AVHRR Polar Pathfinder (APP) and Extended APP (APPx) Climate data Records and Applications

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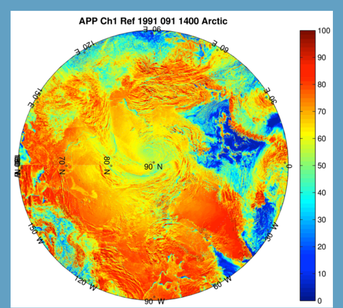
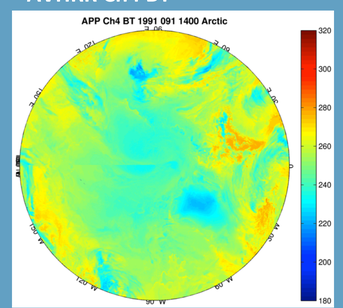
CDR Examples

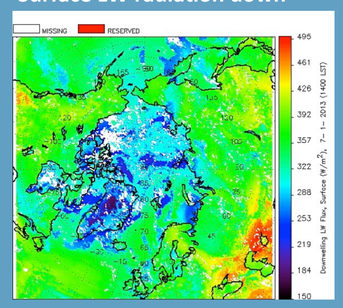
AVHRR Ch1 reflectance



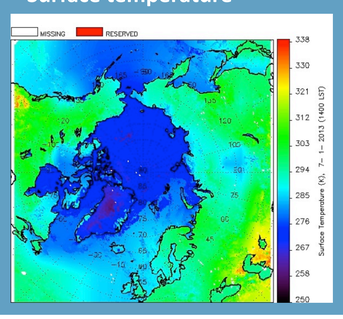
AVHRR Ch4 BT



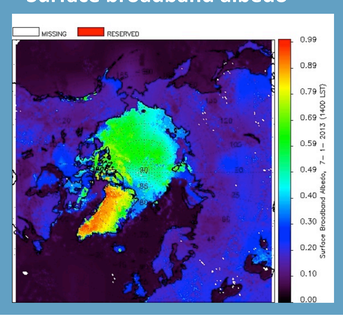
Surface LW radiation down



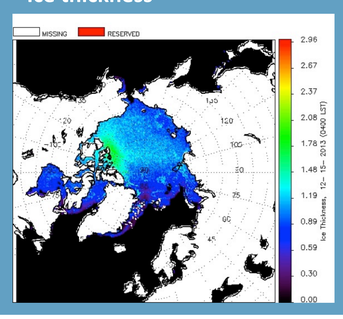
Surface temperature



Surface broadband albedo



Ice thickness



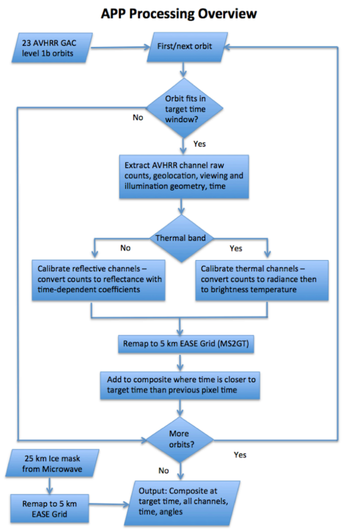
CDR Description

CDR Specifications:

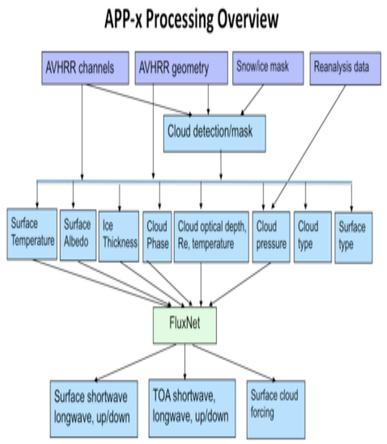
- Arctic and Antarctic
- EASE Grid 5 km for APP and 25 km for APPx
- Twice daily local solar time from 1982 to the present
- Updated daily
- APP includes: AVHRR channel data, viewing and illumination geometry, observation time
- APPx: Surface temperature and albedo, sea ice thickness, cloud properties, surface and TOA radiative fluxes

Inputs to the CDR:

- AVHRR Level 1B GAC data
- Surface type mask based on NISE



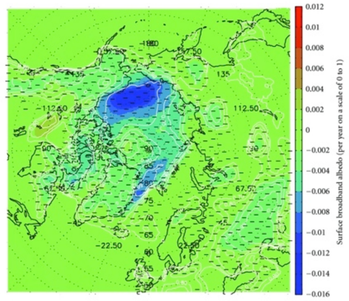
APP processing flow.



APP-x high-level processing flow. Blue boxes are output parameters.

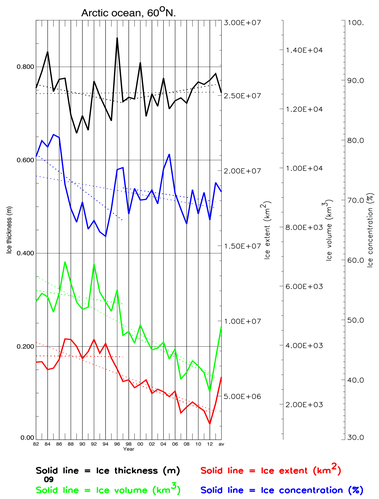
Examples of CDR Applications

Trends: Albedo



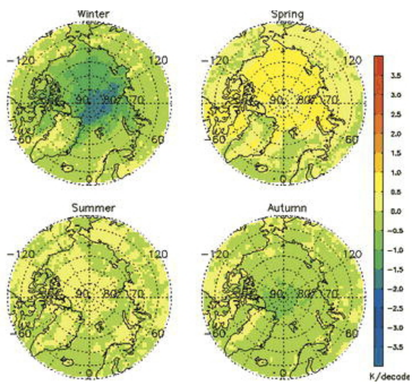
Surface albedo trend in autumn (September, October, and November), 1982-2004.

Trends: sea ice



Arctic Ocean, September (Warm Period), 1982-2013.

Feedbacks



Seasonal trend of the all-sky surface temperature trend caused by the cloud amount trend, 1982-2004, from APP-x.

Future Improvements and Anticipated Applications

Development & Improvement:

- Develop real-time monitoring tool of the data quality, and deep-dive tool to fix potential problem
- Derive climate information records (CIR) for climate analysis
- Compare this CDR with other related CDR products, e.g. PATMOS-x
- Develop a unified retrieval algorithm for extending the products from heritage satellite observations seamlessly to JPSS observations

Potential Applications:

- Detecting long-term trends of Arctic and Arctic climate parameters
- Study the feedback mechanisms and interactions within the polar climate system
- Monitoring and predicting sea ice changes in the Polar Regions
- Verifying, validating, and improving regional and global climate models

NOAA National Centers for Environmental Information

NOAA Climate Data Record Program