

# A Near Real-Time Satellite-Based Aircraft Icing Risk Product for Alaska

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## Introduction

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Results

•Icing caused by super-cooled liquid water (SLW) clouds is a significant aviation hazard in Alaska. Accurate icing diagnoses and forecasts are needed but difficult to obtain.

•Current GOES and MODIS satellite data can provide some information on icing conditions but are currently underutilized. Despite the challenges in retrieving cloud properties in Alaska, including snow/ice cover and high solar zenith angles, it remains a relevant proving ground for satellite icing.

. Satellite estimates of cloud-top phase and temperature can be used to diagnose the presence of SLW near cloud tops.

•When the clouds are sufficiently illuminated by the sun, retrievals of cloud water path and effective droplet size are used to diagnose the potential intensity of the icing conditions.

•This poster describes new satellite products being developed for the Alaska region by our icing team at NASA LaRC. We anticipate that the products will eventually be evaluated by forecasters at the NOAA National Weather Service Alaska Aviation Weather Unit to assess their potential utility in daily operations.

#### Data



















ua-MODIS Water Cloud Effective Radius (um), 23:25 UTC







## Summary

- Satellite icing detection can augment the other datasets used by the NOAA/NWS Alaska Aviation Weather Unit with emphasis on observed rather than modeled icing threat.
- GOES-W and Terra, Aqua MODIS satellite data can be used for aircraft icing detection over Alaska and the adjacent North Pacific.
- · GOES-W icing-related images and data files available every half hour but image resolution is low.
- · Approximately 16 MODIS icing images available each day with high resolution but each image does not cover the entire area.
- · GOES-W images are more timely with 15 min latency whereas MODIS has 2 hour latency with improvement to 45 minutes expected.
- · Current icing risk product significantly better for daytime scenes.
- Icing risk product initially developed for mid-latitudes with some adjustment possibly needed for Alaska/high latitudes (account for low level ice clouds, T inversions, mixed-phase stratus).
- Switch from CERES Edition 3 to 4 algorithm later in 2013 expected to improve the icing results.
- · Data will be used to develop icing climatology maps for Alaska.
- · Research is underway to enhance our satellite-based icing algorithms in order to provide information in a larger range of cloud conditions
- · GOES-R, scheduled for launch in 2015, will provide new GEO capabilities for icing diagnoses, including improved day/night consistency in SLW cloud top detection

## References

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\* To obtain satellite cloud icing images and data, please see our web page: http://cloudsgate2.larc.nasa.gov \* Corresponding author email: Douglas.A.Spangenberg@nasa.gov