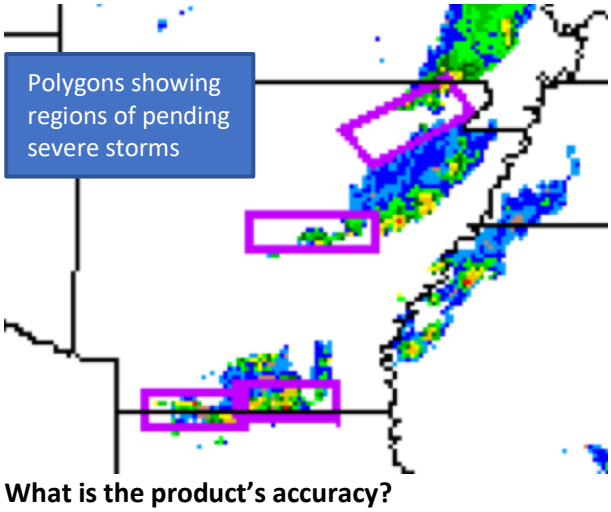
NextStorm SS (Severe Storm) Quick Guide

What is it? What are the input datasets?

NextStorm's Severe Storm (SS) product is similar to the Convective Storm (CS) product in that it is a satellite-based convective initiation (CI) nowcasting (0-2 hour) product fusing geostationary satellite data and numerical weather prediction (NWP) model output within a machine learning model. Cloud objects are first identified by type, and growing cumulus clouds are tracked over consecutive 5-min resolution satellite scans. Once a storm is initiated (has a radar echo of intensity ≥35 dBZ), the SS products provides a probability that severe weather will later occur. Severe weather is either winds >57 mph, hail >1 inch in diameter, or a tornado.

The GOES data used include visible and infrared channels, which are used for cloud typing and determining cloud properties (growth, glaciation, height). The SS product also uses Rapid Refresh (RAP) model fields for environmental information, such as Convective Available Potential Energy (CAPE), Convective Inhibition (CIN), Lifted Index (LI), yet unlike the CS product, the SS product also includes additional RAP fields that are known to be correlated with severe weather, such as 0-6 km wind shear.

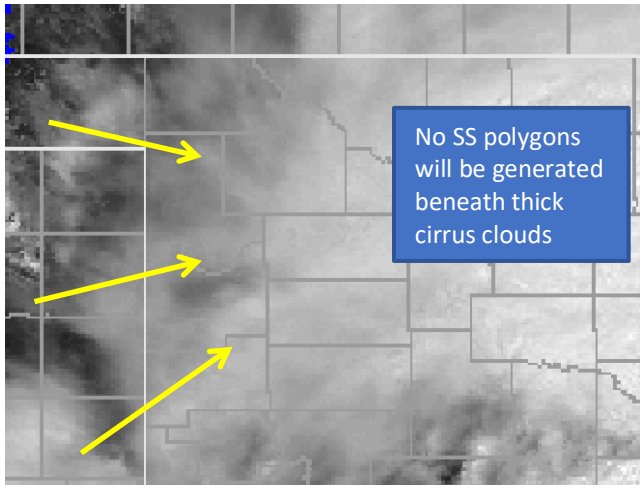


What is the product's accuracy?

SS product accuracy is ~70%, and like the Lightning Threat (LT) product, a polygon is provided that highlights the region of expected severe storm occurrence. The polygon's orientation and size are determined by the size and velocity of the CS cloud object that is projected to produce severe weather. Users are encouraged to display the SS product's polygon in a different or vivid color, especially if the SS probability is greater than 40%.

What is the SS product's resolution? On what domains, and when, is it available?

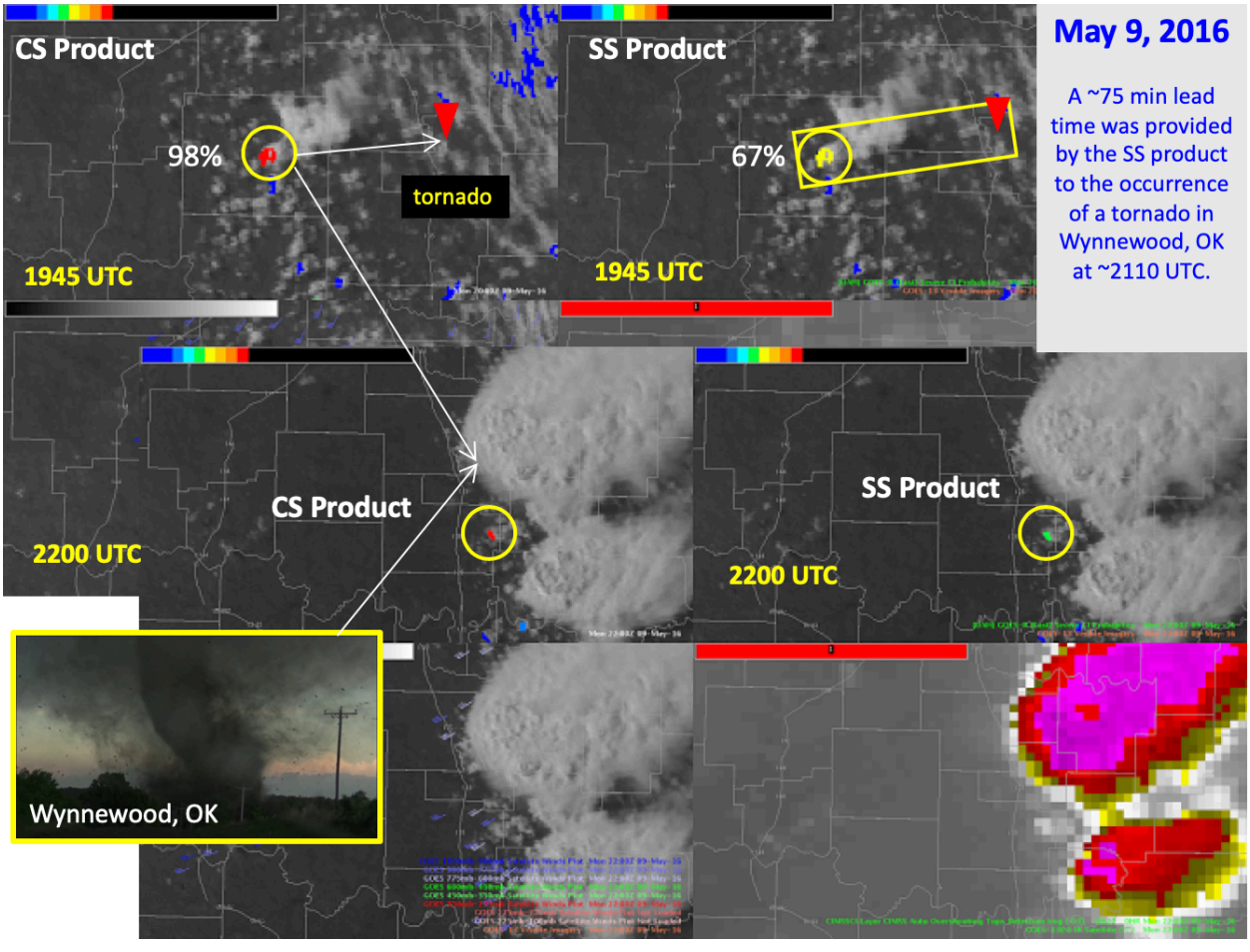
The base resolution of the SS product is 1 km during daytime and 2 km during the night using GOES-16 and -17, yet the product produces a polygon SS region that can be as large as 50 km x 100 km in size. The daytime resolution is from the cloud typing algorithm's use of 500 meter visible data, which allows for more defined cloud objects. At night, the algorithm's dependence on 2 km infrared data for object identification results in blockier cloud objects. This product is available in both the GOES-East and GOES-West domains. Given nighttime thermal problems with GOES-17, the SS product is at times unavailable from 1 to 5 am Central Time. The SS product is available every 5 minutes during normal GOES-East and -West operations.



What should I look out for when using this product?

As with the NextStorm CS product, the NOAA National Weather Service Operational Hydrologic Remote Sensing Center SNOw Data Assimilation System (SNODAS) is helps identify snow cover. Snow covered ground is misidentified by the cloud typing portion of the algorithm as a cumulus cloud. Also, thick cirrus cloud contamination is the major concern when using the SS product since cumulus clouds can be impossible to see beneath thick cirrus clouds. Hence, regions of snow cover and thick cirrus are flagged (such as existing storm anvils), which means there will be no SS polygons formed.

Example:



Resources More information about the NextStorm Severe Storm (SS) product can be found at www.nextstorm.net.

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