A CATALOG OF WAVES. Lucas A. Tarr[1a], Tetsu Anan[1], Gianna Cauzzi[1], Valentin Pillet[1], Kevin Reardon[1], and Thomas Rimmele[1], [1]National Solar Observatory, Boulder, CO and Maui, HI ([a]ltarr@nso.edu).

Abstract: Atmospheric waves are a fundamental contributor to the dynamics of the solar atmosphere. For instance, they are believed to play an important role in the transmission of energy to and through the chromosphere and might be the physical mechanism that causes variations in the elemental abundance of the different varieties of solar wind with respect to the first ionization potential, the so-called FIP effect. Both roles are based on ion-neutral interactions so models of these processes inherently require a multi-fluid approach. Wave dynamics depend heavily on the local magnetic field and its more global topology. While a great deal of progress has been made studying certain wave modes in specific topologies, what we need to develop over the next decade is a systems-level understanding of how all these individual features work together to create the solar dynamics we know and love: which processes generate waves, where they do so, how much power goes into each wave mode, how much energy is exchanged or redistributed between the modes, and how and where all this mechanical energy is dissipated. We need to assemble a catalog of waves, a statistical description of their properties as predicted by theory and simulations and validated by high resolution multiplexed observations at multiple wavelengths from different ground based observatories. This will allow us to discern the presence and relative importance of the myriad wave types in different regions and structures of the solar atmosphere.