# PAESCAL Advanced Visual Analytics Tools

BER-ASCR Partnership

## Scientific Achievement

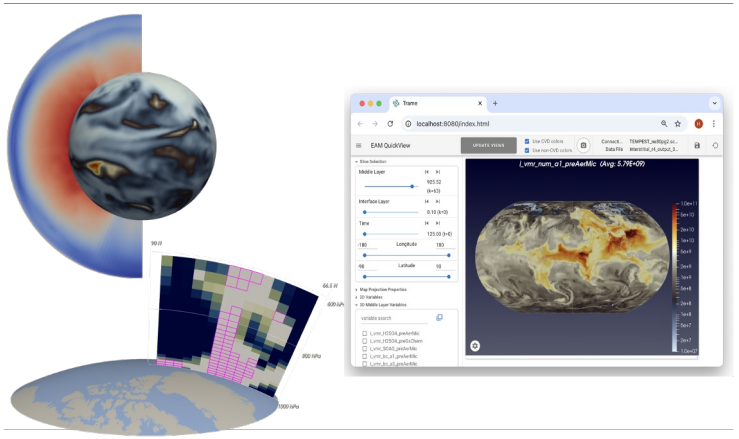
- Development of custom tailored readers, filter, and bespoke analysis tools for the analysis of atmospheric data from E3SM.
- Domain scientists used the tools to uncover key insights into their simulation data – to understand when, where, and why unrealistic, ultra-low cloud droplet number concentrations occur in E3SMv2.

## Significance and Impact

- The software tools helped Identified the key (overlooked) cloud regime and physical processes to investigate in future research of aerosol-cloud interactions.
- Developing a shared vocabulary for bridging the atmosphere modeling community and scientific visualization community.
- Established a new strategy for leveraging advanced visual analytics for E3SM – delivered the first tool, EAM QuickView, tailored to E3SM's atmosphere component.

## Technical Approach

- Developing of Python-based readers and filters for ParaView to accommodate the data models for atmospheric data from E3SM.
- Engaging with domain experts to
  - understand their analysis workflows and encapsulating in a unified framework
  - pain point in the adaptation of tools like ParaView and proposing tools that minimize or eliminate the learning curve and cognitive load to use them.



*On the left, the two figures show the E3SM Atmosphere Model (EAM) results presented by ParaView using tailored Reader and Filters. On the right, the figure shows the screenshot of the EAM QuickView app showing near-ground aerosol particle number concentrations.*

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