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The climate impact of very high stratospheric chlorine loading: a model sensitivity study

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Using a new chemistry-climate model, we study the impact of a sharp increase in stratospheric chlorine loading. Integrating a version of the UK Chemistry and Aerosol model (UKCA) with interactive stratospheric chemistry, with either 3.5 or 9 ppbv of total chlorine, we contrast the meteorology and ozone concentrations under present-day conditions with an 'avoided future' that would have seen 'free-market' growth of chlorine (e.g. Prather et al., 1996). We compare changes in vortex strength and ozone concentrations in mid- and late winter in both hemispheres, and assess issues of ozone loss saturation under extremely elevated chlorine levels.