Lightning is rare but important in Kenai Peninsula fires

by Ed Berg

As a born-and-raised Midwesterner, I love a good thunderstorm with lots of lightning, especially at night. On the Kenai Peninsula I miss these grand pyrotechnic shows and that mixture of awe, terror, and relief, when you say, "Boy, that one was close!!"

On a recent Saturday (Aug 19) we had just such a display as a thunderstorm rolled up the central Peninsula, crossing Tustumena Lake and passing over Sterling. Mark Wegner was fishing at Nikolai Creek and saw lots of lightning on both sides of Tustumena Lake. Two fires were reported the next day, which were probably caused by lightning strikes. One fire was just south of Windy Point on Tustumena Lake, and the other was on the East Fork of the Moose River. We are monitoring these spots, and no smoke has been seen at the Tustumena Lake site for a week. Local pilots did report smoke at the East Fork site last weekend, however. The burned areas are less than an acre. Both fires are in the zone of limited suppression, so we would not extinguish them unless they threatened to move toward populated areas.

I have always been puzzled about the lack of lightning and lightning-caused fires on the Kenai. The vast majority of our wildfires can be clearly traced to human beings (campfires, cigarettes, etc.). Jim Peterson at the Alaska Division of Forestry in Soldotna estimates that maybe one fire per year might be traceable to lightning, although he did recall one thunderstorm in the late 1980's which started seven fires simultaneously in the Caribou Hills.

The Kenai's general lack of lightning contrasts strongly with Interior Alaska, which can have several thousand lightning strikes and dozens of fires in a single thunderstorm. Alaska Fire Service (AFS) data for the Interior, for example, show an average of 26,000 cloud-to-ground lightning strikes per year during the period 1986-97, most occurring between four and six pm during late June and early July.

The electrical impulses from lightning strikes are recorded by electrical sensors at nine stations in Alaska, mostly north of the Alaska Range, and AFS prepares daily lightning maps during the summer. Unfortunately, it takes quite a blast on the Kenai to reach the sensors. When I checked with AFS about our Aug 19 lightning strikes, they hadn't recorded anything at all. If we had more lightning, I was informed, they would put some sensors down here, but they want the biggest bang for the buck, one might say.

So, why don't we have more lightning on the Kenai? I discussed this with Dorte Dissing, who is doing a graduate thesis at UAFInterior Alaska, orographic effect, Swanson River Road, on lightning and the boreal forest in Alaska. She pointed out that to get a good thunderstorm going, you need a very unstable airmass that would rise "forever" if given the chance. You also need some kind of triggering mechanism to set off the instability and get the air churning. The problem in coastal areas like the Kenai is that most marine air masses are very stable, and do not want to rise. In coastal areas it is hard to heat up the ground enough to get the air moving upward by convection, because of the cool ocean air and the extensive cloud cover. Furthermore, the coastal air aloft is much warmer than in the Interior, and it makes a ceiling that prevents any hot air from continuing to rise, because air only rises until it is no longer warmer than the surrounding air.

In the Interior there are triggering mechanisms like thermal troughs and high-pressure ridges, which are uncommon along the coast. On the Kenai the main triggering mechanism is probably the "orographic" effect of the mountains: when a moisture-laden airmass approaches the Kenai Mountains from the west, the flow of air lifts it upwards and cools it. The moisture condenses and we get rain, at least. If the lift is high enough, the water will freeze and ice crystals (and hail) start forming. Ice crystals are necessary to get the separation of electrical charge required for lightning. Orographic lifting thus explains why the big cumulus clouds and (rarely) thunderstorms and lightning usually form near the mountains and not over the Inlet or Kenai-Soldotna.

At the Kenai Refuge, we are starting to rethink the role of lightning in the Peninsula forests. In 1998 we pulled a nine-meter core of sediments from a lake along Swanson River Road. Dr. Scott Anderson of Northern Arizona University has been analyzing the charcoal in this core, in one-centimeter slices. When he is finished, we will have a 13,100-year record of

fire in this drainage, which essentially covers the time since the retreat of the last major glaciation. We can see already that there were fires during the tundra period before spruce arrived 8000 years ago, as well as numerous fires once spruce was established. It is highly unlikely that the native people caused many (if any) of these fires, so lightning as a fire source becomes important on a timescale of decades and centuries.

If you would like learn more about lightning in Alaska, check out Dorte Dissing's website at http://www.dverbyla.net/gradstudents/dorte.html

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