Comparison of Vertical Distribution of Ozone Profiles between Ozonesondes and the GMI Merra II Model

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NOAA has recently completed a homogenization using consistent reprocessing of the long-term vertical ozonesonde profile record which now includes ozonesonde uncertainty (Sterling et al., 2018). In this work we will use an hourly Hindcast simulation of the NASA Global Modeling Initiative (GMI) chemistry transport model (CTM, PI S. Strahan) to show the relative bias with the vertical distribution of the homogenized ozonesonde profiles. The vertical resolution for ozonesondes and the GMI model are 0.1 and 0.75 km, respectively. In this study we will use pressure interpolation with roughly a 1.0-km vertical resolution for all comparisons. As an example, we summarized the bias of the ozone mixing ratio with the GMI model since 1985 over Boulder. The bias is approximately 30% around the tropopause (~100 hPa) where ozone values have quick transitions from low to high concentrations in a short vertical range. The model shows good agreement above and below the area surrounding the tropopause. Different models of ozonesondes have been used throughout the record and we will show these transitions along with the biases that still remain even after homogenization. Additionally, we will show differences between the sondes and model for temperature and altitude from the stations at Boulder, Colorado and Hilo, Hawaii.

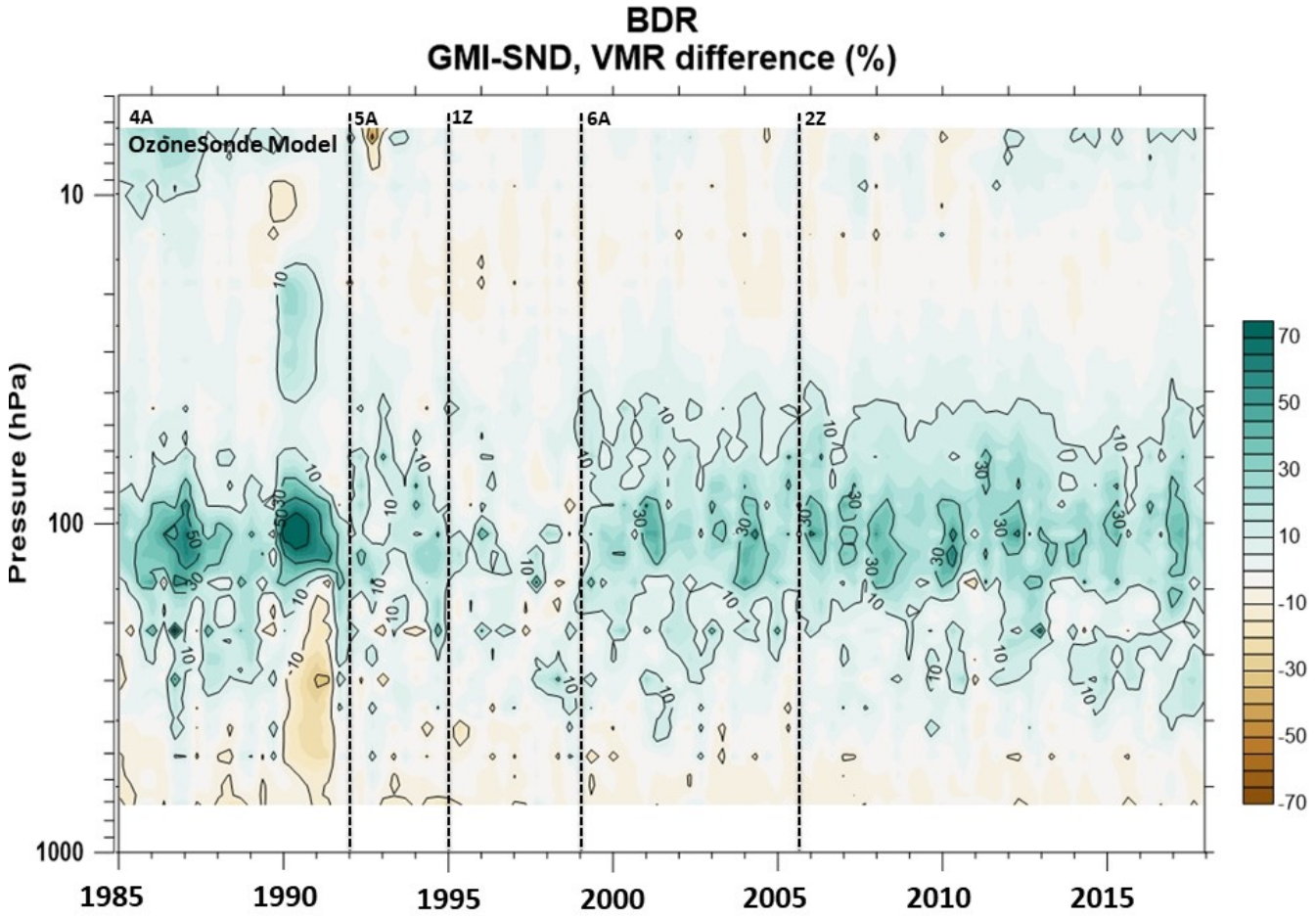

Figure 1. Shown above are the differences in the ozone monthly mean time series between the GMI model and ozonesonde observations. The vertical bars denote an ozonesonde model change.