Satellite Composites in the Polar Regions: Development, Evolution and Applications

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Abstract:

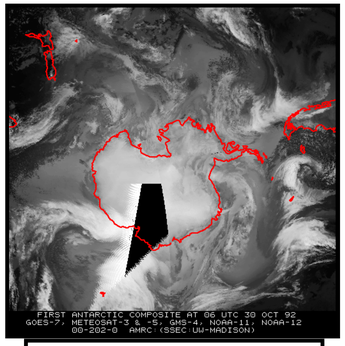
Research investigations and operational needs in the data sparse polar-regions and adjacent high latitudes have called for satellite observations to compliment limited in situ observation systems. For over 17 years, the combination of geostationary and polar orbiting satellite imagery into a single composite view over the Antarctic and Southern Ocean have been captured in three hourly mosaics. Some example applications include storm tracking, atmospheric motion vectors, and cloud mass transport. Improvements in temporal resolution (hourly composite) have be introduced, as well as changes in the processing methodology. Arctic and multi-spectral composites mark recent natural extensions of this effort.

Applications:

- Weather forecasting
- Cloud mass transport
- Case studies
- Glaciology studies
- Atmospheric motion vectors
- Semi-automated storm tracking
- Numerical model verification
- Education and public outreach
- Artists and writers program

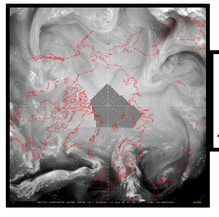
Satellites Utilized:

- GOES
- GMS
- MTSAT
- METEOSAT
- FY-2
- KALPANA
- NOAA
- DMSP
- Aqua & Terra
- MetOp (Coming Soon)
- COMS (Future ?)

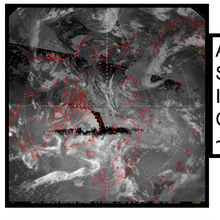


First Antarctic Infrared Composite

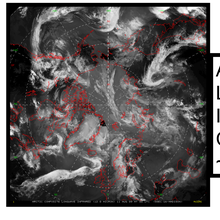
Historical Milestone	Date
First Antarctic Infrared Composite	30 October 1992
First test Arctic Composite	23 March 2000
First Antarctic Water Vapor Composite	2 May 2001
Upgrade of Antarctic Infrared Composite to 5 kilometer resolution	1 November 2002
Start of experimental Antarctic Visible Composite	1 January 2004
"Pseudo-color" Antarctic Composites begin	28 February 2005
First full Arctic Infrared Composite	5 December 2007
Upgrade to Hourly Antarctic Composites	8 April 2009



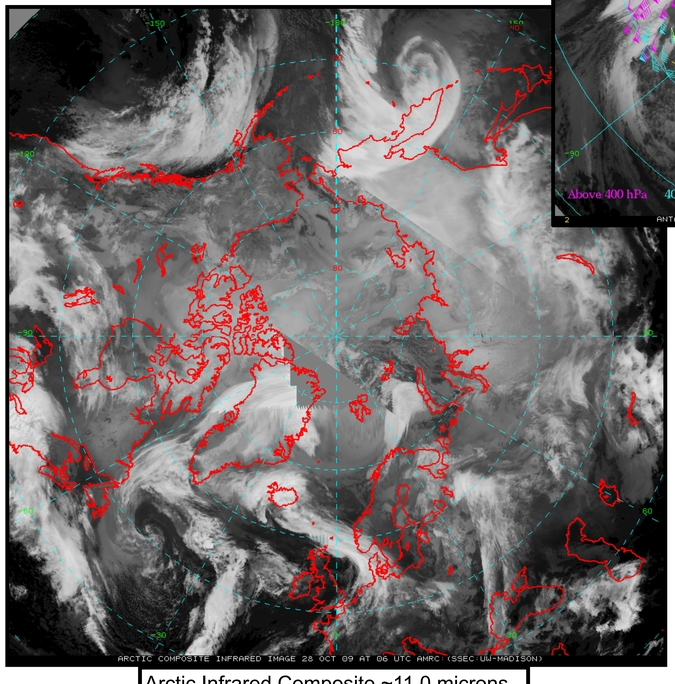
Arctic Water Vapor Composite ~6.7 microns



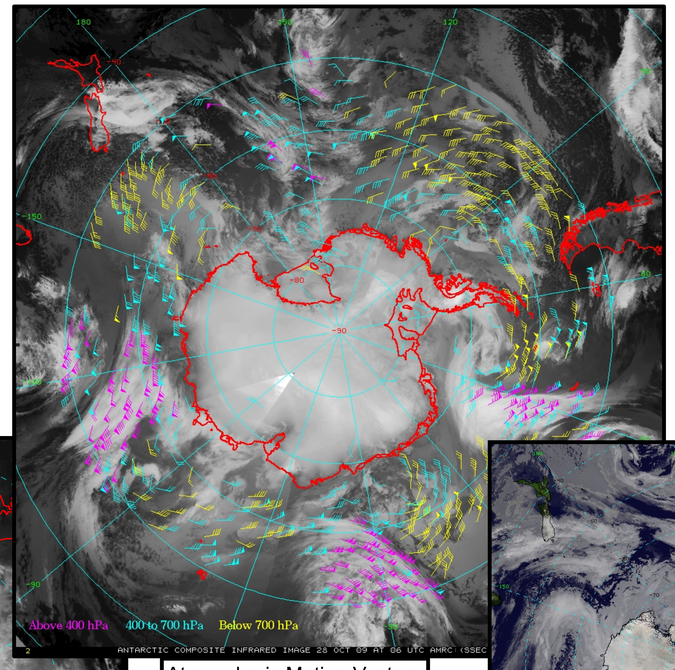
Arctic Short Wave Infrared Composite ~3.7-3.9 microns



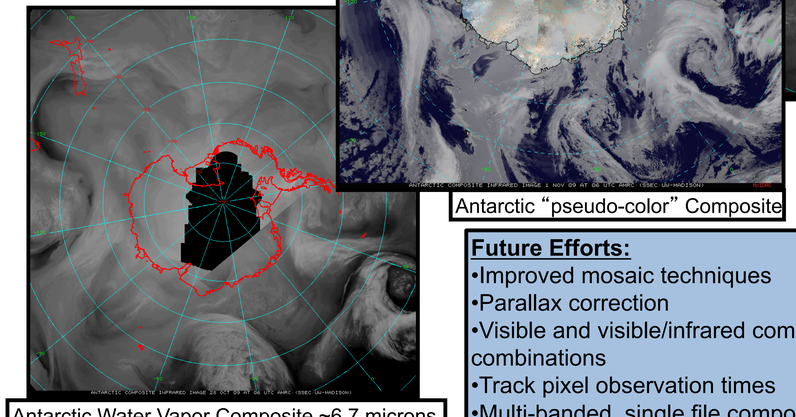
Arctic Long Wave Infrared Composite ~12.0 microns



Arctic Infrared Composite ~11.0 microns

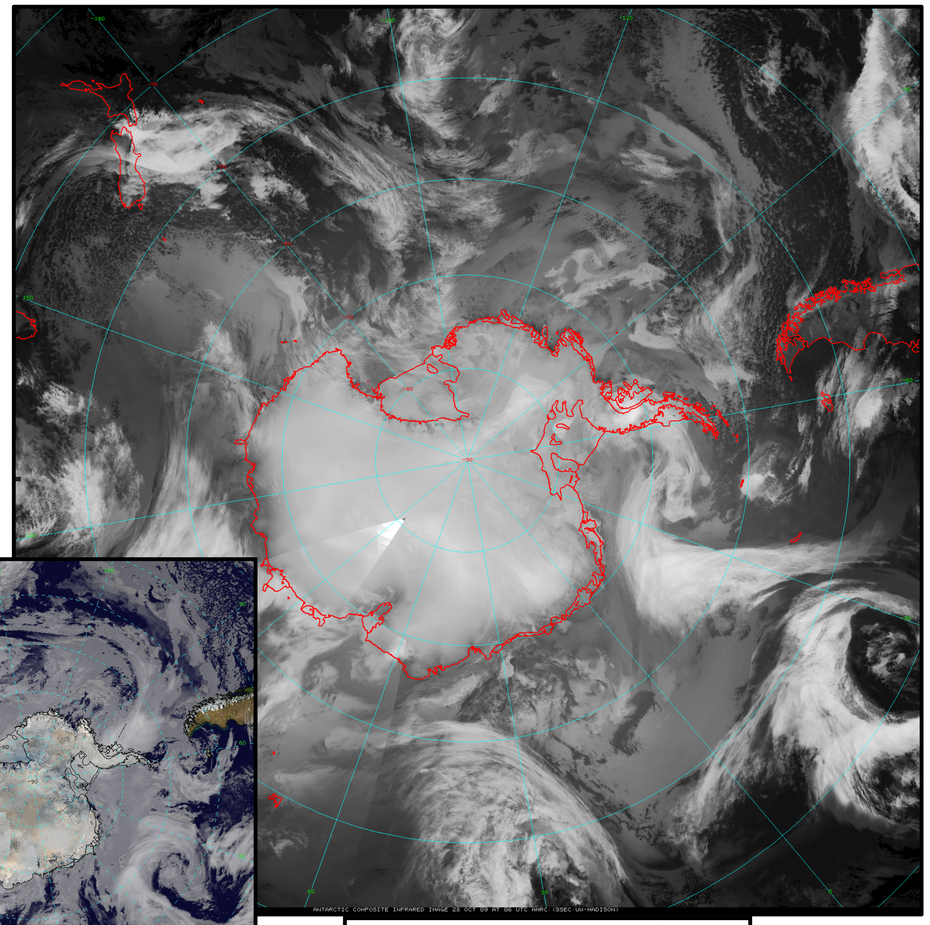


Atmospheric Motion Vectors



Antarctic "pseudo-color" Composite

Antarctic Water Vapor Composite ~6.7 microns



Antarctic Infrared Composite ~11.0 microns

Antarctic Composites: http://amrc.ssec.wisc.edu/
Arctic Composites: http://arctic.ssec.wisc.edu/

Future Efforts:

- Improved mosaic techniques
- Parallax correction
- Visible and visible/infrared composite combinations
- Track pixel observation times
- Multi-banded, single file composites

Acknowledgments:

This material is based upon work supported by the National Science Foundation, Office of Polar Programs under grant numbers ANT-0537827, ANT-0713843, and ANT-0838834.

Poster by Matthew Lazzara