Southeast Alaska
Cloudburst Chronicle

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Wind Observations From Space

By Matthew Foster and Carl Dierking

Along with a wind forecast for one of Southeast Alaska's channels, wouldn't it be nice to know which side of the channel was more sheltered, or where all those "exposed locations" were really located? You might be surprised to know this information is available today from Synthetic Aperture Radar (SAR). Observations from SAR aboard polar-orbiting satellites can display pictures of wind speed in remarkable detail. Unfortunately, the limited number of SAR satellites present timeliness and consistency problems diminishing the usefulness of the data.

As with any radar, SAR emits a pulse of energy and then measures what is reflected back. As surface winds increase over the ocean, the water becomes rougher and

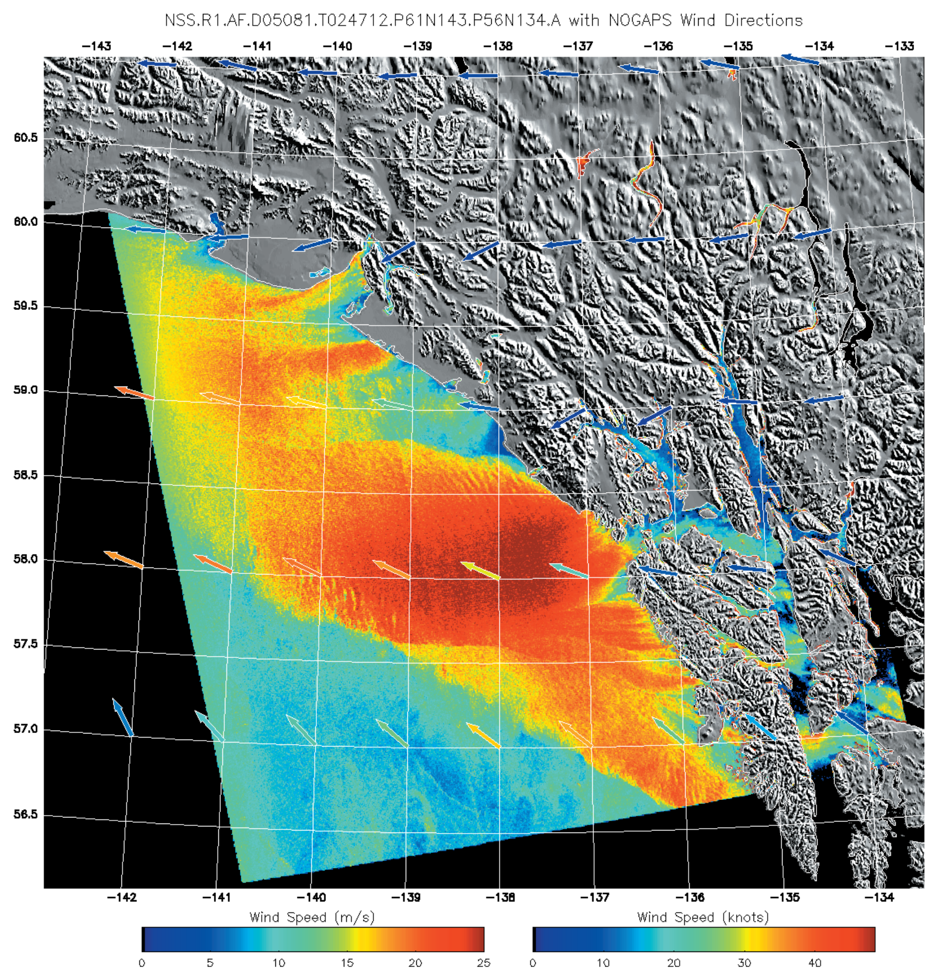


Figure 1 - This SAR image from March 22, 2005 shows how strong offshore flow can result in localized, hurricane-force winds lee of the Fairweather Range and Cross Sound. The terrain in Southeast Alaska causes similar conditions in many other locations. The arrows indicate wind directions predicted by numerical weather models.

more effective at reflecting energy back to the satellite. Based on the amount of returned energy, wind speeds are calculated and presented in a high resolution image with a color scale depicting various wind speeds.

An example of SAR wind imagery is shown below. You can see that the strongest winds in Stephens Passage were on the backside of Douglas Island. Looking closely, winds are depicted lighter on the west side of Chatham Strait than on the east side. This is the result of the large scale southeasterly wind flow over the Alaskan panhandle. In the case of Stephens Passage, the winds are blowing parallel to the direction of the channel. Without any terrain barriers along the waterway and the fact that Stephens Passage is relatively narrow and surrounded by mountainous landscape, the winds at the surface push through this area rapidly as shown in the SAR image. A wind tunnel effect is created along the water and exposed, low-lying land.

In the case of Chatham Strait, the waterway is oriented north-south. The prevailing wind from the southeast, moves over Admiralty Island accelerates through the mountain passes, and enters the eastern waters of Chatham Strait with streaky irregularities in wind speed based on topography. The result shown on the SAR image are patches of faster and slower moving winds along the eastern side of Chatham Strait. On the west side of the strait you see mostly dark blue which corresponds to more uniform, slower wind speeds. This occurs because the airflow is now blocked and slowed by the mountains on Chichagof and Baranof Islands.

Areas considered "exposed" and "protected" in relation to the wind will vary depending upon prevailing wind direction. For example, if the wind in Chatham Strait shifted to more southerly, so that the vector flowed directly up the strait, you would see a situation similar to the Stephens Passage example where winds would increase due to the tunnel effect created by the mountains on both sides. The western side of Chatham Strait would no longer have anything blocking the air in front of it so the wind speed would increase. The formerly protected eastern shores of Chichagof and Baranof Islands now become exposed areas. The winds on the eastern side of the strait would also match the western side in terms of speed and direction.

In Southeast Alaska where so much transportation is done on the water, it is important to know where the high winds and rough waters are located. SAR technology is very useful for observing wind speed and direction in Southeast Alaska where the terrain makes it frequently difficult to do otherwise. Unfortunately, there are only two polar orbiting satellites at any given time retrieving SAR data and, frequently in many cases, this information has time gaps in it making it too inconsistent to use on a regular basis. Someday, this information will have better availability to use for forecasting purposes.

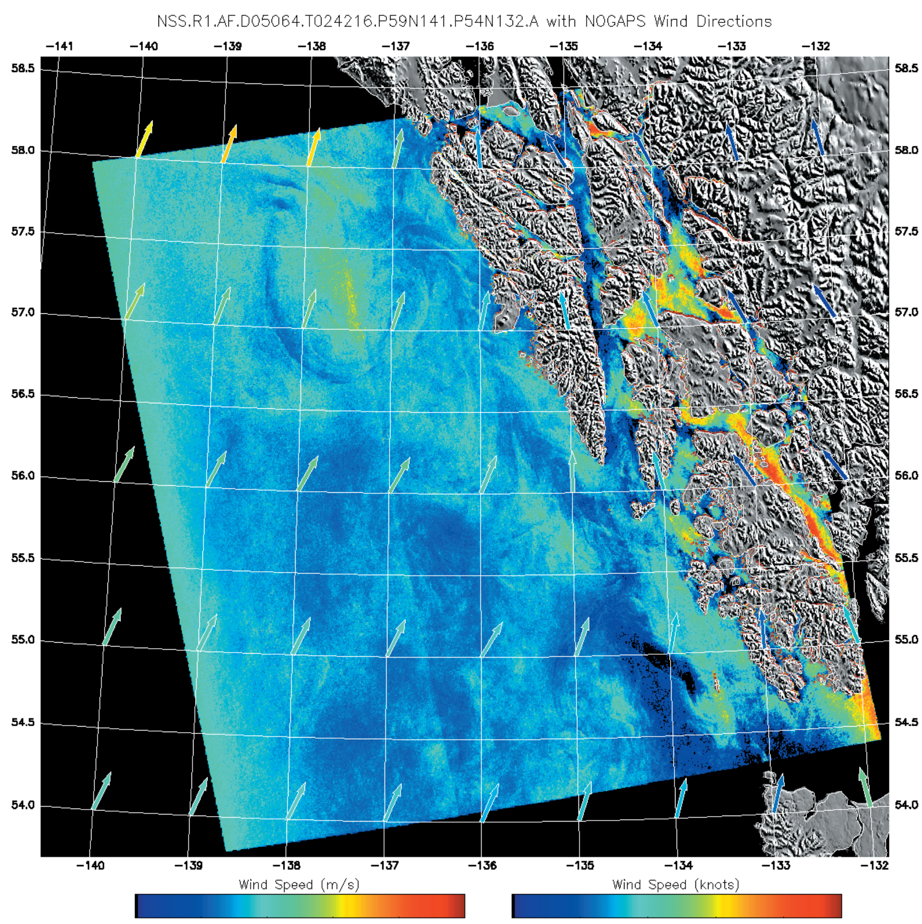


Figure 2 - This SAR wind image from March 4, 2005 shows how localized, strong south-southeast winds can be in our inner channels. Bright red colors indicate sustained winds greater than 40 knots.

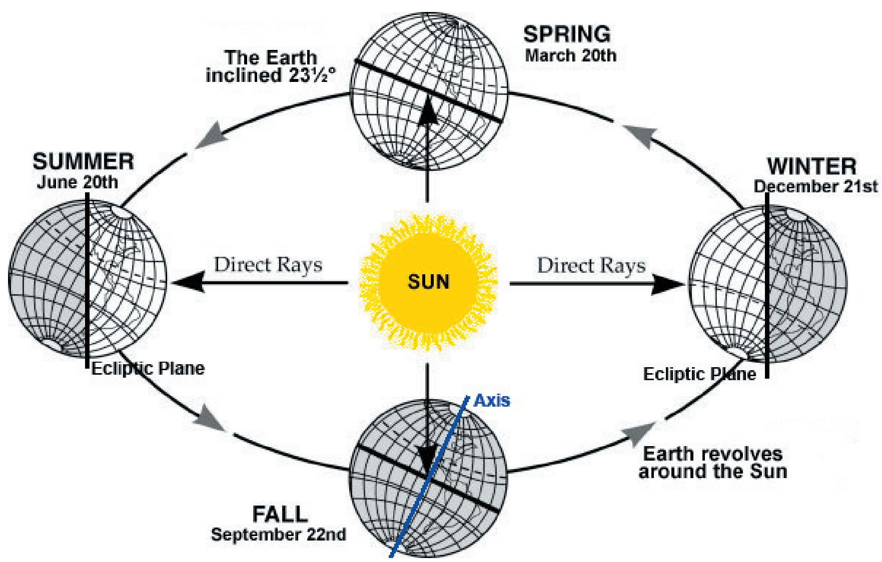
For more information go to http://www.orbit.nesdis.noaa.gov/sod/mecb/sar/

Seasons – Why Do They Happen?

By Ursula Jones

Spring, summer, fall, and winter - seasonal reminders that the environment is constantly changing. Seasons are caused by the tilt of earth's axis, not by the fact that earth's orbit around the sun is an ellipse. The tilt of the earth's axis, approximately 23.5°, does not change while orbiting around the sun. The north end of the axis always points in the same direction, almost directly at the North Star. Since the axis is tilted, different areas of earth are oriented towards the sun at different times of the year.

The North Pole is tilted toward the sun and the Northern Hemisphere is exposed to more hours of sunlight during the "warm" season (i.e. summer). During the "cold" season (i.e. winter), the North Pole is tilted away from the sun. At this time, the Northern Hemisphere receives the least amount of sunlight and spends more time in the dark of earth's own shadow. The shadow line, shown on the diagram, separating night from day is called the "ecliptic plane". The Northern Hemisphere takes longer to rotate through the dark side of the elliptical plane during the winter months because of the earth's tilt. Conversely, in summer it takes less time to rotate through the dark side; hence, longer days. This effect gives us our shorter days in the winter and our longer days in the summer.



Earth's orbit for one year.

Summers are warmer than winters because the sun's rays hit the earth more directly during summer. The angle of the sun also allows the sun's rays to be pointed at earth longer during summer, thereby causing longer daylight hours. In the winter, the effect is opposite; the sun's rays hit earth at a lower angle and we have a) less daylight hours, and b) less direct solar energy being absorbed; hence, colder temperatures. Although some places don't appear to change, these regions go through subtle changes affecting the environment. Regions not appearing to have seasons are located on the equator.

Although not all places appear to have "official" seasons, they all have summer and winter solstices. The summer solstice for the Northern Hemisphere is around June 20, when summer officially begins. The Summer Solstice is also the longest day of the year, an average of 18 hours and 9 minutes of daylight in Southeast Alaska, and when Alaskan's start noticing it gradually getting darker sooner. The winter solstice for the Northern Hemisphere is around December 21, the shortest day of the year with approximately 6 hours and 29 minutes of daylight in Southeast Alaska. If you lived in the Southern Hemisphere, the summer and winter solstice dates would be opposite.

Although we have our seasons opposite the Southern Hemisphere, there are two times a year, during the equinoxes, when the length of the day and night are approximately equal over the entire earth. On this year's equinoxes, taking place on March 20 and September 20 also marks the first day of spring and the first day of autumn, respectively. Of course, you could live in Barrow where the sun sets on November 18 and doesn't rise again until January 23. The flip side is their long summer day that starts at sunrise on May 10 and ends at sunset on August 2 - during this time the sun never goes below the horizon!

Ice in the Summer?! A Look at Hail

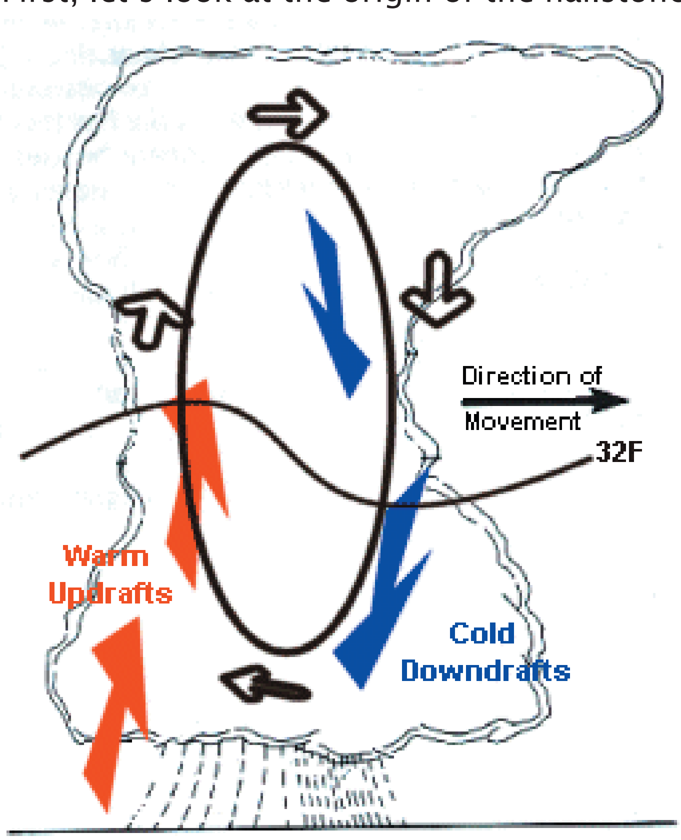
By Kerry Hanko

Anyone in Interior Alaska, Yukon, or British Columbia can tell you that summertime means thunderstorm season. Frequent lightning, heavy rainfall, gusty winds, and even hail can accompany the strongest thunderstorms. While a rare sight in Southeast Alaska, thunderstorms with hail have occurred. Perhaps you have wondered how these little chunks of frozen precipitation can reach the ground on a hot summer day.

The turbulent life cycle of a hailstone can easily be seen by simply slicing the stone in half. Evidence that the stone has moved across several different environments during its formation is seen while viewing the alternating layers of clear and opaque ice which give the stone its characteristic onion-like, layered appearance. The opaque layer of ice is indicative of a quick freeze; air pockets in the ice are frozen before they are able to escape, giving the ice a milky appearance. The clear layers of ice tell us that liquid water froze at a much slower pace, allowing air bubbles to escape before freezing.

Why does hail have so many layers?

First, let's look at the origin of the hailstone. All hailstones begin life as a small core, known as the nucleus. These nuclei can come in the form of small frozen rain drops, frozen clumps of snow known as graupel, or as foreign airborne particles. Airborne particles drawn into the cloud by the updraft can consist of dust, leaves, sand, and even insects. Once a core is established in a cloud, moisture condenses on the nuclei and freezes as it moves into the colder cloud layers. These frozen particles grow in size as they continuously move in and out of subfreezing temperatures. Inside the coldest cloud layers exists supercooled liquid drops. As these drops come in contact with a frozen hail core, supercooled drops may instantly freeze to the particle in a process known as accretion.



Life cycle of Hail

Our hailstone is taking shape! What's next?

During the next step, the developing hailstone must travel into a relatively drier region of the cloud. Without all the supercooled drops colliding with the growing hailstone, this drier air allows the stone to cool and solidify very quickly. If the layer of dry air was absent, the hailstone is nothing more than a slush ball, likely to melt or break apart before reaching the ground! This is one of the main reasons why hail is such a rare sight in places with copious moist air, such as Southeast Alaska's maritime climate and in hurricanes.

<u>We've looked at the mechanism for hail growth; Let's take a look at the hailstone path</u>
One mechanism of transport is the updraft. As a cloud grows and strengthens, updrafts and downdrafts develop within the cloud. You might have seen dust being drawn into a cloud's updraft, or felt the gusty winds of a downdraft ahead of a storm. For even the smallest hail to form, an updraft of around 25 to 35 mph is required. In the severe thunderstorm prone locations of the Great Plains, updrafts as strong as 180 mph are possible, and are able to sustain hail as large as softballs! Once aloft, a hailstone reaches the top of the updraft and is ejected out. Gravity and downdraft winds start the stone tumbling downwards and the stone begins a "roller coaster ride", rising and falling within the updrafts and downdrafts of the storm. During its journey, the hail bounces through the different cloud layers accreting more and more layers of ice. Soon, gravity overcomes the updraft force and the hailstone begins its descent towards the ground. A hailstone could get caught in a strong downdraft, forced to the ground at speeds up to 100 mph!

A second mechanism of hail transport lies just outside the updraft. A hailstone can lie in a state of near equilibrium between an updraft and downdraft. Instead of a roller coaster ride, these stones slowly rise and fall within the prime hail growth zone of a cloud. If introduced to a region of supercooled water, a hailstone can accrete ice as it spins and tumbles through the water droplets. Additionally, other hailstones within this layer will strike each other, either shattering, or freezing together. This often results in larger, more irregular looking hailstones. Again, gravity eventually takes over and the hailstone falls to the ground.

Not even close to actual size, this record-breaking hailstone is 7.0 inches in diameter and weighs over 1.5 pounds!
Aurora, Nebraska June 22, 2003.

Not all hailstones survive the long trip back to the ground. Many are destroyed in collisions or melt. An estimated 40-70% of all hailstones melt before ever touching the ground.

Storms that produce hailstones the size of dimes or larger can result in dents on cars, damage to roofs, broken windows, and, perhaps, cause casualties. Severe thunderstorms, producing large hail, cause nearly one billion dollars in damage to property and crops annually. Hail safety tips and suggestions follow.

Damaging Wind & Large Hail Action Box

- Monitor NOAA Weather Radio
- Listen for “Severe Thunderstorm Watches” for your area. This means that conditions are favorable for severe thunderstorms to develop.
- Listen for “Severe Thunderstorm Warnings” for your area. This means that a severe thunderstorm is occurring or is imminent.
- When severe thunderstorms threaten, go to a small interior room on the lowest floor of your home, school, or business. Avoid windows.
- To improve your odds in minimizing the hazard to life or injury, follow this rule of thumb: “put as many walls as possible between you and the outside wind.”
- In vehicles, avoid driving through severe thunderstorms. Consider pulling over or delaying travel.
- Prior to a severe thunderstorm’s arrival, move vehicles into garages or under carports to help prevent damage. Do this as time and safety permits. Bring in pets.

National Weather Service Hailstone Size Categories

HAIL DIAMETER SIZE (Inches)	DESCRIPTION
1/4	Pea Size
1/2	Marble Size
3/4 ("Severe Thunderstorm" Criteria)	Dime Size
7/8	Nickel Size
1	Quarter Size
1-1/4	Half Dollar Size
1-1/2	Walnut or Ping Pong Ball Size
1-3/4	Golf Ball Size
2	Hen Egg Size
2-1/2	Tennis Ball Size
2-3/4	Baseball Size
3	Teacup Size
4	Grapefruit Size
4-1/2	Softball Size

Did you know...

Hail and sleet are not the same thing. Hail forms in strong updrafts of thunderstorms during the summer months and sleet forms in large scale storms during the winter. Hail stones can reach sizes as big as a golf ball or softball, while sleet is much smaller.

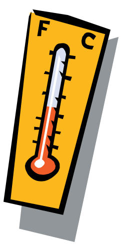
According to the National Center of Atmospheric Research, the heaviest hailstone (shown at the right) ever recorded in the U.S. fell in Coffeyville, Kansas on September 3, 1970, weighing 1.7 pounds and having a radius of 5.7 inches. The largest hailstone, again in the U.S., (shown on page 5) fell in Aurora, Nebraska on June 22, 2003 with a radius of 7 inches, but with a mass less than that of the Coffeyville stone.

Forecast Terminology

The National Weather Service issues forecasts for temperature, precipitation probability, sky conditions, and wind on a routine basis. With the weather constantly changing, the terminology used in these forecasts is also quite variable. Below are descriptions of weather terms regularly used that should give you a better understanding of each forecast.

TEMPERATURE

The temperature in a forecast is used to describe the forecast maximum and minimum temperature, or in some cases, the temperature expected at a specific time.



Temperature Description	Forecast Meaning
Around 40 / Near 40 / About 40	A range of temperatures from 38 to 42
Lower 40s	Temperatures of 40, 41, 42, 43, 44
Middle 40s	Temperatures of 43, 44, 45, 46, 47
Upper 40s	Temperatures of 46, 47, 48, 49
40s	A range of temperatures from 40 to 49
40 to 45	Temperatures of 40, 41, 42, 43, 44, 45

PRECIPITATION PROBABILITY

The Probability of Precipitation (POP) is defined as the likelihood of occurrence (expressed as a percent) of a measurable amount of liquid precipitation (or the water equivalent of frozen precipitation) during a specified period of time at any given point in the forecast area. Measurable precipitation is equal to or greater than 0.01". Unless specified otherwise, the time period is normally 12 hours. NWS forecasters use categorical terms as occasional, intermittent, or periods of to describe a precipitation event that has a high probability of occurrence (80% or more), but is expected to be of an "on and off" nature.

POP Percent Expression of Uncertainty	Equivalent Area Qualifier (convective use only)
10 percent	None used (Isolated / Few)
20 percent	Slight chance (Widely scattered)
30, 40, & 50 percent	Chance (Scattered)
60 & 70 percent	Likely (Numerous or none used)
80, 90, & 100 percent	None used

SKY CONDITION

The sky condition describes the predominant/average sky condition based on eighths of the sky covered by opaque (not transparent) clouds. If a high probability of precipitation (60% or greater) is expected, then the sky condition may be omitted since it is inferred from the precipitation forecast.

Sky Condition	Opaque Cloud Coverage
Cloudy	7/8 to 8/8
Mostly Cloudy / Considerable Cloudiness	5/8 to 7/8
Partly Cloudy / Partly Sunny	3/8 to 5/8
Mostly Clear / Mostly Sunny	1/8 to 3/8
Clear / Sunny	1/8 or less

WIND

The wind describes the prevailing direction from which the wind is blowing, with speeds in miles per hour. Wind velocity is normally included in the first five periods of a zone forecast, although descriptive terms may be used in all periods.

Sustained Wind Speed	Descriptive Term
0-5 mph	Light / Light & variable wind
5-10 mph / 10-15 mph / 10-20 mph	None
15-25 mph	Breezy (mild weather) Brisk or Blustery (cold weather)
20-30 mph	Windy
30-40 mph	Very windy
40-73 mph	Strong, dangerous, high, damaging (High Wind Warning criteria)
74 mph or greater	Hurricane force

TIME FRAME

Forecast Time Period	NWS Definition (Local Standard Time)
Today	6AM-6PM
This Morning	6AM-Noon
This Afternoon	Noon-6PM
This Evening	6PM-Midnight
Overnight	Midnight-6AM
Tonight	6PM-6AM

FLOODS & FLASH FLOODS

By Marquette, Michigan NWS

In the United States, an average of 100 people lose their lives in floods annually, with flood damage averaging more than $2 billion. Ninety percent of all natural disasters in the United States involve flooding.

Flash floods can occur within a few minutes or hours of excessive rainfall, a dam or levee failure, or a sudden release of water held by an ice jam. Floating debris or ice can accumulate at a natural or man-made obstruction and restrict the flow of water. Water held back by the ice or debris jam can cause flooding upstream. Subsequent flash flooding can occur downstream if the obstruction should suddenly release.

Whereas flash floods are sudden and deadly, slower flood buildups also pose danger to life and property – particularly to motorists and spectators. Flooding rivers and streams are not photo or white-water boating opportunities! People can be swept away incredibly easily from slippery or undercut banks or trees. Parents need to set the example and get this message to their children.

During the fall and spring months, storm systems tend to be stronger due to contrasts in air masses. Rivers emptying into the lakes may become backed up, resulting in inland flooding. Waves crashing over breakwalls and jetties can be lethal to spectators.

WHAT YOU CAN DO BEFORE THE FLOOD

- Know your flood risk and evacuation routes.
- If your local streams or rivers flood easily, be prepared to move to a place of safety.
- Move away from gullies and dry stream beds which can quickly become inundated.
- Keep your automobile fueled. If electric power is cut off, gas stations may not be able to operate pumps for several days.
- Store drinking water in clean bathtubs and in various containers. Water service may be interrupted.
- Keep at least a 3-day supply of non-perishable food that requires no refrigeration or cooking. Electric power may be interrupted.
- Assemble a disaster supplies kit containing a first aid kit, essential medicines, canned and/or protected dried food, can opener, bottled water, rubber boots, and rubber gloves.
- Keep a NOAA Weather Radio, a battery-powered portable radio, emergency cooking equipment, and flashlights in working order.
- Install check valves in building sewer traps to prevent flood water from backing up into the drains of your home.

Localized Effects

Photo by David Saville, Federal Emergency Mgmt. Agency East Grand Forks, Minnesota, April, 1997

Southeast Alaska is most prone to flooding in autumn. This is when the majority of our annual precipitation falls. However, a unique type of flooding occurs each summer in Southeast Alaska. Jökulhlaup (an Icelandic term pronounced YO-kul-hloip) is a flood resulting from the breaching of a glacier-dammed lake. There are at least two locations in Southeast Alaska where Jökulhlaups occur with regularity: the Tulsequah Glacier east of Juneau and the Salmon Glacier near Hyder. Snow melt water behind the glacier builds up as temperatures warm in May and June. Usually by July or August the lake breaches near the base of the glaciers and rushes down the Taku and Salmon Rivers. These river levels rapidly rise several feet, crest, and recede, all in about 24 to 36 hours. The record warmth in the summer of 2004 contributed to a record flood level from the Tulsequah Jökulhlaup when many cabins along the upper Taku River were damaged.

FORECASTER SPOTLIGHT

Who Forecasted That?

By Brian Bezenek

Ever wonder after hearing the forecast who did such a wonderful job? Well, here is your chance to meet some of the fine and dedicated employees who do that job. This issue my "Forecaster Spotlight" is about a forecaster who has been at the Juneau Forecast Office nearly 30 years, Don Drew! Welcome Don!

Brian - "Where are you from?"
Don - "I was born in New Jersey in 1950 and moved with my folks to 17 miles east of Montclair, New Jersey in 1955."

Brian - "Have you always been interested in weather?"
Don - "Our family home in New Jersey is located on a hill and, in those days, after a snow we kids had great fun sledding down that hill all day. To find out when it was going to snow I watched and listened to the TV weathermen Pat Hernon and Dr. Frank Field on NBC. Sometimes they were wrong about the snow forecast, so I began to read books on the weather to try to find out if I could do any better at forecasting."

"My very first career choice was engineering specializing in the building of skyscrapers like my favorite building, the Empire State Building. Once I learned how intense the engineering curriculum was going to be, I decided to turn to something else."

"At age 14 in the 9th grade I wrote a "career report" on Weather Forecasting. That's when I decided that was the career for me."

Don Drew all decked out.

Brian - "Where did you get your meteorological training?"

Don - "I majored in meteorology at Rutgers University – The State University of New Jersey on the banks of the Old Raritan in New Brunswick, New Jersey. I earned my Bachelor of Science degree in 1972 and my Masters of Science degree in 1974."

Brian - "Have you worked anywhere besides Juneau?"
Don - "I began my career at, what was then, the Environmental Studies Service Center located on the Auburn University campus in Auburn, Alabama as an Agricultural Metrological Intern in April 1974. In November 1974, I was transferred to the Weather Service Forecast Office in Memphis, Tennessee. I worked in Memphis as a Meteorological Intern until March 1976, then I moved to Juneau."

Brian - "What do you like best about being a weather forecaster?"
Don - "I enjoy working on the Midnight shift, which I have been doing for the past 17 years. Before moving to a permanent Midnight shift schedule, I never knew when I might be working because each forecaster rotates through the same schedule in an effort to cover all the shifts. By working this shift I have a set schedule every week allowing me to pursue outside activities with greater ease."

"One minor benefit is there are fewer interruptions, allowing me more time to concentrate on the forecast process. There is also an immense feeling of satisfaction when all the hard work done on a shift results in weather forecasts that are accurate."

Brian - "Why did you chose to accept a job in Alaska?"
Don - "As a young Meteorologist Intern in Memphis, I viewed Alaska as a region where I could move up the career ladder facing the least amount of competition. I was also intrigued by the fact that Alaska is a meteorologically active region with many different climatic regimes."

Brian - "So, what other hobbies or activities do you do or are interested in?"
Don - "First of all, I love real traditional country, western, and bluegrass music. I have been collecting recordings of this genre on vinyl LPs, and now on CDs, since 1968. That led to an interest in Western Square Dancing beginning in college as a member of The Rutgers Promenaders and continuing here in Juneau. I was a member of the Big Dippers mainstream square dance club and the Gold Dusters plus level square dance club. So far, I've attended two National Square Dance Conventions: Seattle, Washington in 1981 and Portland, Oregon in 1994. My interest in square dancing led to my zeal to wear western apparel. I especially like the 1940's Hollywood retro west designs."

"Since 1981, I have been a volunteer host of a real country, western, and bluegrass program called Mule Train every Tuesday evening from 9 p.m. to midnight on public radio station KTOO-FM."

"I even make an attempt at performing country music as well. I can sing and strum chords on a guitar and have a band backing me up when we play for the senior citizens each month at both the Wildflower Court and Juneau Pioneers' Home. You can catch our act the third Monday of each month at Wildflower Court starting at 7 p.m. and on the last Monday of each month we appear at the Juneau Pioneers' Home starting at 6 p.m."

Brian - "Don, thanks for taking the time to answer my questions. I tip my hat to you on a wonderful job. Tune in next issue to see who ends up in the Spotlight next."

Interning at the Weather Office

By Nicholas Camizzi

April 12th, around 6 p.m., I get the call. The National Weather Service Office in Juneau accepted my application for a position in the Student Temporary Employment Program. I am quite excited. I finished my sophomore year at State University of New York (SUNY) Oswego in mid-May, and then I come home to Buffalo for a few weeks. After thoroughly enjoying the so-called "milk run," consisting of an Alaska Airlines flight from Seattle to Ketchikan to Sitka to Juneau, I arrive on May 29th at 7 p.m.

The summer internship duties blend operational forecasting with a weather research project. After considering several options, I decided to closely examine case studies for four thunderstorm events from last summer. Being a resident of Buffalo, New York, I see thunderstorms several times during the summer. However, Juneau's maritime environment is generally not conducive to such a phenomena. That is why it is important to diagnose a large-scale weather pattern that leads to these rare thunderstorm events.

On the days when I am not working on my summer research project, I help on the "Public Forecast" desk and "Short Term" desk. The Public Forecast desk is responsible for monitoring ongoing weather and anticipated changes that may occur within the next 1 - 6 hours. The Short Term forecaster is responsible for making predictions out to 36 hours. Working with the Forecasters and the Hydro-Meteorological Technicians has been quite enlightening and fun.

The staff here at the office has been nothing but helpful over the past month, both in and out of the office. I can only hope this camaraderie continues until my expected leave date in mid-August.

Cloudburst Classroom

by Kimberly Vaughan

A HOT TOPIC - HEAT INDEX

Weather people love their indexes from the Thermo-dynamic "Showalter Index" to the more subdued "Heat Index." The heat index is a simple concept that considers the combined effects of heat and humidity on the body's ability to cool itself, which can be deadly if ignored. The National Weather Service issues heat advisories and excessive heat warnings when heat index values creep up to 100°F and 105°F respectively. Exactly what is the heat index and why is it important?

With normal summer temperatures only reaching the 70's, the heat index is not something Southeast Alaska residents often refer to. But when you are exposed to temperatures above 80°F (27°C) this is good information that could save your life. The heat index is the apparent, or "feels as" temperature that an average person would feel if the humidity were 25%. In a world of zero percent relative humidity, the heat index would not be needed; the air temperature and the apparent temperature would be equal. As we all know, there is always some humidity in the air. The heat index takes the actual temperature and figures in the relative humidity, along with other factors, and comes up with the heat index. How does this work? Consider a temperature of 90°F with 30% relative humidity. The apparent temperature is still about 90°F. Now, let's raise the humidity to 60%. The average person now feels like the temperature is 100°F. If the relative humidity reached 100% it would feel like 132°F. That's hot! At this point, people should be looking for another glass of water, shade, and a breeze. These are three great things to help us feel cooler.

Our bodies are amazing things! They come fully equipped with an automated air conditioning feature. As our bodies get warm, we start to sweat. This sweat forms beads of water on top of our skin, and then it evaporates. Evaporation is a cooling process so we feel cooler. Drinking fluids helps ensure our bodies ability to sweat; so, go ahead, have that next glass of water. The air is able to evaporate the water more efficiently if it is able to move across it. The faster air moves across our skin the faster the sweat evaporates and the cooler we feel….pretty cool, huh? Staying in the shade and avoiding direct solar radiation also keeps us cooler. The heat index takes into account the ability of the air to evaporate our sweat. Simply put: the more moisture in the air (i.e. higher relative humidity), the slower the air will evaporate moisture from our skin. If the humidity is too high, little or no sweat will be evaporated. Our bodies last resort for cooling itself is panting - move over Fido!

What's the big deal if we can't cool ourselves? We overheat! Over 200 people die each year from heat related causes. The very young and very old are more susceptible, since their bodies ability to cool itself is not fully functional. Healthy adults can also fall victim, if they ignore the risks and don't take precautions.

- ☼ *Always drink plenty of non-alchoholic fluids, even if you don't feel thirsty.*
- ☼ *Whenever possible, stay in the shade.*
- ☼ *Wear appropriate clothing.*
- ☼ *Take frequent breaks.*
- ☼ *Know the signs of heat stroke (i.e. hot, red skin; rapid, weak pulse; rapid, shallow breathing) and exhaustion (i.e. cool, moist, pale or flushed skin; heavy sweating; headache; nausea or vomiting; dizziness; and exhaustion) and how to react to the signs.*
- ☼ *As with any weather related element, knowing before you go can make for a safer and more enjoyable trip.*

The summer is a great time of year: flowers blooming, berries, fishing and wildlife traipsing about with their young. We enjoy these things on foot, in a boat or car, maybe a plane or even a bicycle. Know the forecast before you go and include the heat index when temperatures are on the rise. Packing more water can make a trip go from horrible to enjoyable.

Temperature (F) versus Relative Humidity (%)

°F	90%	80%	70%	60%	50%	40%
80	85	84	82	81	80	79
85	101	96	92	90	86	84
90	121	113	105	99	94	90
95		133	122	113	105	98
100			142	129	118	109
105				148	133	121
110						135

Heat Index Table
(Due to the nature of the heat index calculation, the values in these tables have an error +/- 1.3F.)

Heat Index	Possible Heat Disorder
80°F - 90°F	Fatigue possible with prolonged exposure and physical activity.
90°F - 105°F	Sunstroke, heat cramps, and heat exhaustion possible.
105°F - 130°F	Sunstroke, heat cramps, and heat exhaustion likely, and heat stroke possible.
130°F or greater	**Heat stroke highly likely with continued exposure.**

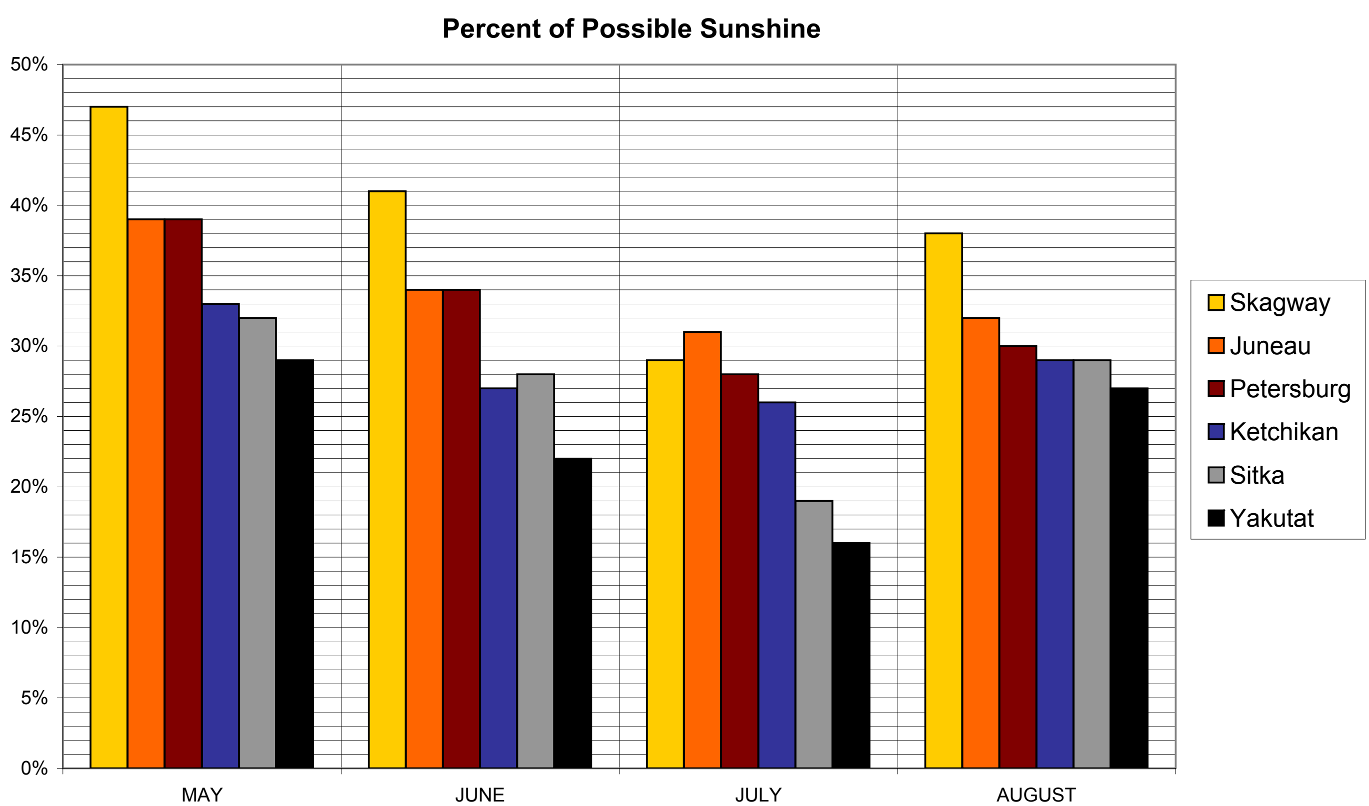
Summer Sunshine - How Much Does Your Community Average?

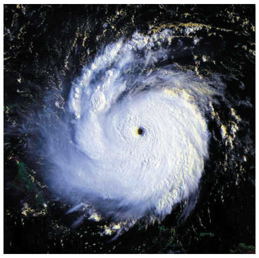
By Chris Maier

Summer sunshine. It's something that no one in Southeast Alaska takes for granted! From the avid gardener to the cruise ship tourist - sunshine is something we all need from time to time in the temperate rainforest that is our home. A recently completed study revealed the percentage of possible sunshine, from sunrise to sunset at a half a dozen Southeast communities. The percentages are warm season monthly averages that were calculated over a 10-year period (1995-2004) using the actual hourly observations from the airport weather sensor in each town. The study was undertaken as part of the effort to update our soon-to-be available *Summer Climate Guide to Southeast Alaska* brochure.

The correct way to interpret the graph is as follows: From 1995-2004, the weather station at the Juneau airport averaged 39% of possible sunshine from sunrise to sunset in the month of May. This also means that Juneau averaged cloudy or foggy conditions the other 61% of the time. Another example is that the weather station at the Yakutat airport averaged only 16% of possible sunshine in the month of July and 84% cloudy or foggy conditions the rest of the time.

At first glance the results are nothing surprising. Our Interior driest locations tend to be our sunniest, and Gulf Coast stations are the cloudiest. Skagway on average receives the most summer sunshine, while Yakutat and Sitka receive the least. Nonetheless, a closer look at the numbers does reveal some interesting climate information. Did you know that May was our sunniest warm season month in Southeast Alaska? You do now! That was the case across the board. How about the fact that in July we usually see our average percent of possible sunshine take a dip? We then typically experience a rise again in August, before the rainy autumn season sets in. So, go out and enjoy the sun while you see it because you never know when that 39% in Juneau might go to 35%.




Hurricane Andrew

Devastating Trivia

1. What is the name of the scale used to classify the intensity of hurricanes?
   a. Saffir-Simpson scale b. Fujita scale
   c. Cyclone scale d. Modified Mercalli scale

2. What scale is used to rate the intensity of a tornado by examining the damage caused by the tornado after it has passed over a man-made structure?
   a. Saffir-Simpson scale b. Fujita scale c. Cyclone scale
   d. Modified Mercalli scale

3. What is used to measure the explosiveness of volcanic eruptions?
   a. Saffir-Simpson scale b. Fujita scale c. Volcanic Explosivity Index d. Cyclone scale

4. What is the fear of tornadoes and hurricanes called?
   a. lilapsophobia b. hurriphobia c. tornphobia d. hutophobia

Did you know? - The Saffir-Simpson scale is used to give an estimate of potential property damage & flooding a hurricane along the coast once it makes landfall. A 1-5 rating is used based on the hurricane's present wind speed.

The Fujita Scale is used to rate the intensity of a tornado by surveying the damage caused by the tornado after it has passed over man-made structures. It also uses a scale of 1-5.

WEATHER WATCHERS

SOUTHEAST ALASKA SPOTTER NETWORK

Our Most Valuable Spotter!

Hail, thunderstorms, and now endless cloud coverage, many of you have conveyed invaluable information to us over the past months. This issue's Most Valuable Spotter is Susan Wise-Eagle for her reports of thunderstorms in the Wrangell area over the past couple months (March 8 and June 9). With no Doppler radar coverage and no lightning detection network, Susan's reports helped our forecasters update our short term forecasts and, in a few cases, issue special marine warnings. Mariners certainly appreciate the advanced notice we give them when thunderstorms are heading their way. We also might have saved a few lives by notifying Southeasterners that lightning was coming. For her efforts , Susan will be receiving a rain gage and an *Alaska Cloud & Weather field guide*. Congratulations and thanks for the great reports!

Writing For the Readers

- Do you have any questions about weather you want answered?
- Do you have any suggestions for improving this newsletter?

Send your questions and suggestions to ursula.jones@noaa.gov because we are always seeking ways to improve our newsletter. Don't forget to send any photos you want to share.

Trivia Answers: ***1.*** *a. Saffir-Simpson scale - According to the National Hurricane Center, Hurricane Andrew, occurring August 24, 1992, was the costliest of recorded hurricanes with damage in excess of 26 billion dollars! Although one of the largest hurricanes in recorded history, Andrew had 23 deaths while the deadliest hurricane in 1900 caused over 8,000 deaths.* ***2.*** *b. Fujita scale - According to the Storm Prediction Center, the deadliest tornado recorded is the Great Tri-State Tornado of March 18, 1925, which tore across Southeast Missouri, Southern Illinois, and Southwest Indiana leaving in its wake 695 fatalities. This tornado also holds the record for the most fatalities in a town/city with at least 234 deaths in Murphysboro, IL alone.* ***3.*** *c. Volcanic Explosivity Index - The 1815 eruption of Tambora, Sumbawa, Indonesia was the largest eruption in historic time. The ash erupted into the atmosphere was about 150 times more than the 1980 eruption of Mount St. Helens.* ***4.*** *a. Lilapsophobia*

This educational newsletter is designed for Southeast Alaska's volunteer weather spotters, schools, emergency managers, and the news media. All of our customers and partners in Southeast Alaska are welcome to subscribe to it.

NOAA's National Weather Service Forecast Office in Juneau, Alaska is responsible for weather forecasts and warnings from Cape Suckling to the Dixon Entrance.

This publication, as well as all of our forecasts and warnings, are available on our web site: http://pajk.arh.noaa.gov

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New VHF Weather Radio broadcast coming to Southeast Alaska! In partnership with the US Coast Guard 17th District, the National Weather Service will begin broadcasting weather information 24 hours a day from a new high level VHF-FM transmitter in Chatham Strait near Manleyville on eastern Baranof Island. The broadcast will cover an area from roughly Angoon to Kuiu Island. More details about this new “High Site” location coming soon.

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