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ZSE Weather Watch

A newsletter from your Seattle ARTCC Center Weather Service Unit

Coastal Radar Update *by John Werth, Meteorologist in Charge*

Figure 1 – New Langley Hill NEXRAD radar (KLGX) along the Washington coast.

KLGX, the new NEXRAD radar to serve Washington's coastal area, is on track to be installed and operational by September 30, 2011. The radar site, named Langley Hill, is approximately 3 miles east of Copalis Beach in Grays Harbor County (**Fig. 1**).

Installation of the tower, radome, and antenna was completed by the end of May. Work remains on installing waveguide, pulling communication cables, completing power and telecommunications infrastructures, and installing the Radar Product Generator (RPG) at NWS Forecast Offices in Seattle and Portland. Radar system integration and acceptance will follow late this summer.

The radar is expected to become fully operational by the end of September once dual-pol has been installed and tested. (Note: See the October 2010 issue of ***ZSE Weather Watch*** for information on dual-pol technology coming to NEXRAD radars.)

KLGX will also be the first NEXRAD to test a unique scanning strategy that includes a lower scan angle of 0.2 degrees. Expected benefits of the lower scan angle include better radar coverage over the offshore waters, better near-shore low level structure of lows and fronts for high wind events, and better rainfall estimates over the south Sound, north coast, and Willipa Hills.

CWSU on Facebook *by John Werth*

Facebook is the largest social media site where users can interact with other people, organizations, or businesses. **Seattle CWSU is now a part of Facebook!** Postings are usually made several times a day - depending on the weather - and are intended to give short bursts of information regarding weather events in ZSE's airspace. Please view and 'like' our Facebook site and be sure to share it with your friends. You can access it via our webpage.

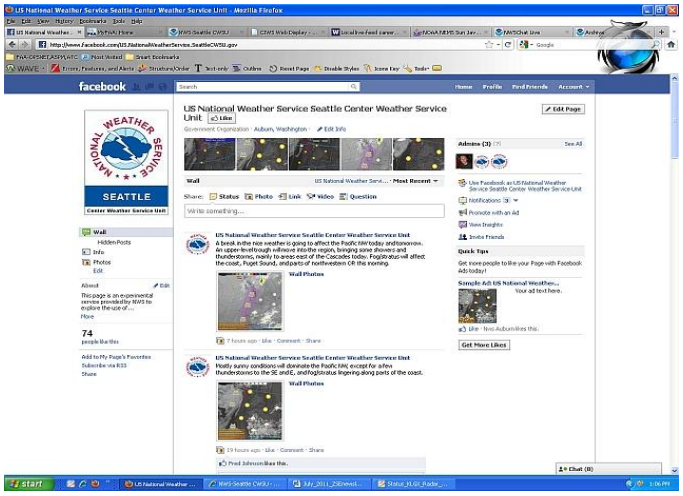

Figure 2 – Seattle CWSU Facebook page.

Lightning Safety *by John Werth*

"An average lightning strike can deliver several hundred kilovolts of electricity; enough to light a 100 watt light bulb for 3 months!

Summer is the peak season for one of the nation's deadliest weather phenomena— lightning. But don't be fooled, lightning strikes year round. On average, 55 people are killed each year by lightning in the United States. Hundreds more are injured by lightning strikes – many resulting in severe, life-long injuries and disabilities.

People struck by lightning suffer from a variety of long-term, debilitating symptoms, including memory loss, attention deficits, sleep disorders, chronic pain, numbness, dizziness, stiffness in joints, irritability, fatigue, weakness, muscle spasms, depression, and more.

There is no safe place outside when thunderstorms are in the area. If you hear thunder, you are likely within striking distance of the storm. Just remember, ***When Thunder Roars, Go Indoors!***

A safe shelter from lightning is either a substantial building or an enclosed metal vehicle.

A **safe building** is one that is fully enclosed with a roof, walls and floor, and has plumbing or wiring. Examples include a home, school, church, hotel, office building or shopping center. Once inside, stay away from showers, sinks, bath tubs, and electronic equipment such as stoves, radios, corded telephones and computers.

Unsafe buildings include car ports, open garages, covered patios, picnic shelters, beach pavilions, golf shelters, tents of any kind, baseball dugouts, sheds and greenhouses.

A **safe vehicle** is any fully enclosed, metal-topped vehicle such as a hard-topped car, minivan, bus, truck, etc. While inside a safe vehicle, do not use electronic devices such as radio communications during a thunderstorm. If you drive into a thunderstorm, slow down and use extra caution. If possible, pull off the road into a safe area. Do not leave the vehicle during a thunderstorm. **Unsafe vehicles** include golf carts, convertibles, motorcycles, or any open cab vehicle.

Figure 3 – Nighttime lightning over Las Vegas, NV

Since lightning can strike outward 10 miles from a thunderstorm, if you hear thunder, you are likely within striking distance of the storm. So be sure to stay inside for at least another 30 minutes after you hear the last clap of thunder.

Be sure to listen to **NOAA Weather Radio** or you favorite news source for the latest weather information. If thunderstorms are forecast for your area, you may want to change or delay your outdoor plans.

How far away was that lightning?
The sound of thunder travels about a mile every 5 seconds. If you count the seconds between the flash of lightning and the crack of thunder and divided by 5, you get the number of miles away from you (10 seconds is 2 miles).

Solar Flares and Aviation Hazards *by Steve Adams*

Most aviation personnel know that severe weather and certain weather phenomena can have significant impacts on safe aviation travel. However, another phenomenon that can have an equally significant (if not critical) impact on safe aviation travel is solar flares and the resulting geomagnetic storms in the earth's atmosphere caused by the solar flares.

Solar flares are generated when accelerated charged particles, mainly electrons, interact with the plasma medium. The flares are ejected from the sun and reach speeds up to 5 million mph and arrive at the earth within a day or two. Solar particles enter the Earth's protective magnetic bubble, energizing the atmosphere high above the north and south poles, creating a geomagnetic storm (**Fig. 5**).

Visual manifestations of these storms are the aurora borealis (northern lights) in the northern hemisphere and the aurora australis (southern lights) in the southern hemisphere.

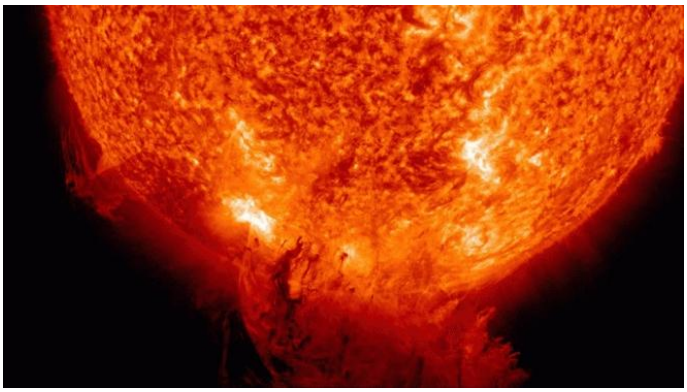

Figure 4 *– Corona flare and mass ejection.*

Solar flares and the resulting solar radiation and geomagnetic storms are more common during peak sunspot cycles. Sunspots are temporary phenomena on the photosphere of the Sun that appear as dark spots on the sun.

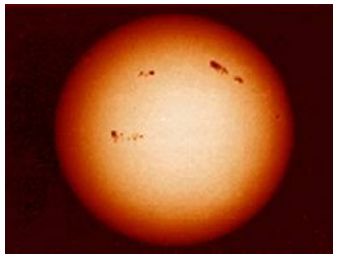

Figure 6 *– Sunspots seen as dark areas on the sun's surface.*

Sunspots result from intense magnetic activity. Sunspot activity cycles from minimum to maximum over a range of approximately 11 years. The next sunspot maximum is expected to occur between 2012 and 2014.

Strong geomagnetic storms can have damaging affects on Earth. In September 1859, a geomagnetic storm disrupted telegraph systems all over Europe and North America with fires erupting at telegraph stations due to power surges in the wires. The northern lights were seen as far south

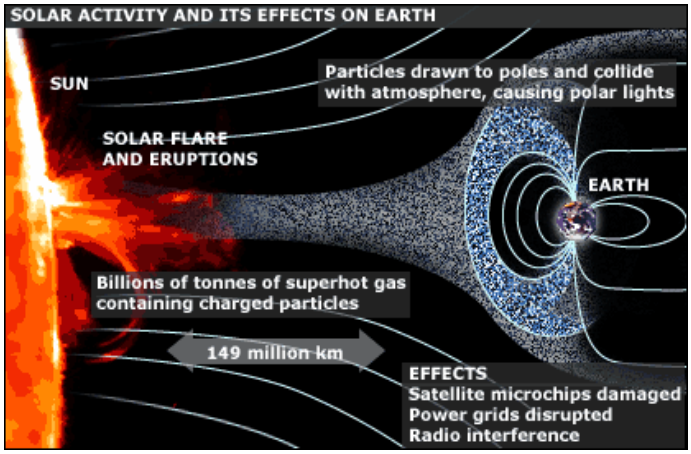

Figure 5 *- Solar flare and resulting geomagnetic storm.*

"The next solar maximum is expected in 2013 and our advanced technological infrastructure will face challenges from the increase in solar activity." Laura Furgione, Deputy Directory, National Weather Service

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as Florida. In 1989 a storm melted the transformers of the HydroQuebec Power Grid causing a nine-hour blackout that affected millions of people in Canada. In 2003, a storm disrupted satellites and global communications, air travel, navigation systems, and power grids all over the world.

The Arctic region is particularly vulnerable to the effects of space weather. Cross-polar flights - the number of which have increased dramatically over the past decade (**Fig. 7**) - can be significantly impacted by space weather.

Emissions from the sun that interact with Earth's atmosphere can, 1) cause radio and communications blackouts, 2) degrade navigation capabilities, 3) present a biological hazard due to increased solar radiation, and 4) affect the operation of electronic equipment. In February 2011, major airlines rerouted polar flights due to communication concerns during a strong solar event, incurring an estimated increase in operating costs of $100,000 per flight.

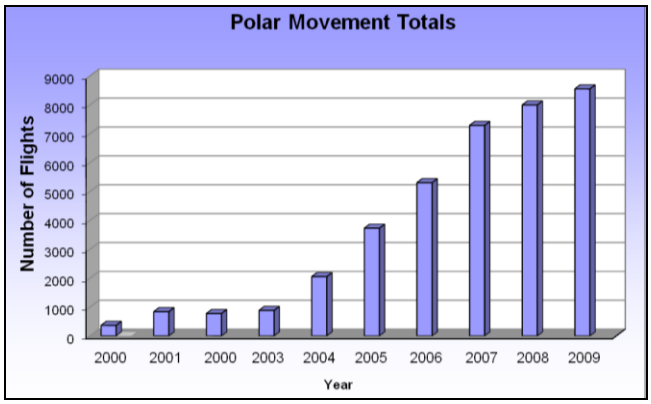

Figure 7 – Cross Polar flight have increased from 12 in 1999 to over 8,500 flights by 13 airlines in 2009.

NOAA is stepping up to meet the fast growing and rapidly evolving customer requirements for space weather services. It has taken action to ensure critical space weather measurements are available to meet the Nation's growing needs for space weather products.

NOAA's NWS has a 24/7 mission to provide the people of the United States with space weather services every day, primarily through the Space Weather Prediction Center(SWPC) in Boulder, CO. SWPC is the sole U.S. official voice for issuing space weather alerts and warnings in support of civil and commercial operations. NOAA's SWPC attempts to mitigate the effects of space weather by providing real-time observations and forecasts of solar and geophysical events that could potentially impact satellites, communications, power grids, navigation, health and safety, and other technological infrastructures around the world.

SWPC works with many national and international partners with whom data, products, and services are shared, including many aviation interests.

Visit SWPC's web site at ***http://www.swpc.noaa.gov*** for the latest space weather observations and forecasts.

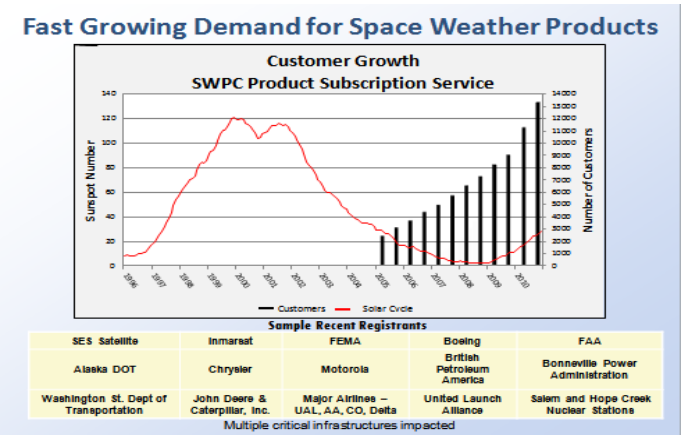

Figure 8 – *Customer growth of SWPC's products and services since 2005.*