



Possible climate response of the Equatorial Pacific to anthropogenic sulfur emission during boreal summer

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The relationship between the equatorial zonal circulation, summer monsoon and manmade/natural aerosols is a very hot topic in climate research. Simulations with Community Earth System Model (CESM) demonstrate that the boreal summer precipitation in tropical regions shows a more active feedback to the forcing of anthropogenic sulfur emission. During the second half of the 20th century, sulfur emission from Annex one group could arouse a wide-scale subsiding flow and make it drier over central and eastern tropical pacific during the boreal summer which may strengthen the climatological tropical zonal circulation. While the anomalous pattern of equatorial zonal circulation induced by non-Annex one group sulfur emission is more like the circulation pattern in the new El Nino (Modoki) event which presents an anomalous ascent over central tropical pacific and anomalous descent over both eastern and western tropical pacific. In other words, except for the local climate implications, manmade sulfur emissions may also have a not negligible influence on tropical zonal circulation during the boreal summer and emission sources should be taken into consider since different anomalous equatorial zonal circulations may be induced by manmade sulfate aerosol from different emission sources. Also it should be mentioned that there are still a lot of uncertainties in these results and more attentions should be paid on in the future researches.