ATS/CIRA Colloquium

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Polarization Difference - the scientific story behind one variable and its practical applications

Hosted by Christine Chiu

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via Microsoft Teams

Cloud ice and snow microphysical characteristics play an important role in determining cloud radiative effect. They are also closely connected to the details of surface precipitation characteristics. Ice orientation is one microphysical property that is traditionally believed to have trivial impact on the weather systems/climate, and it is hard to measure from space.

In this presentation, I will show how many scientific stories can be told from one variable – the brightness temperature difference between vertically-polarized and horizontally-polarized 166 GHz measurements from the Global Precipitation Measurement Microwave Imager (GPM-GMI). Through scrutinizing collocated CloudSat, GMI and GPM radar observations together with the aid of radiative transfer model simulations, we can not only tell apart the particle size, shape and orientation, but also understand the precipitation regime as well as the life stage of a precipitation system. In the second half of my talk, I will showcase how this variable can be used for predicting precipitation flags and separating mixed-phase cloud from liquid and ice with the powerful machine learning/artificial intelligence (ML/AI) technique.

Colloquia page: atmos.colostate.edu/colloquia