

HOW TO RECORD THUNDER AND RAIN

by Gordon Hempton, 10/24/2013

Winds may be among the most difficult nature sounds to record, but Thunder & Rain are surely among the most risky. A microphone amid a thunderstorm is for all practical purposes a lightning rod. Here, I will draw upon three decades of experience recording in one of the wettest places in the world--the rainforests of the Olympic Peninsula, Washington, and share tips to keep you safe and your equipment running.

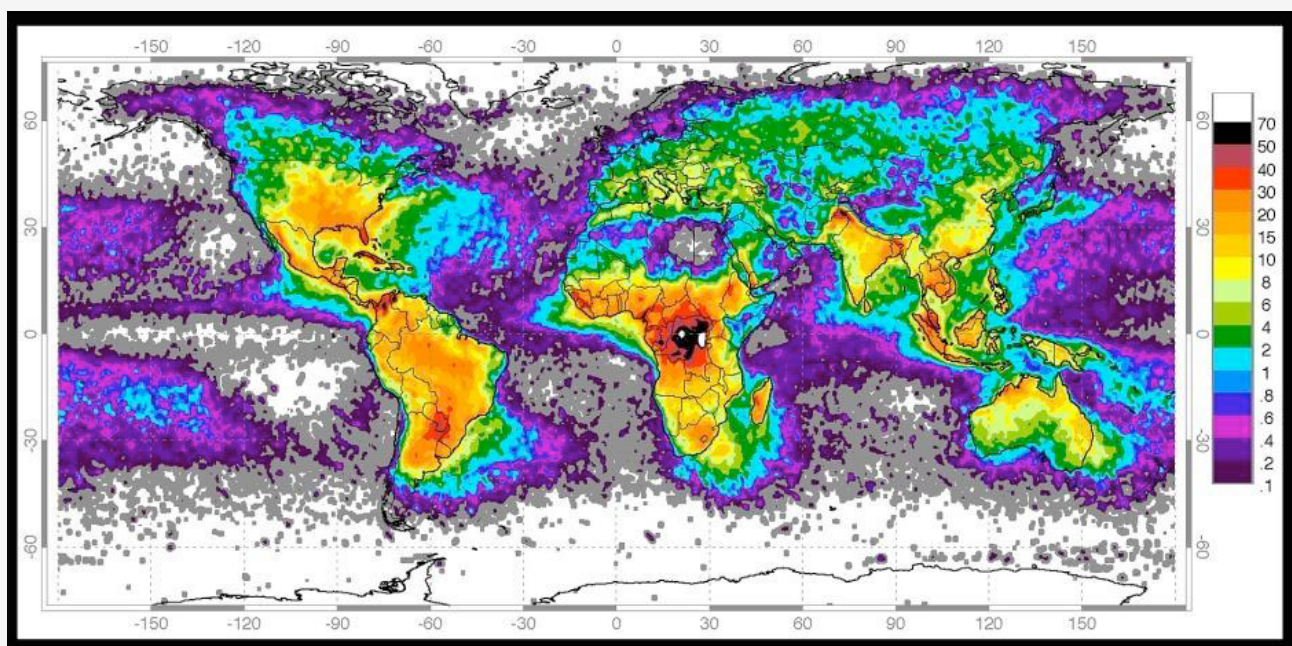
RISKY BUSINESS

It is estimated that more than 1,000 people are struck by lightning in the United States each year. Do your homework. Enough said.

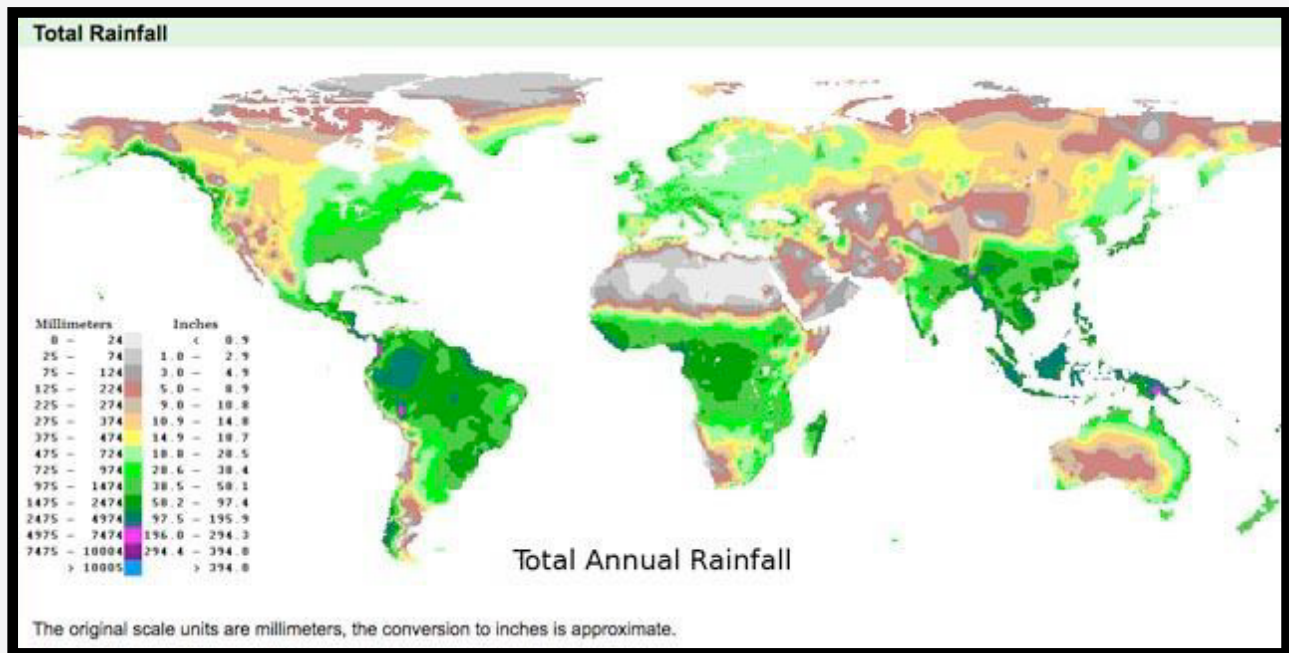
LOCATION IS EVERYTHING

Location is the single most important choice you can make as a field recordist beyond equipment choice, which we'll get to in a moment. You'll probably spend far more time carefully deciding where to record than you will with actually running your equipment. First, you need to find predictable thunder and rain without noise pollution. Second, you will want the right topography and vegetation for outstanding details like dripping leaves.

Fortunately, several kinds of maps are as close as your computer screen. Some show incidence of lightning strikes.



Others depict annual rainfall, a good indicator of vegetation.



Here in the United States, Colorado and Florida are two standouts of lightning and rainfall. Understand, however, that contrary to popular belief, low frequency noise pollution, typical of transportation and power plants, is not masked by rainfall. So both Florida, gridded by coal- fired power plants, and Colorado, crisscrossed by major flight paths, present recording challenges. Severe thunderstorms do divert aircraft temporarily, but they soon return, spoiling all the wonderful events that occur in a storm's aftermath, like puddles, with their engine noise.

The third resource I'd recommend is an up to date NASA night time view of Earth.



I say updated because population growth, combined with energy consumption, can quickly overrun a formerly pristine region with unwanted man-made noise. Light pollution, the evil cousin of noise pollution, is therefore a valuable indicator of places to avoid. The dark areas on the NASA image represent possible recording sites when they coincide with areas of predictable thunder and rain.

Once you have assembled a list of potential recording sites, next locate these places on Google Earth. Zoom in, study access, determine the proximity of noise pollution (both lit and unlit), and also study the topography.

Topography provides a strong indication of a key component of thunderstorm recording, namely, how evocatively thunder will roll. Long echoes reflect the number of ridges and hillsides over which the thunder flows. But it is not the only influence as the atmospheric cells within the storm itself also cause the sound to travel along different paths and arrive at the microphone at different times producing long rolls. Because lightning strikes people every year in flatland areas I prefer forested rolling hills and mountain valleys to level prairies and deserts.

Thunderstorms occur worldwide, even at the poles, but occur most frequently in the tropics. By many accounts, Uganda is the stormiest place on earth. In temperate regions thunderstorms roll in most reliably in spring and summer. Cocking a well-trained ear, legendary naturalist John Muir “recorded” a thunderstorm in California’s Sierra Nevada Mountains with these words in *My First Summer in the Sierra*, which I recommend reading in his collected works „*The Eight Wilderness Discover Books*“:

„Presently a thunderbolt crashes through the crisp air, ringing like steel on steel, sharp and clear, its startling detonation breaking into a spray of echoes against the cliffs and canyon walls. Then down comes a cataract of rain. The big drops sift through the pine-needles, plash and patter on the granite pavements, and pour down the sides of ridges and domes in a network of grey, bubbling rills. In a few minutes the cloud withers to a mesh of dim filaments and disappears, leaving the sky perfectly clear and bright, every dust-particle wiped and washed out of it. Everything is refreshed and invigorated, a steam of fragrance rises, and the storm is finished--one cloud, one lightning-stroke and one dash of rain. This is the Sierra mid-summer thunderstorm reduced to its lowest terms. But some of them attain much larger proportions, and assume a grandeur and energy of expression hardly surpassed by those bred in the depth of winter...“



PACK THE RIGHT EQUIPMENT



You will want both a rain shield and a storm shield. My rain shield is made from mat of hog's hair that I bought from a business that restores antique furniture. You can purchase a similar, two-inch thick, rubberized mat of tightly pressed hog's hair. This rain shield works by dispersing rain on impact and damping sound. When a rain drop strikes the mat, it scatters on impact, making a faint Phip rather than a loud Plop. Close rain drops are less noticeable. When suspended at an angle above your recording spot, rainwater can be drained to the rear, away from the microphones. The larger the rain shield the higher the shield can be placed above the microphones and this added free space makes a more natural sounding recording. Plus, your equipment will stay dryer, too.



My storm shield offers protection from wind as well as rain, but is a bit more awkward to transport and produces a more confined sense of space in the recording. To make it, I encased a wire mesh wastebasket with hog's hair. This wastebasket storm shield is deployed atop the equipment like a fez on the head of a Shriner. The inverted solid bottom of the wastebasket prevents rain from entering even under torrential downpours, and the covering of hog's hair diffuses the impacts of water droplets. By leaving the bottom open, I can suspend the storm shield from a tree limb (that I can picture) or mount it on a tripod (that I cannot visualize). In these instances, I sometimes need to add supplemental hog's hair to prevent wind from blowing in from below.

MICROPHONES



Storms have a wide dynamic range, so you will want microphones that can handle sound pressure levels (SPL) of 130 dB or higher for thunder; and you'll want a clear, crisp, clean transient response with good S/N to bring out all the delicate details of light rain. Wear padded bike gloves to reduce handling noise.

CONFIGURATION

Always go with what sounds natural to you. M-S, ORTF, Surround, AB, X-Y are some of the popular choices. I use the Neumann KU-81i Dummy Head because it does a superb job of spatial imaging, is warm sounding, provides S/N with a maximum SPL of 130 dB at 1 kHz. The Sennheiser MKH 20 (133 max dB) and the DPA 4041-SP (134 max dB), both omnidirectional, may be useful when improved S/N is needed.

CARRY YOUR EQUIPMENT IN DRYING BAGS



You will want two padded shoulder bags, one for your microphones and one for everything else. These bags need to be customized with vapor proof barriers that will contain desiccant to help keep your equipment dry. And while you operate your deck, the flap on your bag can help cover your gear while you operate the controls. I buy my desiccant from ULINE and use several desiccant packets at once. You'll know when the desiccants need replacing by weight. Put a used desiccant packet in one hand; a new one in the other. If the used package is noticeably heavier--replace it with the new one.



With dual drying bags, you can record with confidence--not just storms but elsewhere, recording other nature sounds. These drying bags are dust free and padded, so your equipment is protected from shocks. Plus, by sticking to the limit of two carryon bags enforced by most airlines, you need not check your precious equipment.



My microphone bag is army surplus, once used to carry a jet pilot's helmet. My everything else bag is a shooters bag used by photo-journalists. The backside pouch is where I conveniently store my microphone cable for whenever I need it. By cutting a hole thru to the main compartment, my recorder is never exposed when it's time to setup. The cables are always connected to my recorder--reducing dust, moisture, and valuable setup time.

ON-LOCATION

Look for the right place to record well in advance of an approaching storm. Even with a rain shield and a storm shield at the ready, I find that natural rain shields provide the best results. The two most common natural shelters are large leaning trees and overhanging rocks. If it has rained recently, you can opportunistically occupy a dry area beneath such a find.

Once you're about to settle in place, many choices still remain that will affect the quality of your recording as well as increase its value to a collection. Consider: Are you recording sfx or ambience? Are you composing a finished sound portrait that will remain unedited? Note all the leaf types around you. Tap on them. Imagine how the raindrops and subsequent forest drips will sound on these substrates. Identify any rocks that will splatter. And depressions that will puddle. And maybe reconsider: Are you far enough up the valley to capture rich echoes? These are all artful questions and assessments and judgments that only you can make. In the end, always go with what feels best to you, NOT the calculated answer. Field recording is an art.



CHECK YOUR SETTINGS

Make sure the limiter is off, even if it is soft-limiting. Likewise the Roll-off filter. Adjust the gain for expected peak levels and let everything else fall where it does. Clap your hands loudly in front of the microphones to simulate a loud storm if you have no idea where to set the gain controls. I record at 48 kHz, 24 bit, but frankly, thunderstorms are perfect for higher sampling rates. Adjust headphone monitoring levels to just a little louder than natural levels. Make sure your gear is stable, flip over the protective flap, and push record. Be prepared to leave your equipment running should you need to retreat if lightning seems to be getting dangerously close. Don't forget: Your microphone is a lightning rod.

IT'S NOT OVER UNTIL IT'S OVER

Waiting for thunder, though not waiting for Godot, can often test your patience. The weather doesn't often happen exactly as predicted. Use this wait time to better acquaint yourself with equipment. Each time you open your bag, you let dust and moisture in, so practice sliding your hand inside and learn to make adjustments by feel alone. As an aid, I superglue sandpaper atop the record button to make it instantly recognizable. (Be careful with the superglue. Don't let any of it go beyond your target area.)



Here's another tip. If your headphone volume control can change position too easily, like on my Sound Devices 722, an accidental bump can lead to false gain settings. Wrap the knob with non-adhesive rubber tape (available in the plumbing section of most hardware stores). Two or three close wraps between the knob and the deck body will fix this problem, while still allowing the knob to be turned, if a bit less easily. And while you're at it, you might want to add a marker to the knob to indicate your most common setting.

If distortion occurs, lower the gain level at least 6 dB. If lightning is reasonably close but you are still well below peak levels, then increase the gain. Never turn the gain back up if you have turned it down --there is always that one last thunder clap during the aftermath. You don't want to miss a golden opportunity.

If you hear spurious buzzes during a rain storm the likely culprit is low power. Replace the battery pack even if the low battery indicator is not showing. Buzzing still there? Maybe you didn't change the desiccant in the drying bags before you left home. Replace the desiccant and put the microphones in the drying bag for 24 hours and keep the bag warm. If you are camped out at a cold location, take the microphone drying bag with you inside your sleeping bag. If the buzzing persists, your system might be really wet with moisture drops. Blow it out with canned air, which, because it is compressed, is dry. But be careful. Some canned "air" is flammable. So, allow your equipment to also air naturally before you put it back into the drying bag.



Extra long cable lengths will help you relax during the potentially long waits by allowing you to change postures, stretch muscles, even read a book without recording your movements. Reels sold at hardware stores for wrapping power cords make for fast deployment and easy storage of microphone cables. Be sure to use highest quality cables to avoid high frequency loss due to added length. Be sure to inspect cable when reeling up for rodent teeth marks (they like to exercise their teeth on the rubber coating).

EXPERIENCE COUNTS

Be willing to make mistakes and learn from them. Do your homework. Find the right location. Know your equipment. Keep your gear dry. And above all, **stay safe**.

ADDITIONAL RESOURCE

Sound Designing with Thunder and Rain, Gordon Hempton, 10/28/2013, available with „How to Record Thunder and Rain“, inside the BOOM Library „Thunder and Rain“ product on www.boomlibrary.com.



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