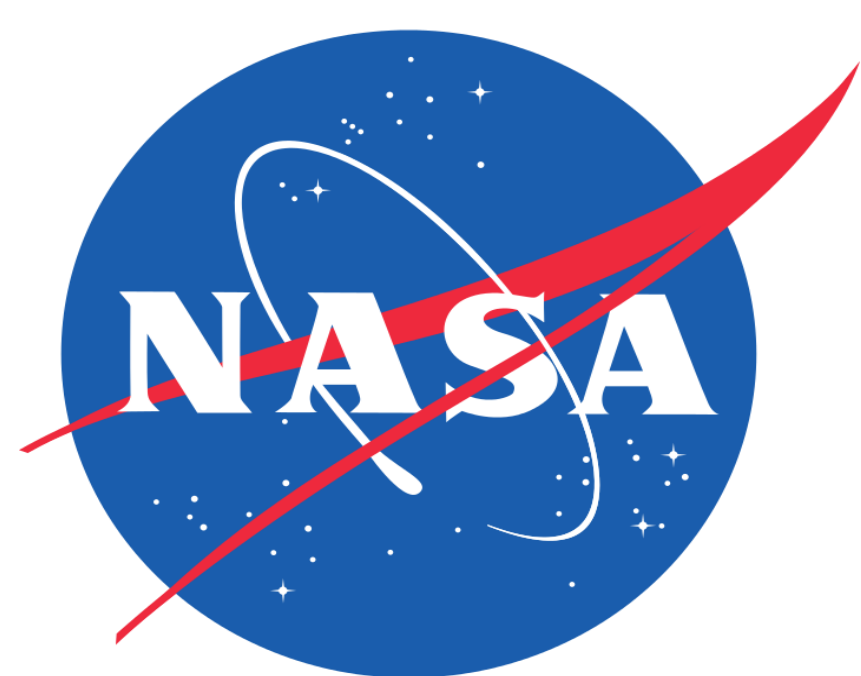




Unique Forecasting Products and Training for the NURTURE Field Campaign

Sebastian Harkema^{1,2}, Patrick Duran^{3,2}, Matthew Miller^{1,2}, Charles Helms^{4,5}, and Roger Allen^{6,2}

¹UAH, ²NASA SPoRT, ³NASA MSFC, ⁴UMD, ⁵NASA GSFC, ⁶Amentum

What is NASA Short-term Prediction Research and Transition (SPoRT)?

- Located at Marshall Space Flight Center in Huntsville, Alabama, USA
- History of innovating products for use in forecasting and decision support spanning more than two decades
- Employs a highly collaborative co-developed paradigm (right image)
- Products generated address real, identified user needs while allowing time in the product development cycle for modifications based on user feedback
- Actively working with 450+ stakeholders including those in academia, local/state/federal government agencies, and the private sector
- Research/Application Themes: Weather & Extremes, Air Quality, Land Surface & Hydrology, and Wildland Fires



SPoRT Website



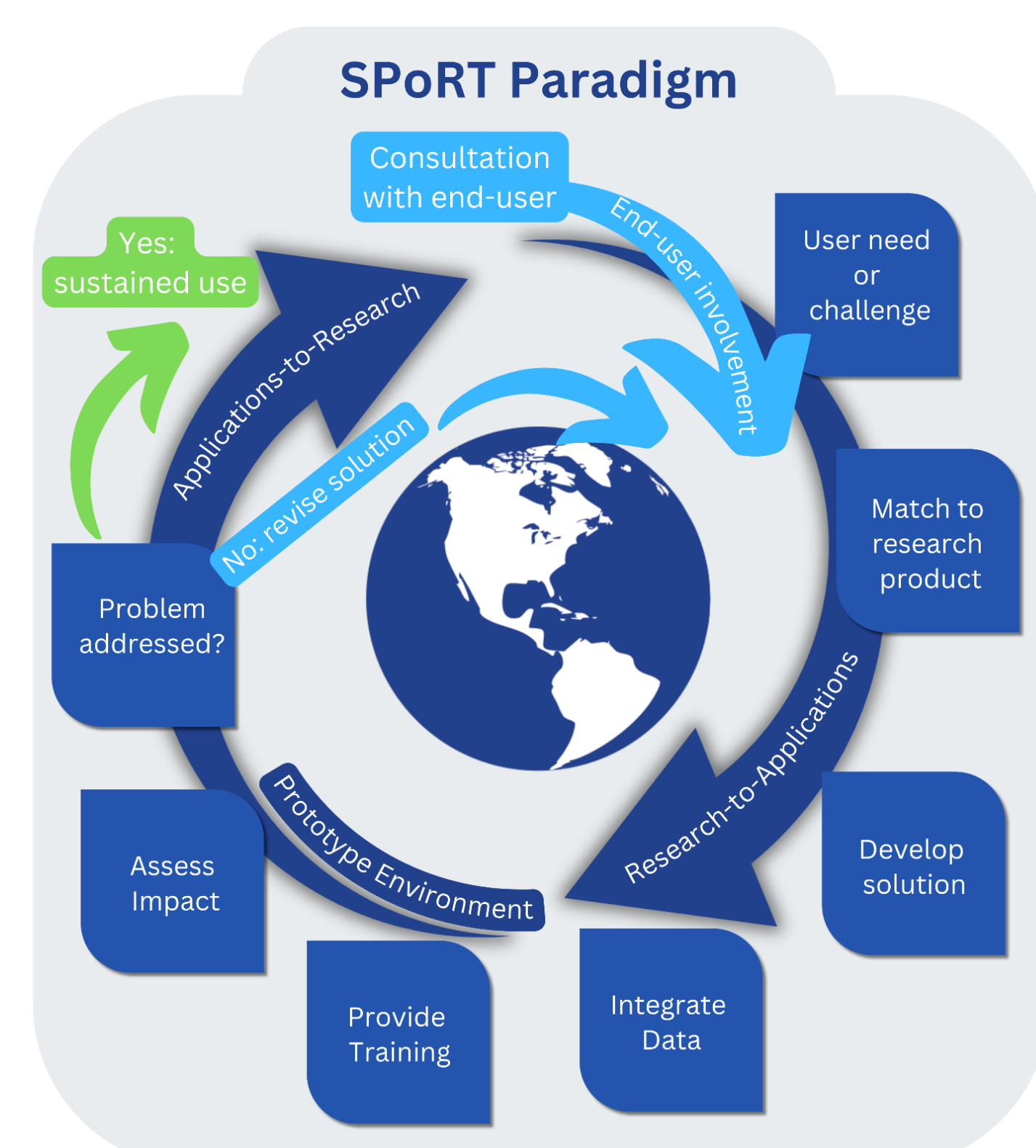
SPoRT Product Viewer



SPoRT Product Catalog



SPoRT/NURTURE Dashboard



Unique Training for NURTURE

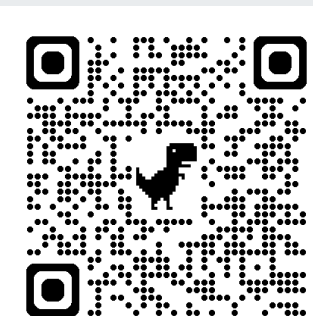
- Three “Quick Guide” style trainings with other longer-form training to come
- Longer-form training will include interactive modules, video examples, and example use cases
- Training also extends to live, in-person demos during the 2027 deployment

Moving lines Quick Guide

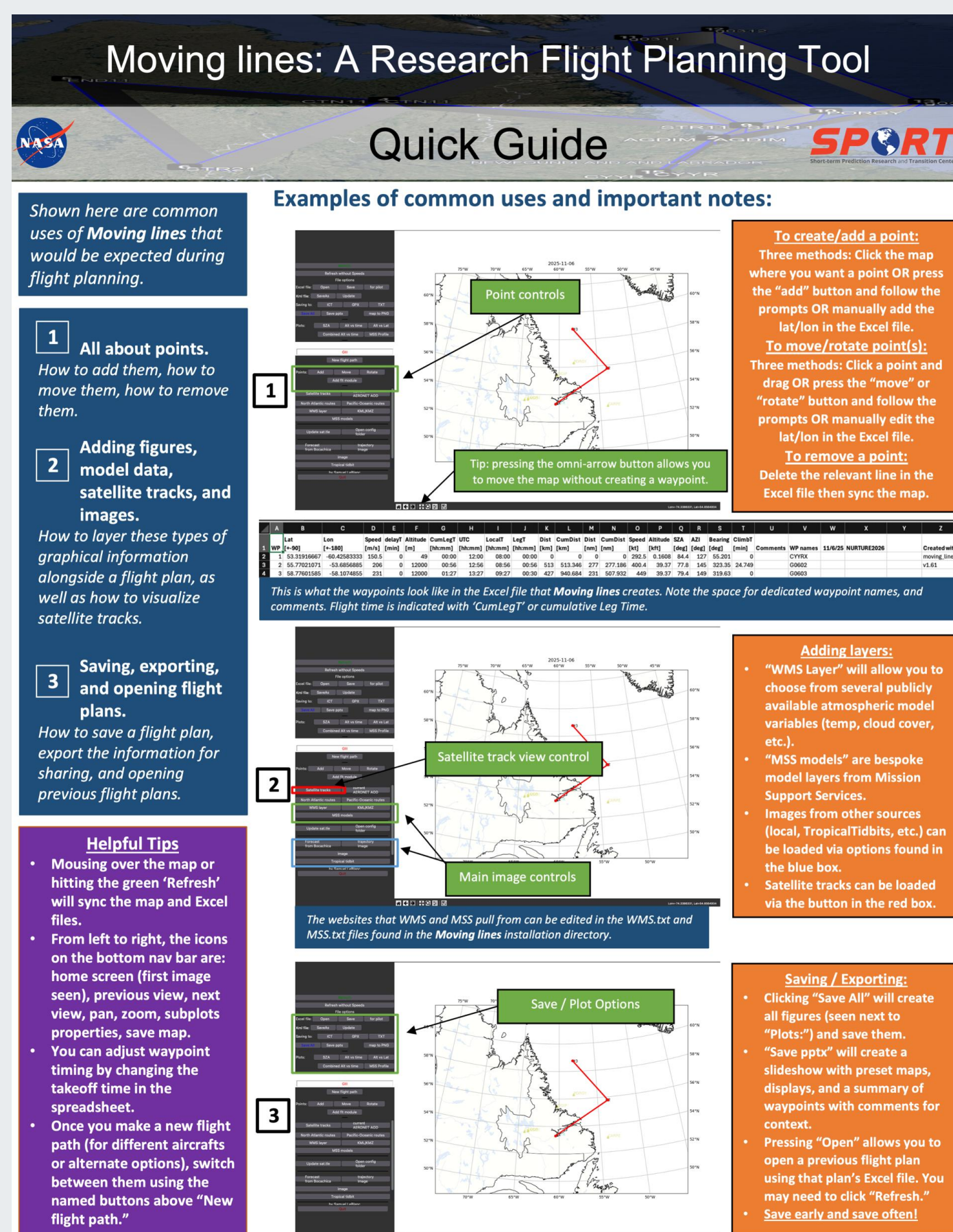
- Open-source research flight planning tool built in Python
- Displays an interactive map with easy-to-select waypoints that is connected to a Microsoft Excel spreadsheet, automating flight time calculations.
- Quick Guide is a source of information on how to use the tool and best practices



Moving lines
GitHub

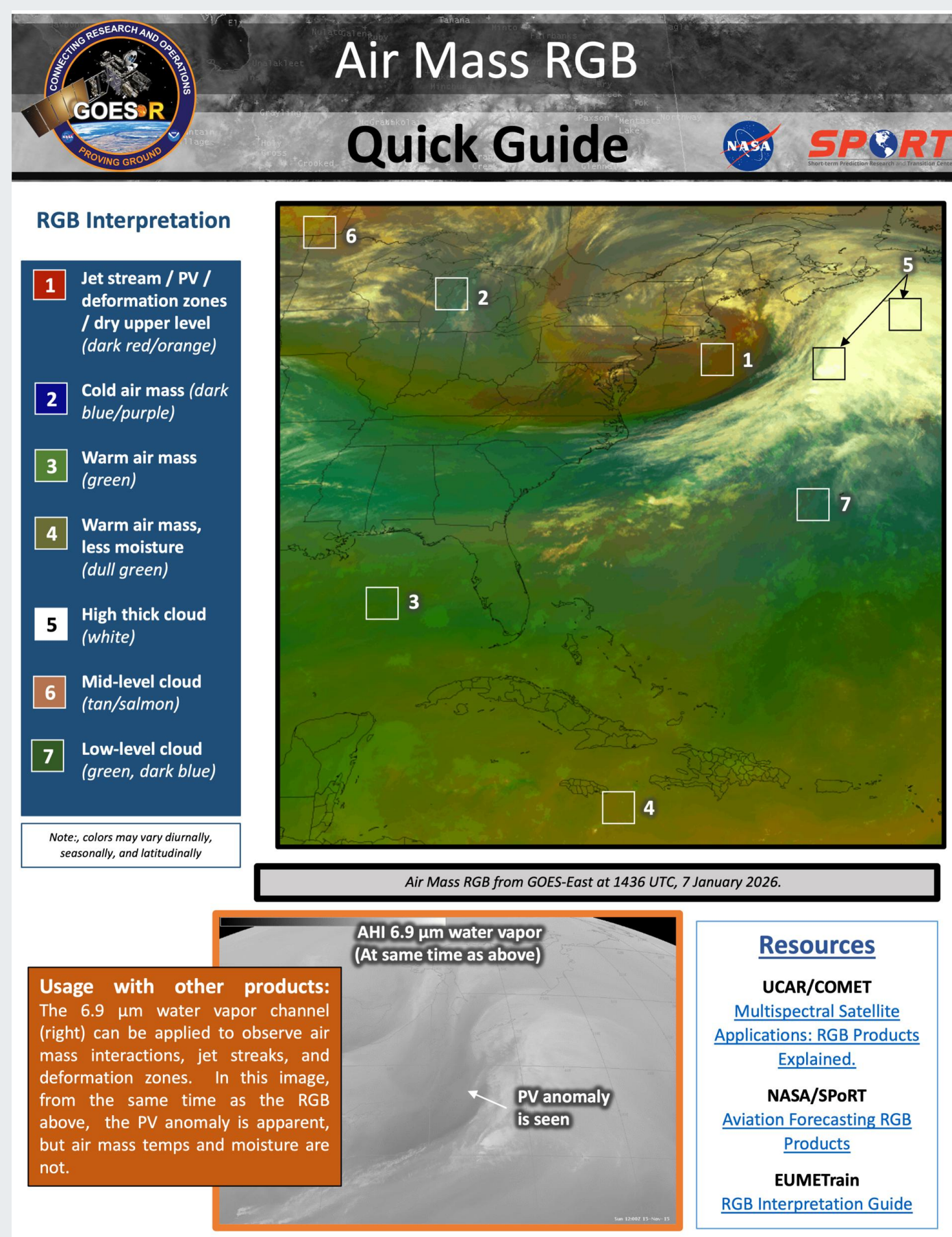


Moving lines
Quick Guide



Gridded NUCAPS Quick Guide

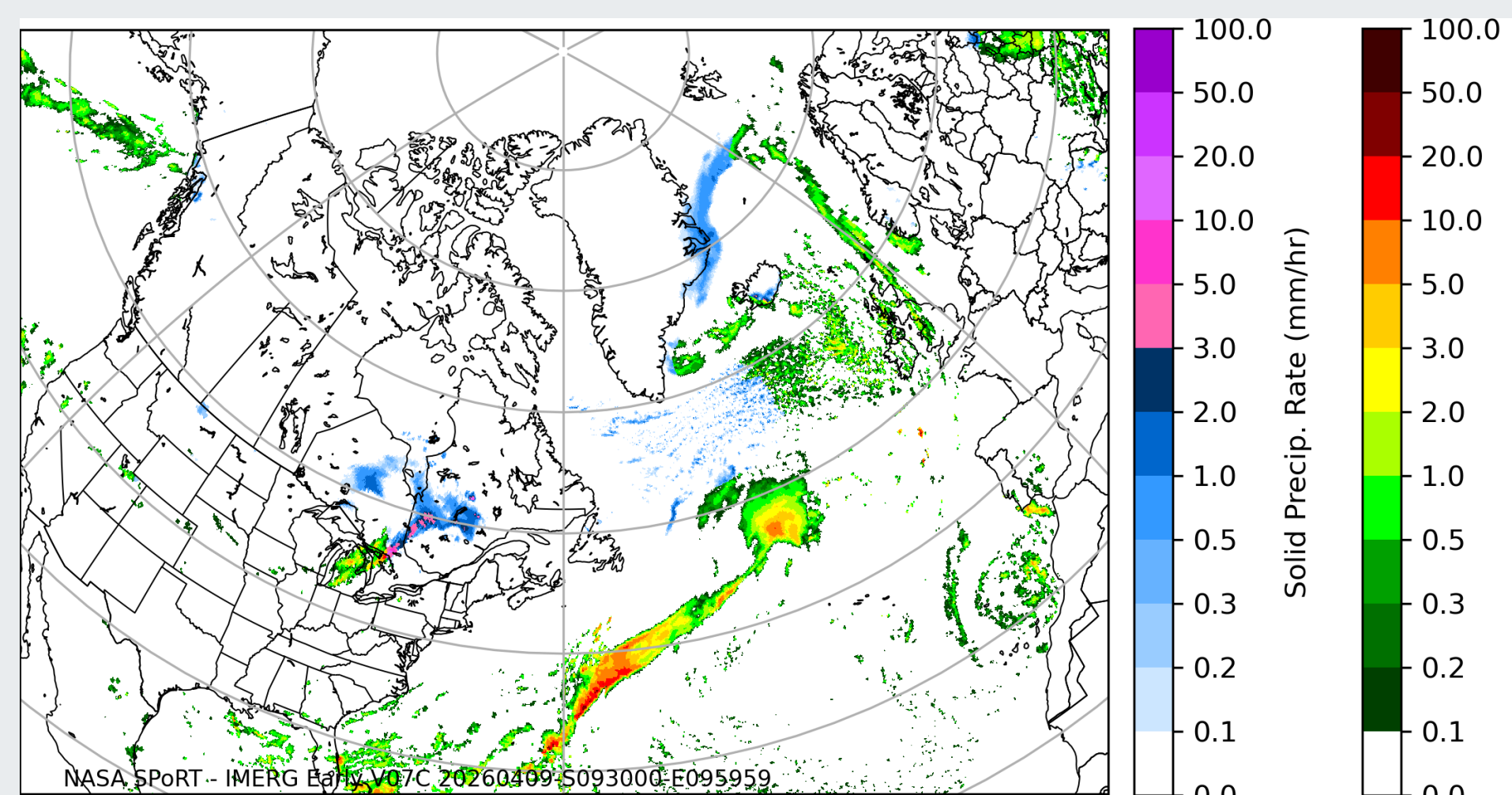
- Gridded NUCAPS offers the capability to view plan-view and cross-section displays
- Quick Guide shows visual examples of different features to look for, as well as helpful product information



Satellite-Derived Products for NURTURE

- All satellite products are available in four different projections and near real-time to support decision support for flight operations
- Products are compatible with NASA's Mission Tools Suite (MTS) and Moving Lines airborne research flight planning tool
- SPoRT has enough flexibility and experience to quickly adapt new satellite retrievals and/or variables to support the needs of mission scientists and forecasters

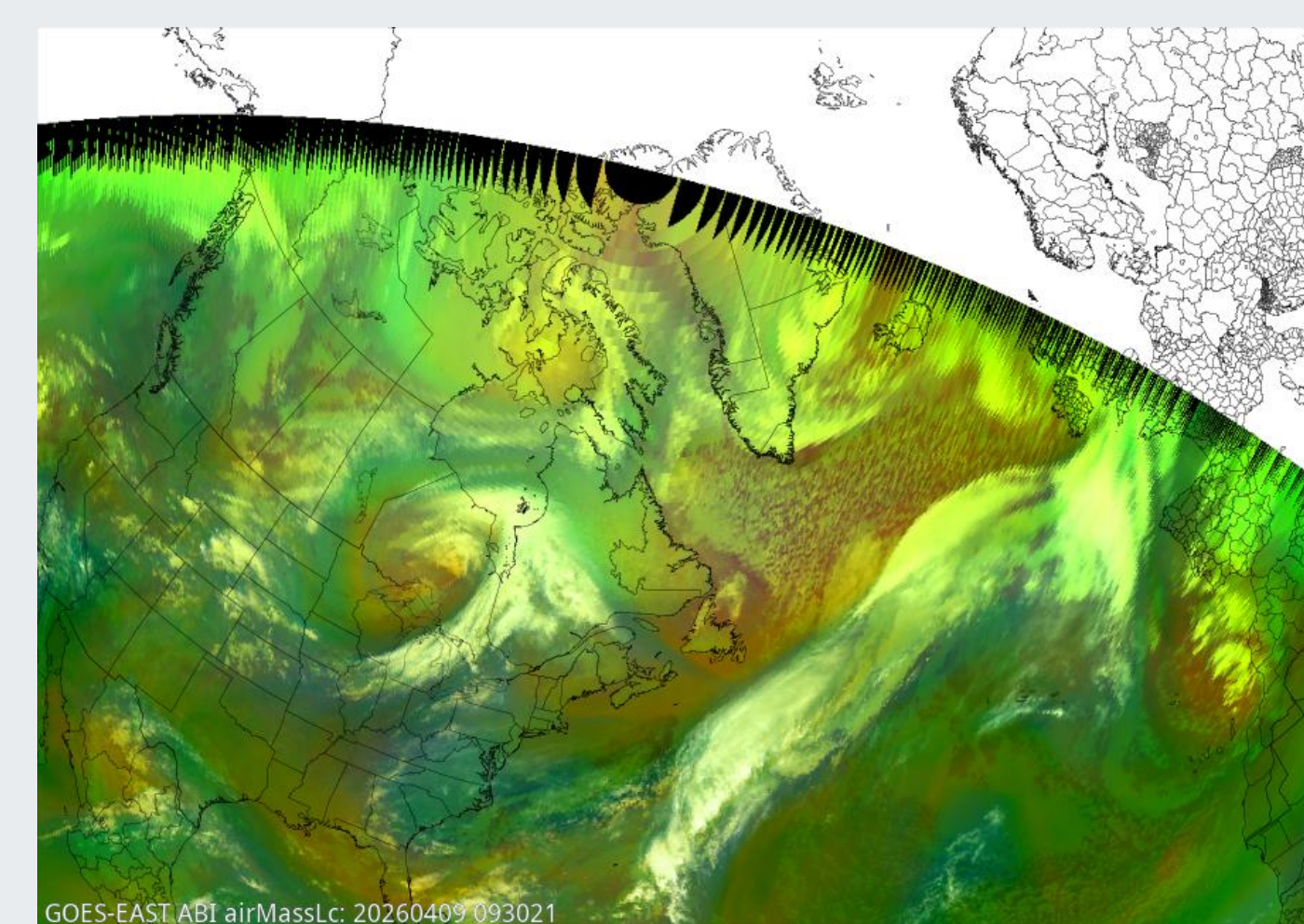
NASA's Integrated Multi-satellite Retrievals for GPM (IMERG)



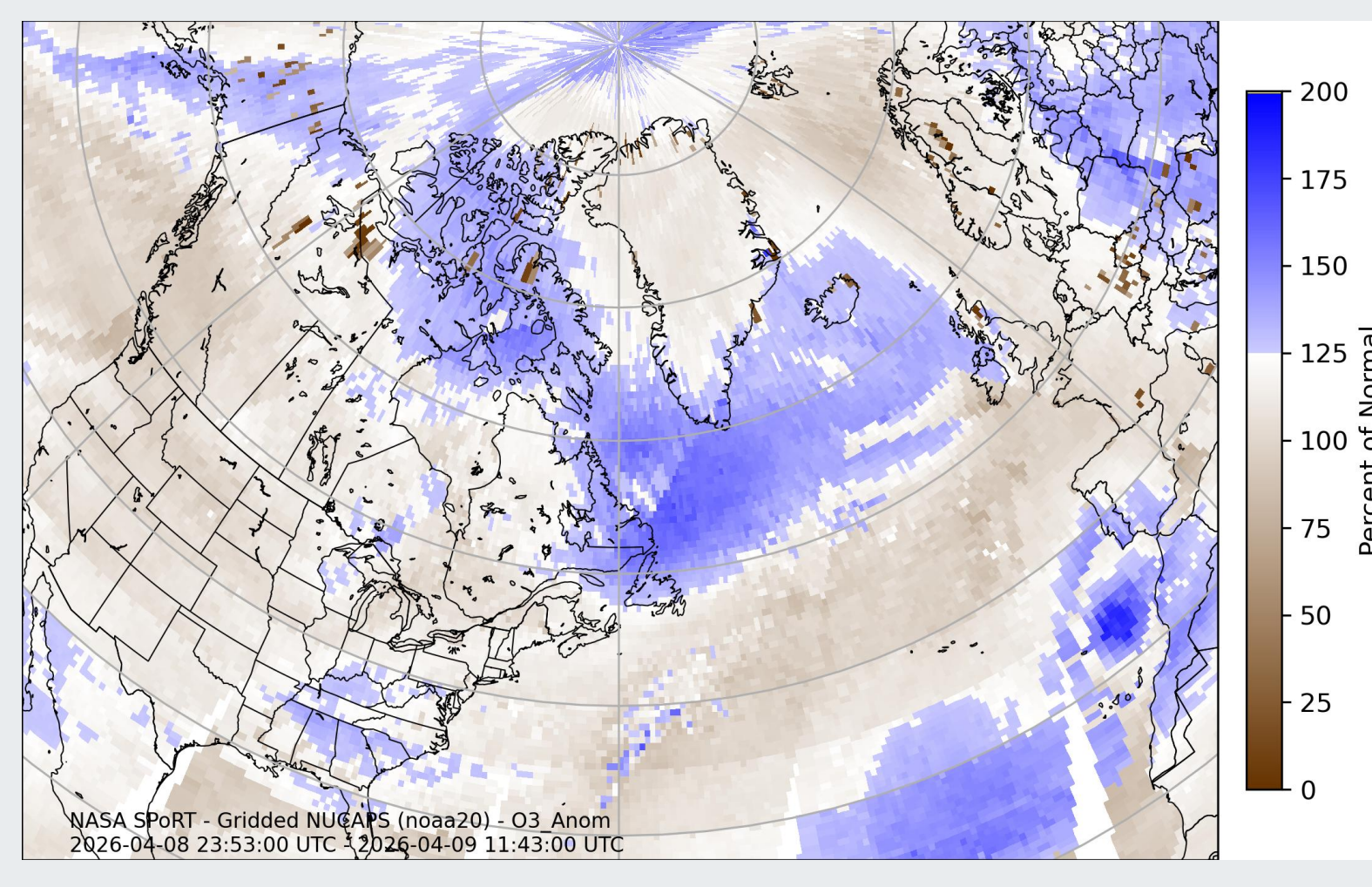
- Gridded satellite-derived product that can differentiate solid and liquid precipitation
- Provides precipitation estimates even in data sparse regions

GOES Advanced Baseline Imager (ABI) Limb-Corrected Airmass RGB

- Airmass RGB provides insight into dry airmasses, ozone enriched areas, tropopause folds, and PV anomalies (red hues)
- Limb-correction accounts for atmospheric cooling along limbs of the data



NOAA Unique Combined Atmospheric Processing System (NUCAPS)



- Gridded satellite-derived profiles that provide a variety of data products at various heights (e.g., ozone, temperature, moisture, stability indices)
- Provides first guess of quantities that can be validated against airborne observations

NASA SPoRT Sea Surface Temperature (SST) Product

- Multi-satellite gridded SST product that updates twice daily with a 2-km resolution
- Offers insight into changes in SSTs and sea ice extent associated with tropopause polar vortices (TPVs)

