



Antarctic and Arctic Satellite Composite Imagery

A Bird's Eye View of the Poles

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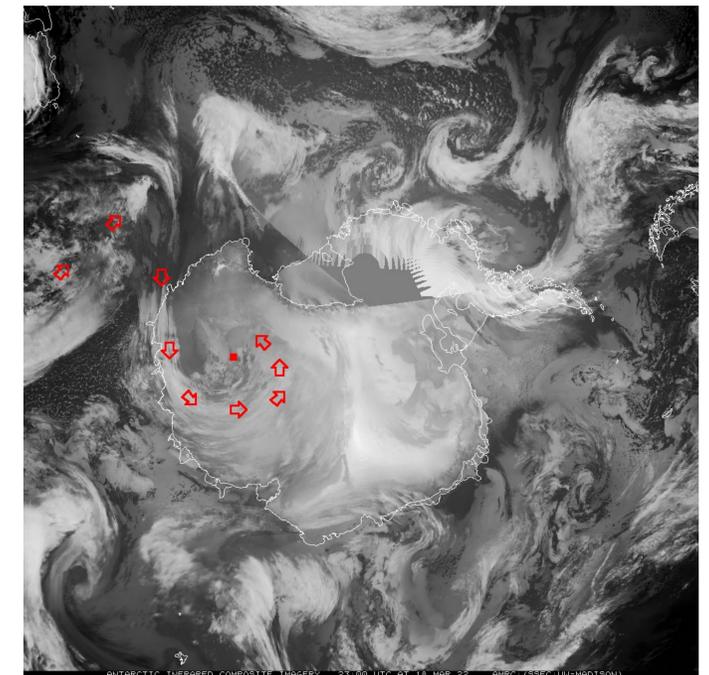
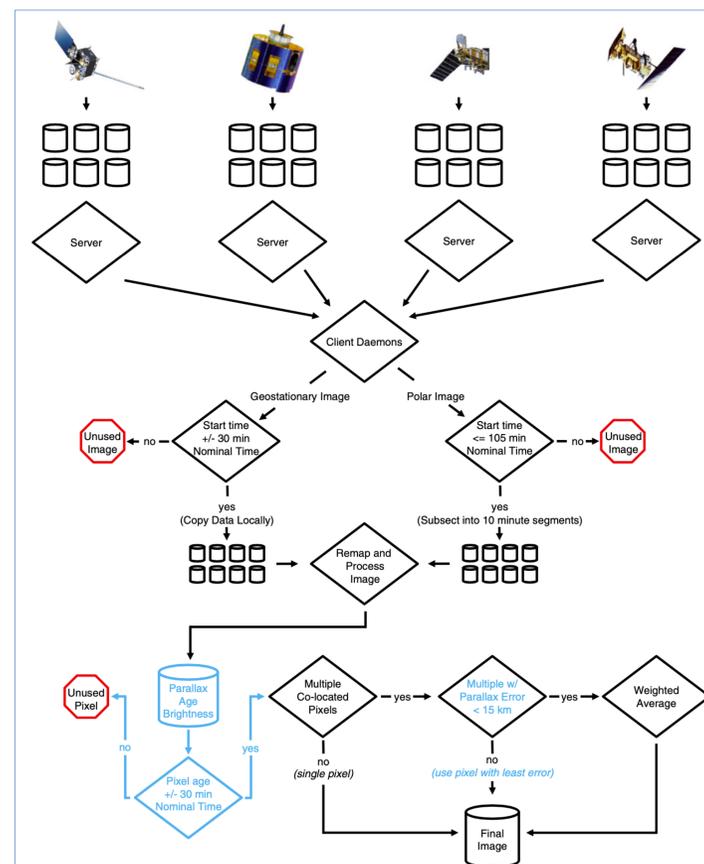
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Abstract

October 30, 2022 will mark 30 years of the generation of Antarctic satellite composite imagery in the infrared (11.0 micron) window channel. This imagery that covers the Antarctic and adjacent Southern Ocean has been uniquely created using both polar orbiting and geostationary satellite observations to support weather forecasting, research, and educational activities. It has inspired the development of additional spectral channels – now up to 5 of the most commonly available channels on meteorological satellites (0.65, 3.8, 6.7, 11.0, and 12.0 μm). The development of the same styled composite over the Arctic has been routinely produced over the last 15 or so years.

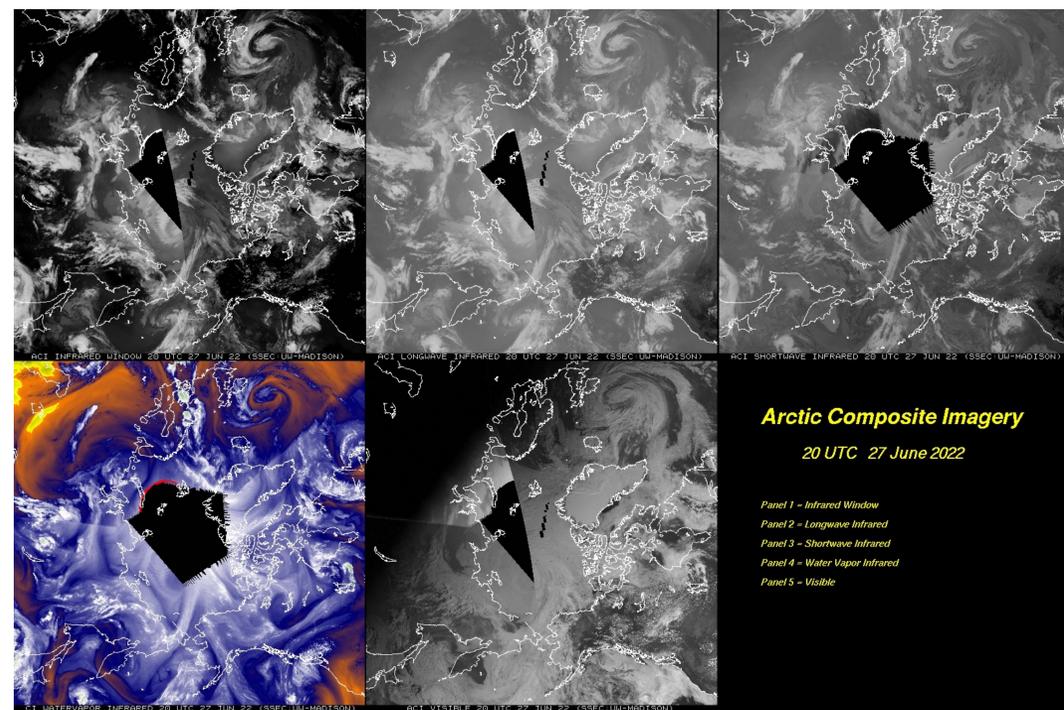
Applications

Composite Production



An Antarctic satellite composite (infrared 10.7 microns) from 23 UTC on 18 March 2022 showing an atmospheric river that impacted East Antarctica (as depicted by the red arrows). This resulted in perhaps one of the warmest weather events in recorded history in East Antarctica with record temperatures at Dome C II AWS of -9.4°C.

Research to Operations



The Arctic composite featured above with all 5 spectral channels shown is an example of a research to operations project, initially funded by the National Science Foundation, and transitioned to the National Oceanic and Atmospheric Administration.

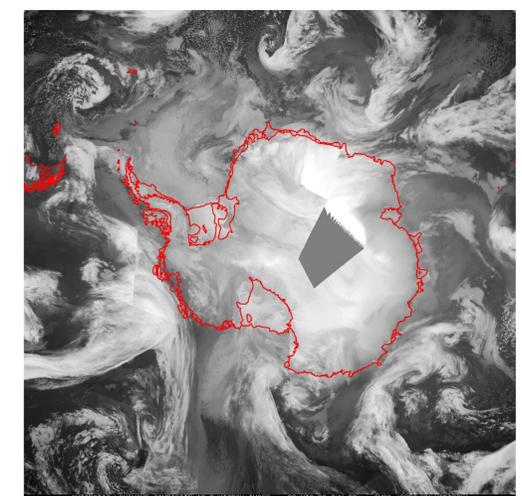
The composite imagery is built using both polar orbiting and geostationary satellite imagery inputs from up to 15 satellites, with the newest, highest resolution, lowest parallax error imagery used in the final image via a weighted average (for co-located pixels). Composites are constructed on an hourly basis with data no longer than +/- 30 minutes on average, available 3 to 4 hours after valid time.

Challenges

- Incomplete coverage over the deep polar regions
- Missing water vapor (~6.7 micron) imagery on most polar orbiting satellites
- Funded long-term archive of Arctic composite imagery
- Bad input imagery included in the composite

Acknowledgments

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Coming soon: Antarctic satellite composite imagery rotated with 0° longitude standard (Longwave infrared 10.7 microns from 9 UTC on 22 June 2022).