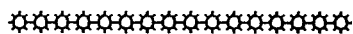




NEWSLETTER
TWIN CITIES CHAPTER
AMERICAN METEOROLOGICAL SOCIETY
OCTOBER & NOVEMBER 1994
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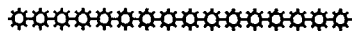
SPECIAL ANNOUNCEMENT

The October and November meetings of the Twin Cities Chapter of the AMS will be held only twelve days apart. This combined newsletter will be the last of the (calendar) year. The next issue of the monthly newsletter will be sent in early January 1995. The January meeting is tentatively set for the 19th.



■ **OCTOBER 20, 1994 at 7:30 P.M.** *A tour of the weather facility at Northwest Airlines.* Tom Fahey will host a tour of the weather office at Northwest Airlines. The meeting will begin promptly at 7:30; due to building security, your early arrival is encouraged. Contact Chapter President, Eve Bowman, if you plan to invite guests. We will be checking names from a roster to gain access to the building. Call 742-6533 between 8:00 A.M and 2:00 P.M. Monday through Friday; early evenings call 557-0392. Messages may be left at any time at 742-5544; enter 6533# (that's a pound sign after the 4-digit extension) to leave a voice message.

Directions to Northwest Airlines, Building F - Flight Service Building - FSB. Adjacent to Minneapolis-St. Paul International Airport. From I-494 exit onto 34th Avenue. Turn north on 34th Avenue and take a left onto 72nd Street. Parking is available at the back of the building. **Arrive before 7:30 P.M.**



■ **NOVEMBER 1, 1994 at 7:00 P.M. - Satellite Meteorology.** Guest speaker Mike Mogil, NESDIS, at the National Weather Service, in the FAA Building. Note that the starting time of this meeting is 7:00 P.M.; again, due to building security, please try to arrive before 7:00.

Directions to the National Weather Service Office in the FAA Building. Adjacent to MSP. (NWS plans to move to their Chanhassen offices in early February 1995.) From the Crosstown (Highway 62) exit onto 28th Avenue. Turn south on 28th Avenue and take a left at the stopsign on Radio Tower Road. Turn right beyond the reserve base and park in the second lot, in front of the FAA Building. Enter by west-facing doors at the north end of the building **before 7:00 P.M.**

Buzzzzz! My alarm clock (with the soft texture of a *screamer weatheradio*) jolted me out of bed at 6:00 a.m. It was a poor night of sleep, as it had been raining for most of the night. Although not a real warm morning here in the Twin Cities, the high dewpoints made it almost impossible to sleep. To make matters worse, the "rush hour roadways" were slick from the rainfall. So much for a "quick and smooth" drive into work. However, I was getting prepared for one of the most spectacular days in Minnesota severe weather history!

It was Tuesday June 16 of 1992, and the forces of nature were setting their gun-sights on the state of Minnesota. SELS (**S**Evere **L**ocal **S**torms Unit of the National Severe Storms Forecast Center) had placed parts of the Upper Mississippi Valley in a "High Risk" of severe thunderstorms for the day. A "High Risk" is unusual up here, and only in certain conditions do we see them. The "trigger" for today's active weather was an intensifying low pressure system out in South Dakota in association with some powerful dynamics aloft. The word from Kansas City was "strong sheer (which is the increased speed and turning of the winds with height) combined with very strong instability gives the likelihood of supercells with associated *strong and damaging tornadoes* as the activity moves across the High Risk area". As a veteran stormchaser here in Minnesota, this was presenting a wonderful opportunity for me to be involved with this "once in every 25 years" type of event!

One thing that would not be present was abundant heating from the sun. With a thick low level layer of stratus covering the skies over Minnesota, there would be little in the way of surface heating. However, contrary to what some may believe, a system like this does not require heating of the day to produce tornadoes. This was to be a *dynamically driven* situation versus a *thermally driven* system, and would be explosive enough even without help from the sun.

I coordinated with my chase team that consisted of Bob Adams, Mike Langfus and Dave Floyd. Bob and Mike were able to leave early from work, so they were going to cruise just after 1:00 p.m. Dave (now a *NEXRAD* training instructor at the Operational Support Facility in Norman Oklahoma) was training in a new employee at Kavouras until 5:00 p.m. I was able to sneak out of work by 3:30 p.m. Soon after I left, SELS dropped a P.D.S. (**P**articularly **D**angerous **S**ituation) Tornado Watch for most of southwest Minnesota. Having seen this, Dave let his new employee know that "training for the day was over" and he *flew* to meet me at his home in Savage! Meanwhile, a supercell was developing in southwest Minnesota, so the day was just getting started. Soon, a TORNADO WARNING went out for Murray County, so the two "turbo charged" stormchasers hopped in *The Bullet* (a *turbo charged* Mitsubishi Eclipse) and the chase was on!

After we got out of the Metro, we blasted west towards the storm. Sometimes during the heat of the chase you forget the speed limit. It was during one of those "lapses" when I saw the Highway Patrol car pulled over in the distance. Dave was wondering why I was *slowing down*, I was wondering if I had enough *bail money*! Well, the officer was obviously more concerned with the storm than he was with people breaking the speed limit. Lucky me!

By 6:30 p.m. Dave and I pulled over just south of the town of Wabasso (which is located in Redwood County) to get some "perspective" on the storm. The inflow winds (that "feed" the storm) into the cell were quite strong! Dave and I estimated the gusts to be in the 30 to 40 m.p.h. range, quite impressive. This storm had developed in association with a warm front and the surface low, so the amount of "deep" moisture in the atmosphere was making things downright

murky. That made getting good visual clues of the storm difficult at best, so it was tough for Dave and I to get a good handle on it. We decided to head back north to Wabasso, and west on highway 68. As we moved into position the side of *The Bullet* was "smacked" with two shots of "golf ball sized" hail from the east, even though the storm was still several miles away! What happened? Sometimes in very dynamic situations the storm's updraft area and the strong mid and upper level winds can send large hail several miles downstream. The hail that hit us got caught in the inflow winds and that sent them crashing into the side of my car! Ouch!!

As we drifted west of Wabasso on Highway 68, we could see a dark precipitation core just to the west. We finally were starting to make some headway on our cell! As we got out of the car, we got blasted by the powerful inflow winds that had intensified! It was absolutely incredible! In all of our experiences, we had never dealt with "inflow" winds that were this powerful! At times we estimated the gusts were over 50 m.p.h.!! Still having problems with visibility, Dave and I guessed that we were dealing with an "HP" (High Precipitation) supercell. The key with these "beasts" is that the *mesocyclone* (the rotating updraft area of the cell) wraps rain around and fills in what would usually be the "rainfree base" (or the updraft region) of the storm. That makes chasing very difficult, and very dangerous. We had to give the storm a "wide berth" or get caught in its path!

Now it was maneuvering time. With any tornadic cell, the best place to be is on the southeast flank of the storm, or inside the area that is called the "inflow notch". From this location, you have the best chance of seeing a tornado, as well as monitoring how much energy (inflow) is feeding the updraft. Since the winds at our location were weakening, we realized that the "action area" was moving away, so we took Redwood County 6 to the north out of Wabasso. Time, 7:15 p.m.

After going north for a few miles, we stopped to get a better view of the storm. Suddenly, we heard some "nut" honking his horn repeatedly! Who was it? You got it! After leaving 3 1/2 hours ahead of us, and without the benefit of radio contact, Mike and Bob had picked the same road as we did! Dave and I had thought that they were on this storm, and that they had probably already seen a tornado. No such luck. They had been cut off from the storm by running into the damage path of a violent tornado that passed through the town of Lake Wilson.

With the inflow winds "screaming" once again, I emitted the immortal words "we've got to stop talking and start moving", so our *united* chase team blasted north on County Road 6! We had a very suspicious area off to our left, and with strong inflow just cranking into that area, anywhere became a candidate for tornadic development. We continued to fly north on 6!!

Whoa there little doggie!! The inflow winds had knocked down a tree across the road, and we saw it just in time! Yes, I swallowed my heart! That wouldn't have been a nice *ending* to our chase now would it? It was a good lesson learned though. After skirting by the tree, I looked to the west, we were now deep into the "inflow notch" and things were becoming well defined. I started slowing down as I "felt" that something was going to happen...

TORNADO Dave yelled!!! To our west and less than a mile away, not one but two tornadoes had suddenly revealed themselves! **TWO OF THEM ON THE GROUND, TWO OF THEM ON THE GROUND** I yelled back via radio to Bob and Mike! On the left sat a skinny "needle" shaped tornado that was in clear contact with the ground! On the right, a large condensation funnel aloft was kicking up dust and debris forming the second tornado! Dave flew out of *The Bullet* to film Mother Nature's awesome display! Initially too *frozen* to grab my camcorder, I finally grabbed it from the back seat and started filming. The smaller tornado on the left dissipated, but the tornado

on the right was intensifying into a large "wedge shaped" F3 (winds of 158 to 206 m.p.h.) tornado! I yelled out "LADIES AND GENTLEMAN, TIME IS 7:40, LARGE TORNADO ON THE GROUND"!!!! The tornado quickly grew in size, but remember what I said earlier about "HP" supercells? Well, the mesocyclone was quickly wrapping rain around the tornado, and within 1 minute, it was completely wrapped in rain! What we had worked so hard (hours of chasing) to see was gone within a couple of minutes. Here's where I must stress the danger involved in stormchasing, especially on this day. Had we approached the area from the north, or in other words, from the main precipitation area of the storm, we might have driven right into the rain wrapped tornado, and we could have easily been killed. This was NOT the day for the un-experienced stormchaser. The short lived tornadoes did not diminish our excitement as we celebrated our first catch of a difficult day! However, we wanted to get back into the "inflow notch" for yet another one!

Before I continue, you maybe wondering what causes two tornadoes to show up at the same time. Well, sometimes the parent mesocyclone can be "flexible" enough to generate two areas of tornadic development, and in this case we were dealing with what's called *cyclic tornado genesis*. In simpler terms, we were watching a segment of a "tornado family". As the tornado on the left had it's energy (inflow) cut off by the *RFD* (Rear Flank Downdraft), it weakened and dissipated. The RFD now enhanced the tornado on the right, and "handed off" the intense energy to it, so the new tornado now became very strong. Although "tornado families" are rare in Minnesota, this type of scenario (the "hand-off") is actually very common with tornadic supercells exhibiting the process of cyclic tornado genesis. Oh, such *fancy words* for such simple terms!

Back to the chase! We did maneuver around Renville County for the next hour, filming one more brief spin up that did some minor tree damage, but our main event for the day was over. Our "mega-supercell" that had been alive for 4 hours was now being swallowed up by a massive squall line. With daylight fading, (chasing tornadoes at night is just plain stupid) we broke off the chase and let the squall line *chase us* as we flew east towards the Twin Cities!

What a day! In total, 27 tornadoes touched down, setting a new record for tornadoes in a day here in Minnesota. Our state even saw it's first F5 (winds of 261 to 318 m.p.h.) tornado since 1968 in the town of Chandler, which is located in southwest Minnesota. Despite all those tornadoes, few people actually saw one. To the best of my knowledge, there are only three videos that exist from that day. The very nature of the main tornado producing storm allowed only brief glimpses of its pendant tornadoes, making for an extremely dangerous day. The video our team shot near Wabasso is widely used in spotter training across the state as it clearly shows the sometimes under-estimated danger of rain wrapped tornadoes. Thanks to the outstanding work of SELS, the National Weather Service of both Minneapolis and Sioux Falls, SKYWARN spotters and the media, there was only one fatality. In years past a family of rain-wrapped tornadoes could have killed dozens, but thankfully that did not occur on this day.

As for me, I have chased thousands of miles (including 2 trips down to Kansas, Oklahoma and Texas) since then and have been in over 30 Tornado Watches. I have seen many "busted chases" (for example, driving 500 miles just to get sunburned!) but I have also seen dozens of severe thunderstorms including 4 tornadoes. However, nothing can top June 16, 1992! It was an incredible experience, and one that I will not forget!

Scott Woelm Metro SKYWARN Training Instructor

■ **News from the President**

Breaking from the traditional meeting night (the third Thursday of the month from September through May), the November meeting has been rescheduled for Tuesday, November 1. Mark your calendars so you won't miss a talk on Satellite Meteorology given by Mike Mogil, Chief of NESDIS' Satellite Training Branch. See below for more details.

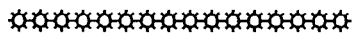
The special lectures at the University of Minnesota on October 4 and 5 were a huge success. Approximately 250 people attended the second of the Kuenhast Lecture Series, given by Dr. Waggoner of the Connecticut Agricultural Experimental Station (the oldest of these stations in the U.S.A.) Hosted by University faculty and State Climatology personnel, this lecture was funded by an endowment from the Kuehnast family.

The Baker Symposium, held on October 5, consisting of lectures throughout the day and a luncheon, was also well-attended. Your Chapter President had the honor of presenting Dr. Donald G. Baker with an award from the American Meteorological Society in recognition of his outstanding contributions to the science of climatology and his years of dedicated work in training, research, and education.

If you have not sent in your dues at this time, please send \$5.00 for regular members (\$2.50 for students) to Chapter Treasurer, Bob Conzemius, 3800 W. 103rd Street, Bloomington, MN 55431. Make checks payable to Twin Cities Chapter AMS. Dues will be accepted at the October meeting as well.

This month's article was contributed by Scott Woelm, member and storm-chaser. Thanks to Scott for his educational and inspiring story.

Eve Bowman, Chapter President



■ **II. Michael Mogil - A Short Biography**

H. Michael (Mike) Mogil has been a professional meteorologist with NOAA for twenty-eight years. His experience spans forecasting, research, program and staff management, and training. He worked as Acting Meteorologist in Charge at the Fort Worth forecast office; as lead forecaster and preparedness meteorologist at the San Francisco forecast office; as a severe storms forecaster at the National Severe Storms Forecast Center; as forecaster at the National Meteorological Center; and has done severe storms research at the Technique Development Laboratory. He has served in his current position as Chief of NESDIS' Satellite Training Branch for nearly ten years.

Mike graduated from East Islip High School (East Islip, NY) and received his B.S. (1967) and M.S. (1969) degrees in meteorology from Florida State University (Tallahassee, FL) and was inducted into Chi Epsilon Pi (meteorology honor society) while at FSU. Mike is involved in numerous professional organizations, including past chair of the National Weather Association's

Training Center and current chair of their Forecasting Committee. He is an associate editor of Weatherwise Magazine, and has contibuted to AM Weather (PBS' aviation weather show.) Mike also belongs to the National Earth Science Teachers Association, the Maryland Association of Science Teachers, the American Meteorological Society, the American Association of Weather Observers, and the International Weather Watchers Association.

Mike has written scores of articles on such varied topics as basic weather understanding and forecasting, severe storms, emergency preparedness, and NWS' severe storms and flash flood warnings and forecasting programs. He participated in writing the Program Development Plans for several major National Weather Service advanced technology systems and has served on several NOAA natural disaster survey teams. He has co-developed two techniques for using satellite imagery to assess central pressures in middle-latitude ocean cyclones. He has also developed numerous satellite training aids including a videotape on thunderstorms, three slide sets, and a comprehensive reference guide (NWS Forecasting Handbook Number 6 - "Satellite Imagery Interpretation for Forecasters"). Many of these aids resulted from an informal inter-agency satellite training coordination group which Mike has chaired for five years.

Mike has taught many weather courses to professional meteorologists, weather broadcasters, and others over the past fifteen years. He has been a featured presenter at several AMS- and NWS-sponsored Short Courses for Weather Broadcasters.

Mike is a certified consulting meteorologist; holds the AMS TV Seal of Approval; is an Able Toastmaster; has received two NOAA Unit Citations; and has been entered into Who's Who in Technology, Who's Who is the East, and Who's Who in Government Services. Mike was recognized by the NWA in 1988 as their Member of the Year for his wide-reaching and innovative educational activities. In 1994, he was chosen as the "trainer of the year" within the Satellite Applications Laboratory for his extensive efforts at providing training opportunities to U.S. Navy meteorologists and oceanographers.

■ Meetings for the remainder of 1994

October 20 - Tom Fahey and a Northwest Airlines weather facility tour - Northwest Airlines, Building F, Minneapolis

November 1 - Mike Mogil and Satellite Meteorology - NWS, FAA Building, Minneapolis

December - no meeting

-- SEE YOU AT THE OCTOBER AND NOVEMBER MEETINGS --

OCTOBER

Thursday, October 20, 1994
WHERE: Northwest Airlines, Building F
WHEN: 7:30 P.M.
WHO: Tom Fahey and staff

NOVEMBER

Tuesday, November 1, 1994
WHERE: National Weather Service, FAA Bldg.
WHEN: 7:00 P.M.
WHO: Mike Mogil