

Implementing Polar Projections with OGC Services for the Enhancement of AIRS NRT Visualization in LANCE

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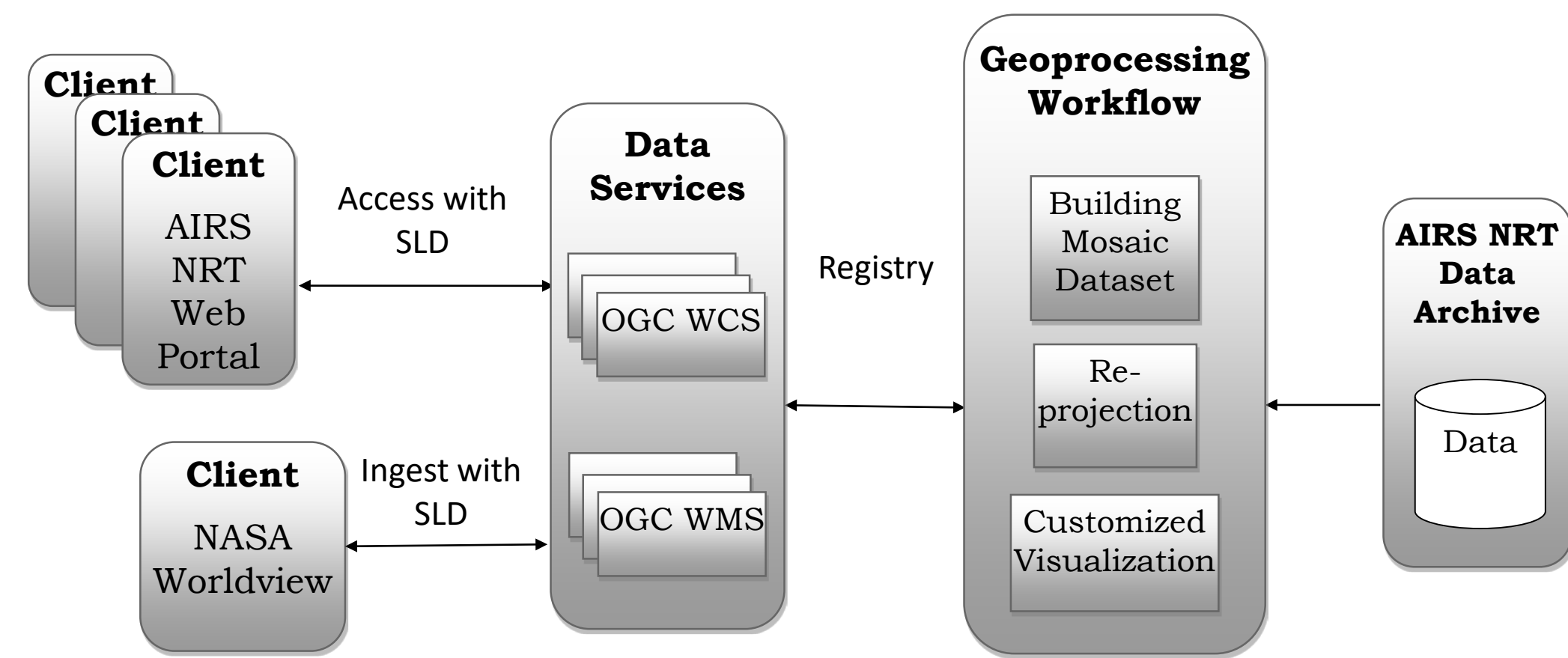
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Introduction

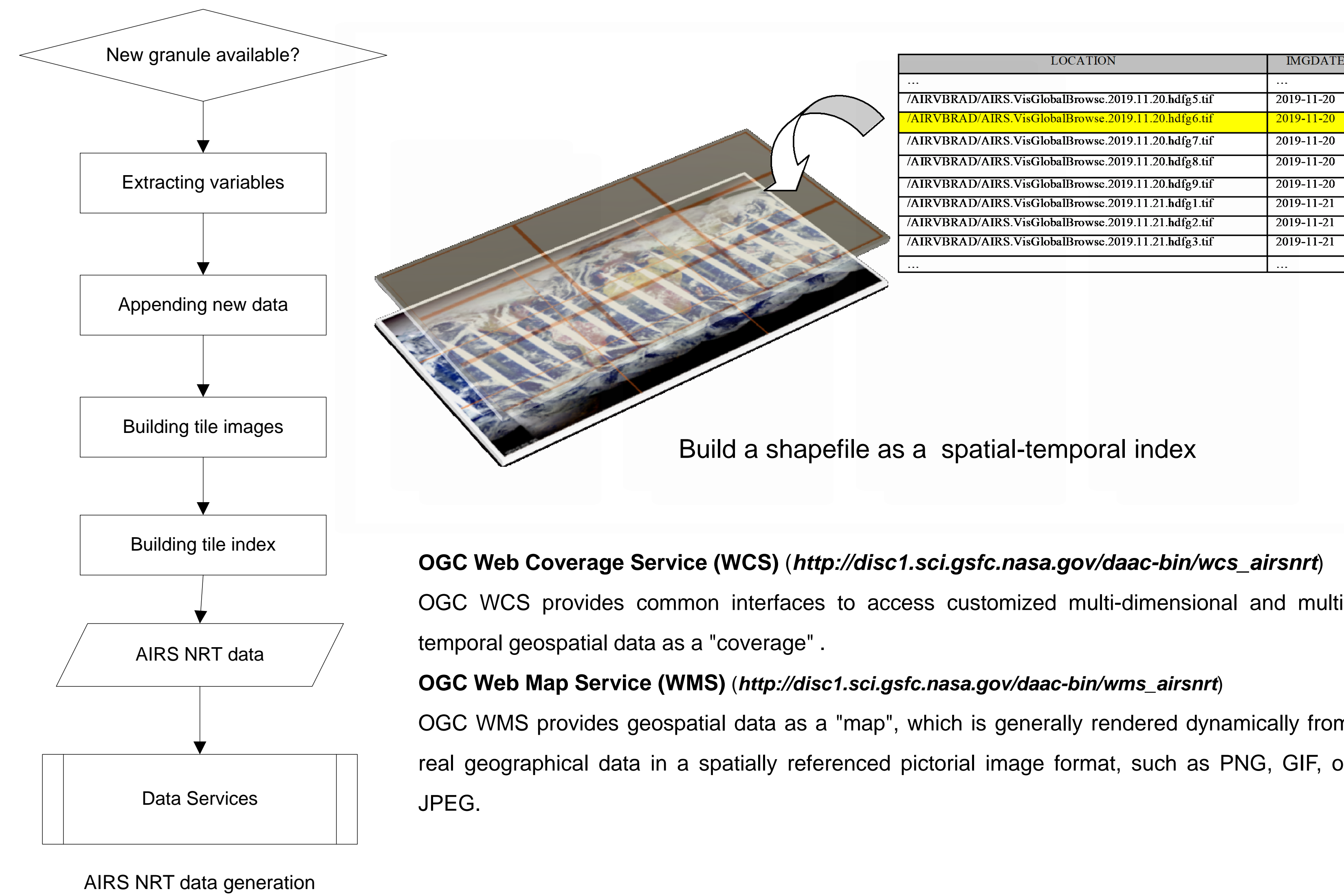
The Atmospheric Infrared Sounder (AIRS) Near-Real Time (NRT) data from the Land Atmosphere Near real-time Capability for EOS (LANCE) element at the Goddard Earth Sciences Data and Information Services Center (GES DISC) provides information on the global and regional atmospheric state, with very low temporal latency, to support climate research and improve weather forecasting. Open Geospatial Consortium (OGC) services are being utilized to facilitate access to, and integration of, LANCE AIRS NRT data and images. The map is refreshed every 45 minutes, and about 2 hours behind real-time.

Ongoing AIRS NRT imagery enhancement work includes adding a new set of the images in polar projections. Polar projections are commonly used for mapping the Antarctic and Arctic regions. We have implemented a more precise south polar (EPSG:3031) projection and north polar (EPSG:3413) projection making our OGC service instances more useful and interoperable. Thus, AIRS NRT data can be easily accessed and integrated with other applications, greatly increasing the impact of our data on researches and applications in polar regions.

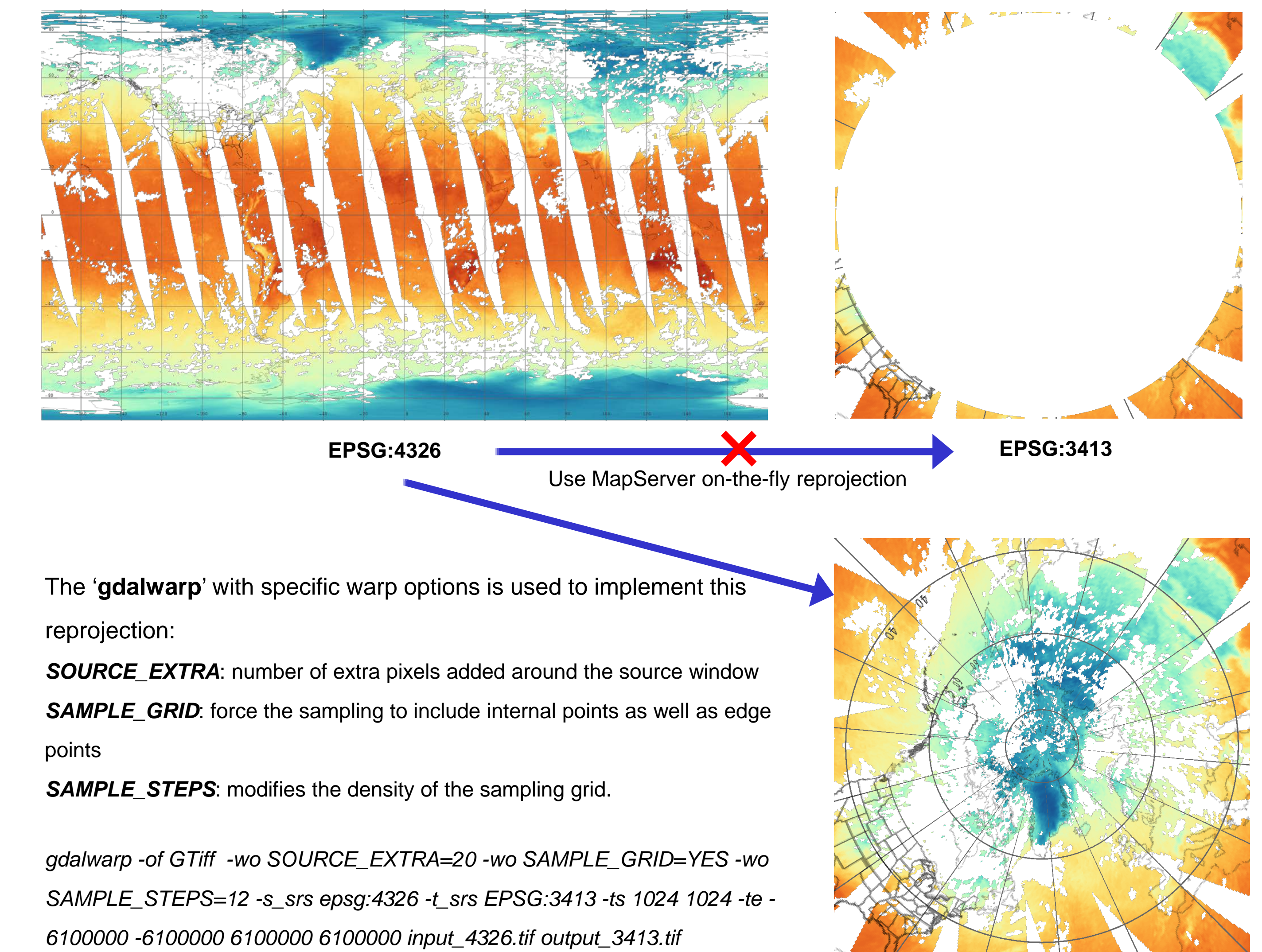


An open and interoperable way for access and integration of AIRS NRT data

AIRS NRT Data Services



Data Reprojection



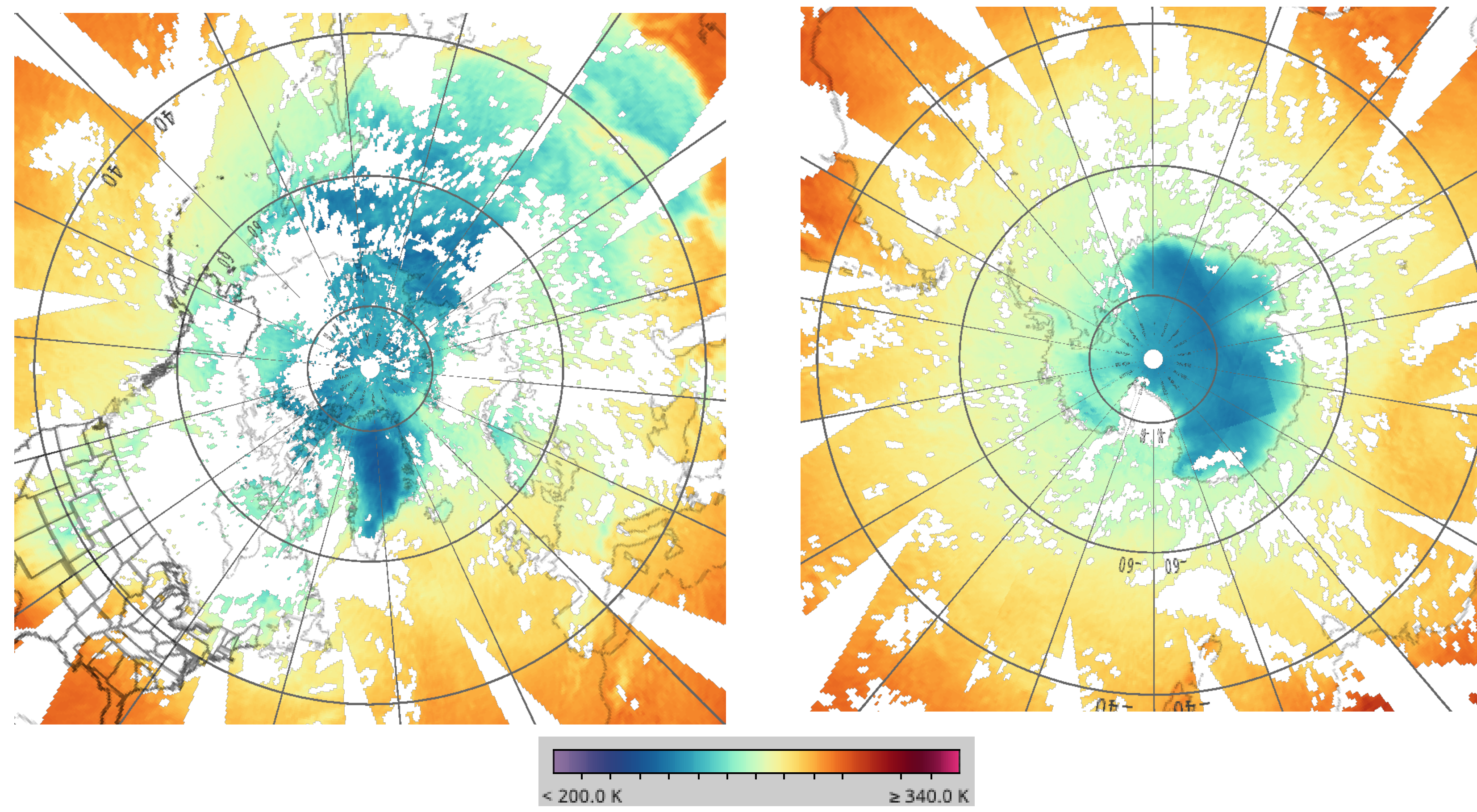
AIRS NRT Data

AIRS NRT variables

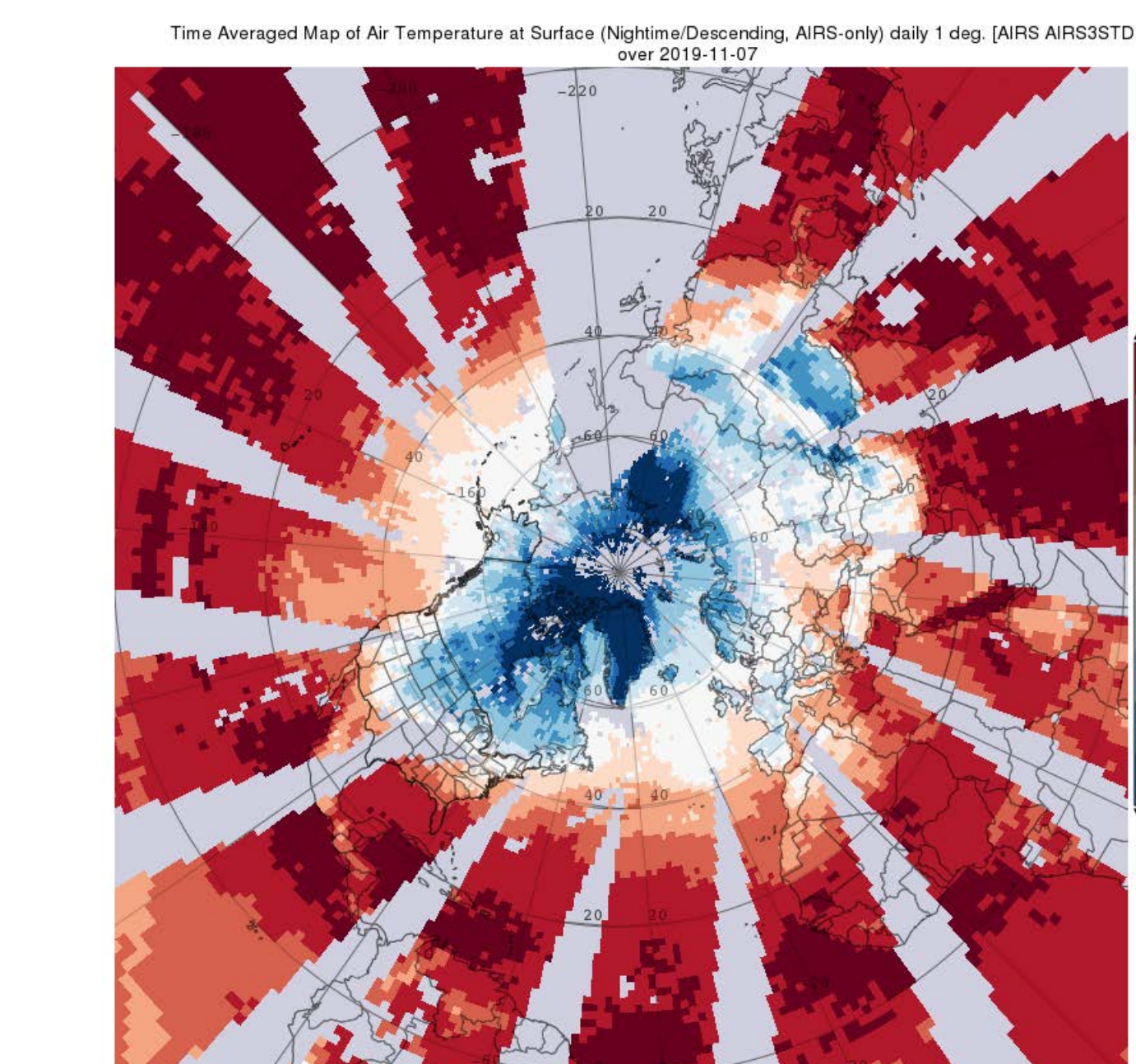
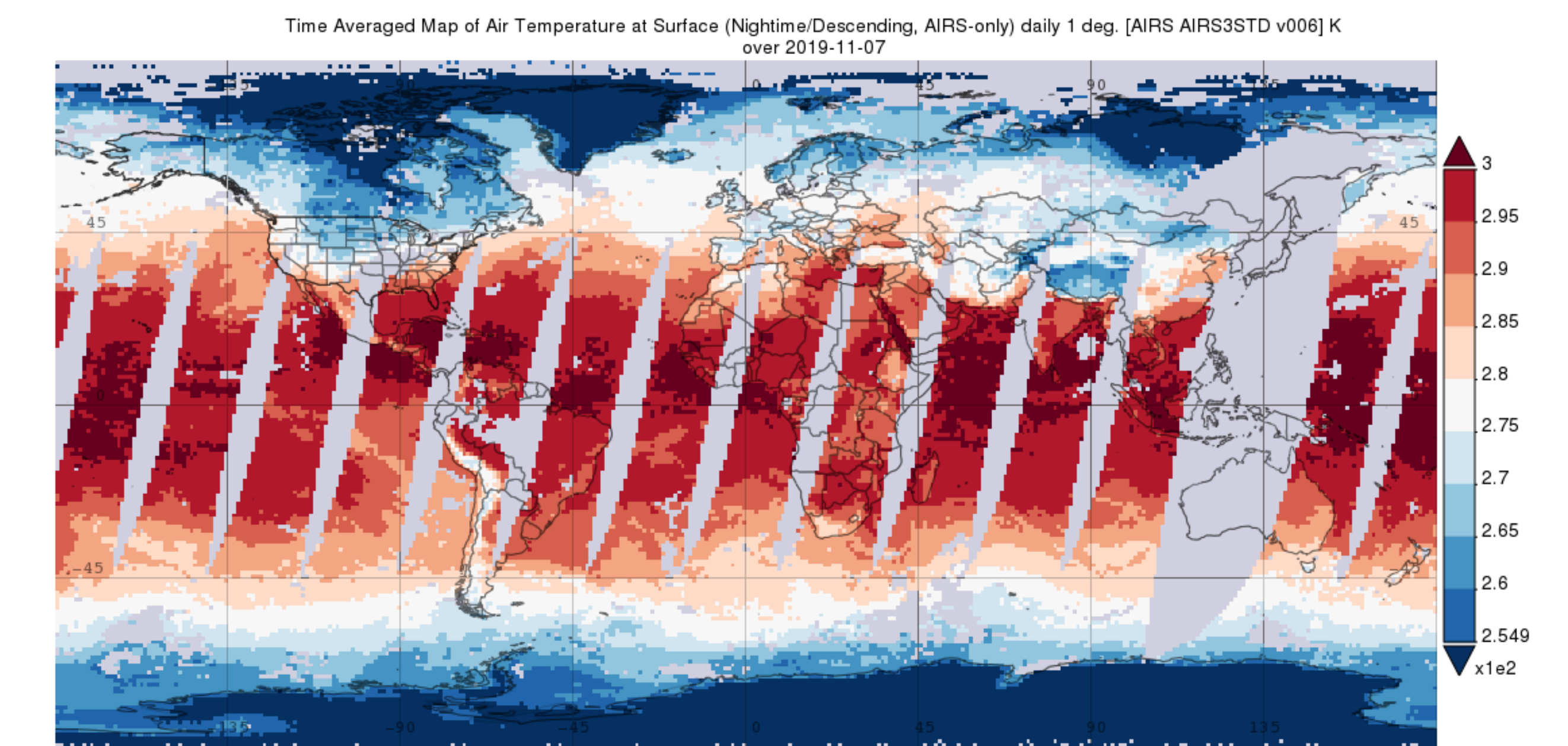
Variable Name	Data Source
Surface Air Temperature	Level 2 AIRS2RET_NRT
Surface Skin Temperature	Level 2 AIRS2RET_NRT
Air Temperature at 850hPa	Level 2 AIRS2RET_NRT
Air Temperature at 700hPa	Level 2 AIRS2RET_NRT
Air Temperature at 500hPa	Level 2 AIRS2RET_NRT
Surface Relative Humidity	Level 2 AIRS2RET_NRT
Relative Humidity at 850hPa	Level 2 AIRS2RET_NRT
Relative Humidity at 700hPa	Level 2 AIRS2RET_NRT
Relative Humidity at 500hPa	Level 2 AIRS2RET_NRT
Carbon Monoxide Mole Fraction in Air at 500hPa	Level 2 AIRS2RET_NRT
Methane Mole Fraction in Air at a00hPa	Level 2 AIRS2RET_NRT
Total Cloud Fraction	Level 2 AIRS2RET_NRT
Cloud Top Height	Level 2 AIRS2RET_NRT
Sulfur Dioxide Brightness Temperature Difference	Level 2 AIRS2SUP_NRT
Dust Score	Level 2 AIRS2SUP_NRT

Polar Projections

The polar projection is an azimuthal projection based on a plane perpendicular to the Earth axis in contact with the North or South Pole. It shows that all points on the map are at the correct azimuth and at proportionally correct distances from the center point. In polar projections, parallels of latitude are mapped to concentric circles, and all lines of longitude are mapped to radiating straight lines.



"Arctic Blast" in Polar Projection



The first Arctic frigid air "blast" of the 2019 season headed over North America more than a month before official astronomical winter began, and caused air temperatures to drop sharply over most of the United States.

The figures show the surface air temperature from AIRS descending/nighttime mode on November 7, 2019, in both north polar projection and equilateral projection. The map in polar projection clearly gives a better view of such a synoptic weather event originating from the northern polar region.