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**Imaging Gravity Waves and Sprites in the Earth's Upper Atmosphere** MICHAEL TAYLOR, Physics, Utah State University — Ground-based remote sensing studies of the Earth's upper atmospheric regions provide a low-cost and reliable method for long-term measurements. At mesospheric heights (∼60-100 km) the atmospheric pressure and density are lower than can be achieved in most vacuum systems yet this tenuous region is home to a wealth of dynamical phenomena. In particular atmospheric gravity waves, generated by thunderstorms, severe weather, and by strong winds blowing over large mountain ranges (such as the Rockies), can propagate upwards from their source regions into the mesosphere in only a few hours. At heights above about 80 km these waves start to break (like ocean waves as they reach the shore) and deposit their energy and momentum which has a dramatic influence on the upper atmospheric circulation and the temperature field. We use sensitive CCD imaging systems to characterize these gravity waves and much larger-scale tidal perturbations using the naturally occurring nightglow emissions. Currently we have cameras operating remotely in Utah, Hawaii, Antarctica (and soon in Norway), to help study their global variability and dominant source regions. This talk will introduce the topic of atmospheric imaging with examples of our current research. Novel applications of imaging techniques to other areas of our ongoing atmospheric research will also be presented.

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