preventive maintenance and to download data. Your labmate is new to the group and this will be their first time to the site.

It is the peak of summer monsoon season and the forecast has a high likelihood of afternoon thunderstorms. To retrieve the data, you need to climb the tower (30 m) to swap the data card.

In your breakout, discuss some hazards of this trip and associated control measures that could be used.
The project lead has asked you (lab manager) and 2 others (a postdoctoral fellow and an undergrad student) to help with soil sampling around the tower. The measurements are urgently needed for an important publication.

You are working in pairs (you and the PI; the postdoc and student). You notice the undergrad taking frequent breaks and complaining about the hot weather conditions. You also overhear the postdoc using harsh language towards the undergrad and telling the student to ‘toughen’ up.

In your breakout, discuss what you would do in this situation.
Breakout 1 Feedback (alpine)

Top
Breakout 2 Feedback
Thank You!