

Stratospheric biases and their impact on tropospheric predictability

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Abstract:

Accurate representation of the stratospheric circulation in numerical weather prediction models is important for tropospheric predictability on medium-range and seasonal timescales. However, operational forecast systems at the European Centre for Medium Range Weather Forecasts suffer from a number of stratospheric biases, three of which are highlighted in this talk: i) The cold polar tropopause bias, which maximizes in the Northern Hemisphere summer and is common to most numerical weather and climate prediction models; ii) The cold tropical lower stratosphere bias, which amplifies with increase in the horizontal resolution without concomitant increase in the vertical resolution; and iii) The early bias in the stratospheric seasonal cycle during Southern Hemisphere spring. The reasons behind these biases are discussed. More importantly, it is illustrated that eradicating the biases results in improved forecast skill in the troposphere at extended and seasonal forecast ranges motivating the need for further work in reducing stratospheric biases in numerical weather prediction models.