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Can we use the ozone response in a CCM to say which solar spectral irradiance is most likely correct?

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Ozone plays a key role in the temperature structure of the Earth's atmosphere and absorbs damaging ultraviolet (UV) solar radiation. Evidence suggests that variations in stratospheric ozone resulting from changes in solar UV output may have an important role to play in weather over the North Atlantic and Europe on decadal timescales through a "top-down" coupling with the troposphere. However, the magnitude of the stratospheric response to the Sun over the 11-year solar cycle (SC) depends primarily on how much the UV changes. SC UV changes differ significantly between different observational instruments and the observations and models. The substantial disagreements between existing SSI datasets lead to different atmospheric responses when they are used in climate models and, therefore, we still cannot fully understand and simulate the ozone variability.

We use the SOCOL chemistry-climate model, in specified dynamics mode, to calculate the atmospheric response from using different spectral irradiance from the SATIRE-S and NRLSSI models and with SORCE observations and a constant Sun. We compare the ozone and hydroxl results from these runs with observations to try to determine which SSI dataset is most likely to be correct. This is important to get a better understanding of which SSI dataset should be used in climate modelling and what magnitude of UV variability the Sun has. This will lead to a better understanding of the Sun's influence upon our climate and weather.