CAPRICIOUS CYTHEREAN CLOUDS: THE LONG AND THE SHORT OF IT. K. McGouldrick[1], J. Peralta[2], C. C. Tsang[3], J. Barstow[4], and T. Satoh[2,5], [1]University of Colorado Boulder, [2]Japan Aerospace Exploration Agency, [3]Southwest Research Institute, [4]University College London, [5]Sokendai University.

Introduction: Variations in the condensational clouds of Venus at altitudes between roughly 45 km and 60 km altitude were first revealed by Allen and Crawford [1]. Understanding these variations was a primary goal of the VIRTIS instrument on Venus Express [2]. And these variations are also being leveraged by Akatsuki in a continuing effort to understand the super-rotation of the Venus atmosphere [3].

Background: We previously characterized the evolution of individual features by using data from VIRTIS-M-IR on Venus Express to quantify the variability of those features [4]. That work found that individual features evolved on time scales typically of about one day (24 hours), though smaller features were seen to form and/or dissipate on much shorter time scales (as short as the 30 minute cadence of the analyzed data). That work also found that the mesoscale dynamics in the vicinity of the features was consistent with the circulation that would develop in response to convergence and divergence on an Earth-sized planet having a seven-Earth-day rotation period. More recent work found a roughly 150-Earth-day periodicity in the 1.74µm radiance, indicating long-term, periodic, variations in the cloud cover are also present [5]. These long-term variations were most pronounced at mid-latitudes (30°−60°), but could not be ruled out at equatorial latitudes (0°−30°), due to the observation geometry of VIRTIS. No long-term polar (60°−90°) trends were noted.

Present Work: In the present work, we build on those previous efforts in two ways. First, we demonstrate a baseline whereby results from VIRTIS (a medium-resolution imaging spectrometer) can be quantifiably compared with images through the several filters of the IR2 camera on Akatsuki. Next, we quantify the physical changes in the clouds that are observed at different times of high or low overall cloud opacity, and attempt to leverage this information to produce a reasonable picture of both long- and short-term cloud evolution in the constantly changing, capricious, clouds of Venus.

References: [1] Allen D. A. and Crawford J. W. (1984) *Nature, 307*, 222. [2] Drossart P. et al. (2007) *Planet. Space Sci.., 55*, 1653. [3] Nakamura M. et al. (2016) *Earth, Planets, Space, 68*, 75. [4] McGouldrick, K. et al. (2012) *Icarus 217*, 615. [5] McGouldrick, K. and Tsang C. C. (2017) *Icarus, 286*, 118.