Increasing the utility of real-time IASI moisture and temperature soundings
In very-short-range forecasting

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Adapting GOES NearCasts to use asynchronous LEO retrievals

Independent of which retrieval system is used, the combination of detailed low-level Equivalent Potential Temperature with updated information about vertical temperature structure (including tropopause presence) present in the CrIS/IASI retrievals allows more realistic computation of important diagnostic parameters, such as CAPE in CINH.

Aviation Hazard caused by Extremely Cold Cruise Level Temps
- Can cause jet fuel to ‘gel’ -

NearCasts Analyses:
✓ Detect area and show structure of extremely cold air (~ -70°C) near 200 kPa before 1200 UTC Barrow and Fairbanks RAOBs, including extension over Arctic Ocean
✓ Indicate some inconsistency between nadir and limb retrievals – Feedback for satellite product developers

NearCast Projections:
✓ Agree well with 1200 UTC Barrow and Fairbanks RAOBs
✓ Show slow progression of cold pool to north and east
✓ Would have been useful in determining air routes to avoid

Impacts of EFOV Difference in CrIS/IASI Retrieval

Performing analysis at μwave or IR FOV size impacts detail in analyses/forecasts

Summary:
✓ Input CrIS/IASI data show dry biases
✓ NearCast system adapted to use asynchronous LEO retrievals
✓ Successfully tested for Severe Weather and Aviation Hazard Events
✓ Data access issues are delaying real-time testing
✓ Access to real-time retrievals from BOTH IASI and CrIS is critical for optimal forecaster use

Background and Purpose
Forecasters in the Alaska Region have requested that short-range NearCasting techniques (developed for using GOES soundings over the CONUS) be applied to hyper-spectral sounder products generated from the multiple Low Earth Orbiting (LEO) satellites that make frequent overpasses at high latitudes (e.g., CrIS and IASI). these data should help fill the space and time gaps between sparse RAOB reports available there.

This presentation demonstrates the potential of new short-range forecaster tools designed to use otherwise underutilized hyperspectral soundings in polar latitudes. Although these observations lack the special and temporal detail of GEO data, the increased vertical sounding resolution should be especially important both in areas with limited radar coverage or other ad-hoc observations and when conventional NWP guidance is questionable.

Forecasters have also noted the need for short-range guidance using full resolution satellite observations in cloudy conditions (not included in IR-only satellite products) for a variety of problems, especially those related to heavy precipitation events and oceanic weather systems. To address this need, NearCasts generated using combined IR/microwave retrievals are also presented to illustrate how these data can add short-range forecast information in areas where IR instruments are ‘blind’. These observationally driven short-range projections could also provide a unique GEO synergy by filling spatial gaps in future high-time frequency GOES-R IR products and displays. In this poster, we:

1. Study the accuracy of several POES retrieval systems over Alaska
2. Demonstrate the NearCast using IASI data over Europe, using 2 different retrieval candidates.
3. Show an example of a high-impact aviation event over Alaska.
4. Discuss several outstanding data access issues.

Determining Hyperspectral Moisture Retrieval Quality
Comparisons made at GPS receiver station in summer 2013.

Data Acquisition Issues
Real-time access to CrIS and IASI Retrievals/Radiances is Problematic
✓ Currently, NOAA NUCAPS only processing CrIS retrievals in real-time
✓ NUCAPS IASI data expected to be available soon
✓ EUMETSAT retrievals difficult to obtain via GTS and only for IASI

Missing either morning and afternoon orbit data leaves detrimental gaps in analyses, even in polar areas.

Gaps can be easily filled through access to centralized reception and retrievals from both CrIS and IASI.