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Oral

Accurate cloud nowcasting holds critical significance in facilitating timely decision-making across diverse Department of Defense (DoD) applications. Leveraging optical flow methods within atmospheric sciences has emerged as a prominent solution due to their inherent capacity to capture intricate motion patterns in image sequences, especially when applied to radar and satellite imagery. This proficiency contributes valuable insights into atmospheric conditions, encompassing parameters such as cloud top divergence and cooling, while also enhancing cloud tracking accuracy for short-term forecasting.

The integration of optical flow-derived products with machine learning (ML) techniques presents a promising avenue for advancing cloud nowcasting capabilities, particularly in regions characterized by cloud dissipation or new cloud formation. Our ongoing research reveals preliminary findings in 3D cloud nowcasting, featuring a comparative analysis between traditional advection methods and machine learning approaches. Notably, our study seeks to demonstrate the potential of optical flow as a tool to inform ML models, thereby elevating the accuracy and performance of cloud nowcasting.

By illustrating the synergies between optical flow methodologies and ML strategies, our research underscores the potential to enhance cloud nowcasting accuracy, ultimately aligning with the operational requirements of DoD-specific applications. These findings contribute to the broader discourse on cloud analysis, diagnosis, and verification.

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