Statistics on the size, strength and duration of Southern Hemisphere polar vortex and Antarctic Ozone Hole from September to December are examined to infer future scenarios of Ozone Hole recovery and surface UV radiation at southern mid- and high-latitudes. We examine monthly mean Total Ozone Column (TOC), temperature and wind fields produced for the second Chemistry-Climate Model Validation (CCMVal-2) activity of Stratospheric Processes and their Role in Climate (SPARC). CCMVal-2 involved contributions from 15 chemistry-climate models. These models simulate 3-dimensional atmospheric circulation with fully interactive stratospheric ozone chemistry: varying greenhouse gases (GHG) and ozone-depleting substances (ODS) are prescribed. We examine a subset of models focusing on both the ‘modern era’ and ‘prediction era’ (1960 -2100).

Time series plots of zonally averaged TOC poleward of 60 degrees for each model are analysed with respect to the Spring months and early Summer. Temperature and wind fields are also examined over the same period in order to ascertain the influence of GHG and ODS’s on prolonging the Ozone Hole and the Polar Vortex in the future. Ozone Hole metrics such as area and mass are calculated at 100 hPa and 50 hPa, to examine the vertical structure within the stratosphere. Multi-modal averages with a calculated baseline are obtained to show deviation of temperature, TOC and wind velocities from natural atmospheric conditions. Model results suggest that Antarctic ozone recovery will occur between 2055 and 2065 depending on the month. Later months show a progressively later recovery, which is also reflected in the temperature fields.