

## **Amplifying the Pacific climate system response to a small 11 year solar cycle forcing**

One of the mysteries regarding the earth's climate system response to variations in solar output is how the relatively small fluctuations of the 11 year solar cycle can produce the magnitude of the observed climate signals in the tropical Pacific associated with such solar fluctuations. Two mechanisms, the top-down stratospheric response of ozone to fluctuations of shortwave solar forcing, and the bottom-up coupled ocean-atmosphere surface response, are included in versions of three global climate models with either mechanism acting alone or both together. We show that the two mechanisms act together to enhance the climatological off-equatorial tropical precipitation maxima in the Pacific, lower the eastern equatorial Pacific sea surface temperatures during peaks in the 11 year solar cycle, and reduce low latitude clouds to amplify the solar forcing at the surface.