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Projections of springtime surface UV-B radiation over southern high latitudes using ozone and clouds derived from chemistry-climate models

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We present estimates of surface UV-B radiation over high and polar latitudes in the southern hemisphere for the period 1960 to 2100. The calculations were performed with the libRadtran radiative transfer model using as input projections of ozone and temperature profiles and surface shortwave radiation provided on daily basis by three chemistry-climate models (CCM). In particular we investigate the seasonal evolution of different weightings of UV radiation resulting from the severe ozone reductions during and inside the ozone hole in conjunction with the changing solar zenith angle during the transition from spring to early summer. With the projected ozone recovery in the second half of the 21st century, the timing of the vortex breakdown moves earlier in the spring, to dates with larger solar zenith angles, both resulting in decreases in UV-B radiation. Finally we estimate how projected changes in cloud cover, resulting from changes in climate, will modify the effects on spectral UV radiation induced by the projected ozone changes.