PACE's polarimeters, SPEXone and HARP2, harness the properties of light waves as they bounce through Earth's atmosphere to reveal detailed cloud characteristics. By capturing polarized sunlight across multiple wavelengths and viewing angles, these instruments surf the electromagnetic spectrum to determine cloud droplet sizes, shapes, and composition with exceptional accuracy. This wave-based analysis enables scientists to distinguish between different cloud types and understand their microphysical properties better than traditional methods. The precise data on cloud formation and evolution improves climate models and weather predictions. These light-driven insights reveal how clouds interact with incoming solar radiation and influence Earth's energy balance, advancing our understanding of their critical role in climate regulation.